

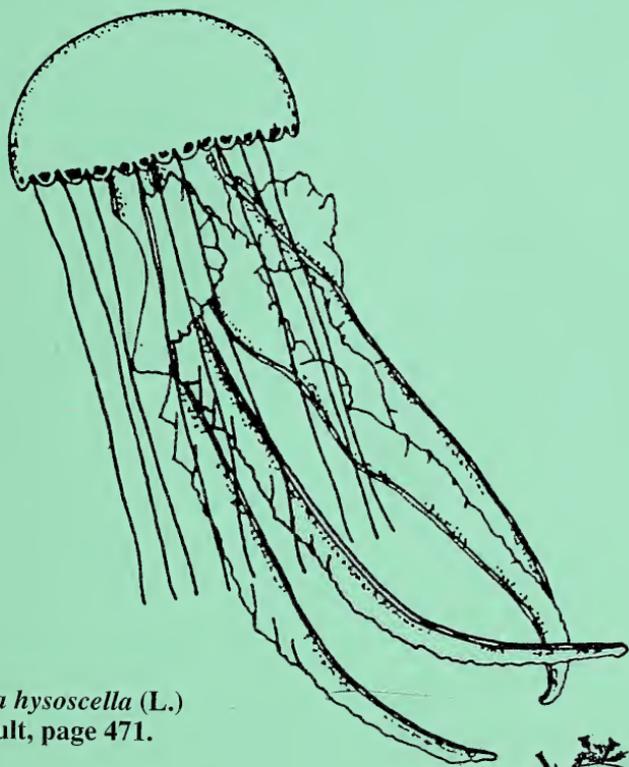








# *The Glasgow Naturalist*



*Chrysaora hysoscella* (L.)  
young adult, page 471.

**Volume 22**

**Part 5  
1995**



**The Glasgow Natural History Society**  
**(formerly The Andersonian Naturalists of Glasgow)**

The object of the Society is the encouragement of the study of natural history in all its branches, by meetings for reading and discussing papers and exhibiting specimens and by excursions for field work. The Glasgow Natural History Society meet at least once a month except during July and August, in the University of Glasgow or the Glasgow Art Gallery and Museum.

The present rates of subscription per annum are: for Ordinary Members, £11. (£10 if paid before the A.G.M.); Family Members, £2 extra; Junior Members (under 21), £5; School Members, £1. Payment by Direct Debit is encouraged. Further information regarding the Society's activities and membership application forms are obtainable from the *General Secretary*:

C/O NATURAL HISTORY DEPARTMENT,  
MUSEUM & ART GALLERY,  
KELVINGROVE,  
GLASGOW, G3 8AG.

**The Glasgow Naturalist**

Published by the Glasgow Natural History Society

February 1995

ISSN 0373-241X

Price £6.00

Edited by R.M.Dobson with the assistance of J. H. Dickson, R.H.Dobson, A.McG.Stirling, I.C.Wilkie and T.N.Tait.

Contributions are invited, especially when they bear on the natural history of Scotland. A note of information for contributors is printed on the inside back cover.

Smaller items are also welcome from members and others. These may cover, for example, new stations for a species, rediscoveries of old records, additions to records in the *Atlas of the British Flora*, unusual dates of flowering, unusual colour forms, ringed birds recovered, weather notes, occurrences known to be rare, interesting localities not usually visited by naturalists. The nomenclature of vascular plants should be as in Stace, C. A. 1991. *The New Flora of the British Isles*. Oxford University Press.

Advice to contributors is given on the inside back cover.

A limited number of advertisements can be accepted and enquiries should be sent to *The Editor*.

Back numbers available are listed on the inside back cover.

# A Survey of Farms and their Agrochemical Inputs in the Lower Clyde Valley

NOV 14 1995  
LIBRARIES

J. RICHARD M. THACKER and GILLIAN McKNIGHT<sup>1</sup>

Department of Biological Sciences, University of Paisley, High Street, Paisley PA1 2BE

<sup>1</sup> Strathclyde Greenbelt Farming and Wildlife Advisory Group, Abbey Mill Business Centre, Seedhill, Paisley PA1 1TJ

On the global scale of agricultural production systems the UK has been characterised as being dominated by high-input farming (Tivy, 1990). In such high-input systems the aim is to maximise productivity by adopting a highly technical approach that relies on large amounts of capital expenditure within which economics dictate bigger is better. Focus upon farming systems at a national level however, indicates that the UK is composed of a mosaic of farming systems, which as well as including the high-input variety also include less environmentally harmful options such as pastoral and organic farming systems (Curtis *et al.*, 1991). Nowhere is this mosaic more clearly seen than in Scotland where topography and climate have prolonged the conversion to intensive farming which has occurred so rapidly over much of England since the 1950's.

In Scotland, most of the finest land for intensive agricultural exploitation lies within the Clyde and Forth valleys. The aim of our questionnaire-based research therefore was to find out just how far towards intensive agriculture the farms in one of these regions (the Lower Clyde Valley) had gone. Our primary interest was on the level of agrochemical inputs, since this is often indicative of intensive farming practices, i.e. more intensively managed crops and land typically require more chemical inputs since problems with weeds, pathogens and pests are usually exacerbated. It also becomes more cost-effective to control these organisms in high-input systems. Our results are discussed in relation to high-input farming systems elsewhere in the UK and in rela-

tion to conservation and to the ecotoxicological effects of the agrochemicals that were being most extensively used.

## Methods

A detailed questionnaire was devised by the authors and sent to 250 farmers in the Lower Clyde Valley. To maintain confidentiality it was sent under the auspices of the Strathclyde Greenbelt Farming and Wildlife Advisory Group (FWAG). To maximise replies a FREEPOST return envelope was included with the questionnaire.

The questionnaire considered four domains of agricultural practices. These were:

(1) general farm characteristics i.e., the size of the farm, the primary crops grown, the number of fields on the farm, the size of the biggest and smallest fields and the extent to which crop rotations were used;

(2) agrochemical usage i.e., the products used, the method of application, the frequency of application, the use of spray additives, the costs of the products used and the sources of advice for the products used;

(3) pest types i.e., the most important weeds, pathogens and animal pests on the farm and whether the growers had perceived any changes in the pest status of these species since they had been farming;

(4) the farmland environment i.e., how important were beneficial insects on farmland perceived to be, how important were landscape features such as hedgerows, did the growers use economic thresholds for pesticide applications and would they be interested in receiving advice on conservation and farming.

In all, a total of 28 questions were asked, the majority of which required a yes/no response. Our aim with the questionnaire was to get as broad a picture as we could concerning farmland in the region.

## Results

The response rate to the questionnaire was 24%, 60 out of the 250 questionnaires sent were returned. The area covered by the survey totalled 14,865 acres and the mean farm size was 265 acres (+/- 58\*). The average number of fields per farm was 17 (+/- 2\*).

\*(95% Confidence Limits)

The distribution of farm types surveyed is shown in Fig. 1. Most farmers described themselves as cattle farmers (67%) and the remainder described themselves as either sheep (25%) or arable farmers (8%). In agreement with this result were the data which considered the farmer's most important crop (Fig. 2). Most farmers considered grass to be their primary crop (58%), while barley and oats received proportions of 37% and 5%, respectively.

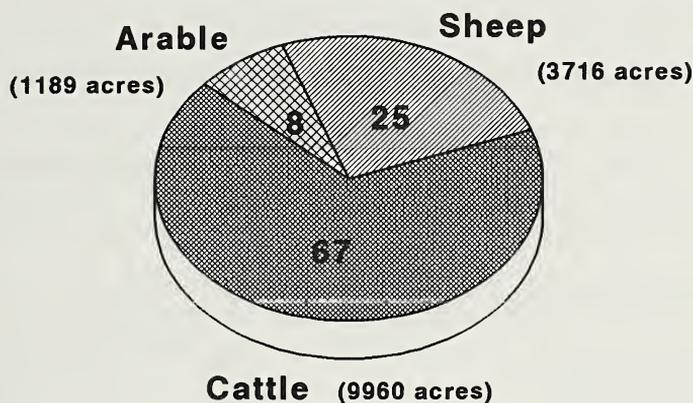


Figure 1: Distribution of farm types in the Lower Clyde Valley

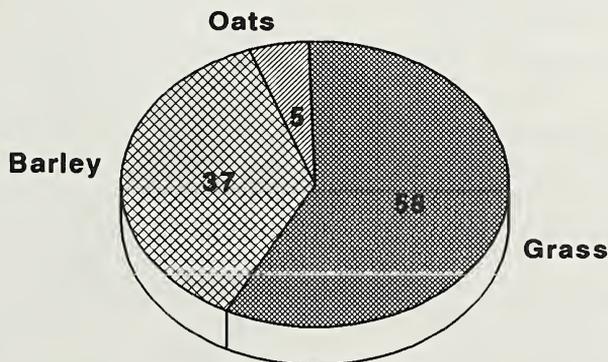


Figure 2: Distribution of crops by importance on farms in the Lower Clyde Valley

The responses (by percentage) to the survey questions that were associated with agrochemical usage and farm conservation are shown in Table 1. The majority (85%) were found to apply herbicides routinely, while insecticides (38%) and fungicides (25%) were used by a far smaller proportion. The response to our question concerning the brands of compounds that were used was very poor. However, it was clear from the few responses that were received (and from contact with regional agrochemical wholesalers) that the most frequently applied herbicides were *Docklene* (dicamba + mecoprop + MCPA) and *Banlene* (dicamba + dichlorprop + ioxynil), while the most frequently applied insecticide was *Dursban* (chlorpyrifos). Chemicals were

**Table 1: The proportion of farmers responding positively or negatively to survey questions.**

QUESTION CATEGORY	PROPORTION	
	YES	NO
A) Agrochemical Usage		
Applying Herbicides	85%	15%
Applying Fungicides	25%	75%
Applying Insecticides	38%	62%
Using Tank Mixtures	35%	65%
Using Adjuvants	8%	92%
Using Thresholds	11%	89%
Applying Prophylactically	36%	64%
B) Farmland Ecology		
Using Crop Rotations	24%	76%
Aware of Beneficial Species	98%	8%
Think Field Margin is Important	68%	32%
Spraying Field Margins	33%	67%
C) Questionnaire Utility		
Interested in Collaboration	20%	80%
Interested in Results	43%	57%

applied as tank mixtures in 35% of cases in which the most often cited mixture was of a herbicide and a fungicide. Adjuvants (wettters, spreaders, etc.) were not recorded as being used to any great extent (8%). Interestingly, 89% of farmers claimed that they did not use economic thresholds for pesticide applications although only 36% of farmers applied products for prophylactic (preventative) reasons. This latter result suggests that individual farmers apply pesticides based on their own (as opposed to published) economic thresholds, as conditions dictate, each year.

The proportion of farmers employing crop rotations was very low (24%) although the proportion that were aware of the importance of beneficial invertebrates on farmland was almost 100% (98%) and the proportion that considered the field margin to be an important landscape feature (for whatever reason) was also high (69%). However, despite the above, 33% of farmers were still routinely spraying their field margins in order to control noxious weed species.

Weed species that were perceived to be the greatest threat to productivity are shown in Fig. 3. Eighteen species were cited in all although Fig. 3 only lists those cited by more than one respondent.

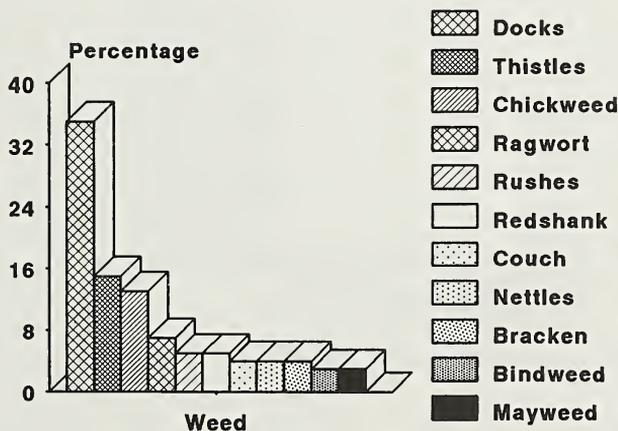


Figure 3: Weed species that are perceived to be the greatest threat to productivity.

Clearly, the most significant weed species were docks, thistles and chickweed. The most important pathogenic fungi are shown in Fig. 4. By far the most important was mildew (75%). Animal species perceived to be threats to productivity are shown in Fig. 5. As would be expected on farms where the primary income is derived from cattle, the most important pests were flies, nematodes and leatherjackets. The first two are pests of livestock while the latter is a pest of pasture.

In Fig. 6 the proportion of farmers perceiving a change in the status of pest species on their farms is given. Most farmers (92%) answered that they had detected no changes in the nature of any of their pest problems. A small proportion (4%) though felt that both docks and bracken had become more serious over the years. The respondents were not asked for how long they had been farming.

Finally, although 43% of those farmers who returned questionnaires were interested in a copy of the results of the survey only 20% expressed an interest in further collaboration with the authors.

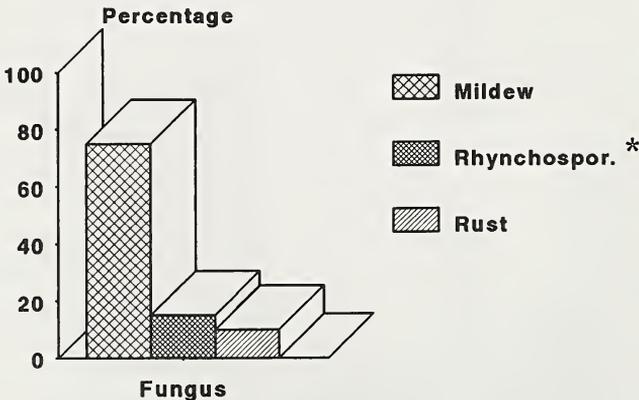


Figure 4: Pathogenic species that are perceived to be the greatest threat to productivity.

\* = *Rhynchosporium*

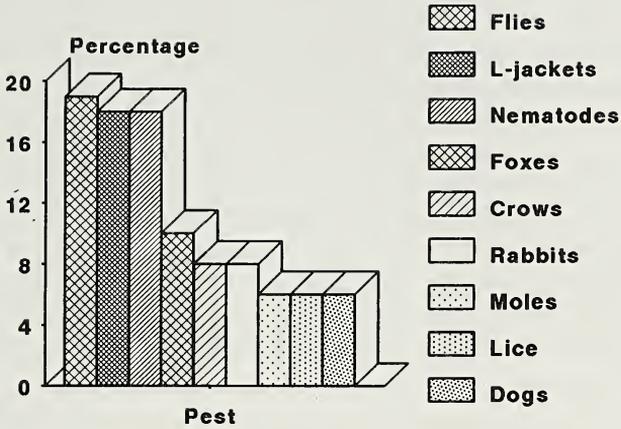


Figure 5: Animal species that are perceived to be the greatest threat to productivity.

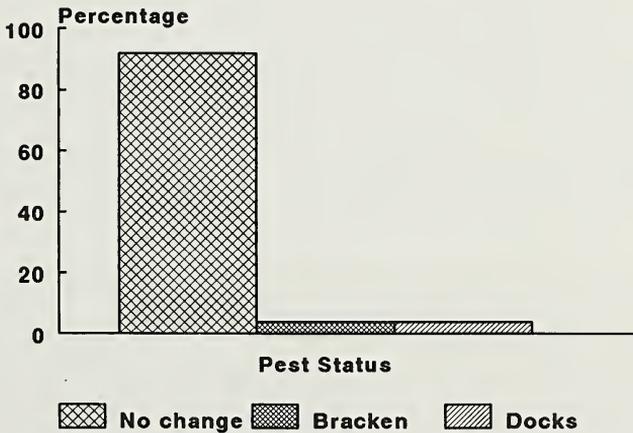


Figure 6: The change in pest status of problem species on farms in the Lower Clyde Valley.

## Discussion

The picture of land use within the Lower Clyde Valley that was built up by the results of this survey is consistent with the development of intensive farming systems. For the average farmer in the region the survey suggests that, (1) his main income is likely to be derived from cattle which will be fed on a mixture of grass and barley on a farm of about 270 acres, (2) he is unlikely to practice crop rotations, (3) he will probably apply herbicides at least once a year and has a 38% and 25% chance, respectively, of using insecticides and fungicides, (4) he is unlikely to use thresholds for his pesticide applications although he is aware that beneficial insects may make a contribution towards the control of pest species on farmland and (5) he is unlikely to want to be contacted by university researchers or by representative's of local wild-life advisory groups.

From an environmental point of view at least three trends cause concern. The lack of use of crop rotations, the relatively high proportion of farmers (33%) who apply pesticides (herbicides) to the field margin and the almost exclusive reliance on one insecticide (chlorpyrifos) for leatherjacket control. We shall deal with each of these points in turn.

The rationale for rotating crops on farmland is two-fold. Traditionally, crops are rotated to (1) maintain soil fertility and (2) to keep weeds, pathogens and animal pests under control. With the development of agrochemicals such as fertilisers and pesticides though there has been a general shift from crop rotations to continuous cultivation or the maintenance of 'permanent' pasture. These systems however, require skill to maintain successfully. The most frequent problems associated with intensive grassland use are sward deterioration and a build up of weed species and, a build up of parasite and worm populations because of intensive grazing by livestock (Haines, 1982). Weed species build up because ploughing is no longer used to control their populations and because high amounts of fertiliser can cause damage to hardy native grass swards which are generally adapted to survival under low nutrient conditions. Animal and fungal pest problems are exacerbated because of the absence of a break from their host. Both of these problems, of course, lead to more intensive agrochemical usage and so exacerbate the cycle. Wilson (1812) in his treatise on agriculture in Renfrewshire suggests that, at that time at least, most farmers would have practised some form of crop rotation.

Hedgerows have been described as impoverished woodland or woodland-edge habitat (Pollard *et al.*, 1974) in which a very high number of mammals, reptiles, birds and insects breed. They are also regarded by many farmers as a source of weeds and pests of agriculture and, as our survey has demonstrated, they are often routinely targeted by pesticide applications. For conservation however, the direct application of herbicides to hedgerows and indirect contamination of hedgerows by insecticides (e.g. by drift), are of great concern. In the south of England for example, Potts (1990) details clearly the effects that herbicides can have on game bird survival following loss of their preferred insect food types. The effects of herbicides are manifest in two ways. Firstly, as a result of the direct mortality of invertebrate species exposed to herbicide and secondly, as a result of the removal of weed-eating species following weed species' decline. That such effects may be responsible for the decline of other bird species that feed on agricultural land has yet to be established. However, the data indicate that in our region the potential for such adverse effects clearly exists.

In addition to putative effects on bird survival the direct targeting of hedgerows with herbicides may result in exacerbated weed control problems. For example, the application of herbicides to hedgerows can result in the mortality of many non-competitive wild flower species (in addition to the target weeds) whose removal then results in increased weed problems with more aggressive species such as docks, nettles and cleavers. Although not established, this is exactly the sort of pattern that our data display, i.e. docks are perceived as the most important weed species and they are also thought by many farmers to have increased as a problem over the years (despite widespread herbicide use).

Chlorpyrifos is an organophosphorus insecticide that farmers in Strathclyde use for leatherjacket control and is the only insecticide that is widely applied in the region. Although in many cases a need undoubtedly exists to control these pests the side-effects that are caused by this pesticide have been well recorded. For example, Luff & Rushton (1989) and Clements *et al.* (1988) both report small, transient, depressions in the number of beneficial invertebrates from the families Carabidae (Ground Beetles) and Linyphiidae (Money Spiders) as a result of chlorpyrifos applications to grassland. The significance of these side-effects is related to the mounting evidence that many species

from these families may be important as indigenous biological control agents on farmland (Wratten, 1987). However, both the authors (mentioned above) also suggest that the effects of chlorpyrifos are unlikely to be severe in the long-term because of the dispersive nature of these invertebrate families and hence their potential for recovery by re-invasion. However, while this may be true where a small proportion of the total area is treated, it becomes much less likely to be true as wider applications become the norm (Jepson & Thacker, 1990; Thacker & Jepson, 1993). This is because refuges, such as hedgerows, grassy strips, woodland edges, etc. from which species not exposed to pesticides can reinvade, suffer from an increased toxic loading of pesticides (and hence beneficial species depletion) as the scale of pesticide application is increased. The data in this paper indicate that a large proportion of farmers (38%) are now using this insecticide and further work will be needed to monitor this situation. In the long term, the two most widely cited causes of the breakdown of chemical control programmes are natural enemy mortality and the development of resistance. While neither of these events has been recorded in this region yet, at least one of the landowners believed that leatherjackets, as pests, had increased in importance over the years. If this is true, then it is likely that the area treated with chlorpyrifos will expand. It is our intention to monitor this situation in respect of any further detrimental environmental side-effects.

To summarise: the aim of this survey was two-fold. To make contact with landowners in the region and to survey the volume of agrochemical inputs in the area. To this end, the survey achieved what it set out to do. The results of the survey indicated that there were at least three areas of concern from an environmental point of view. It is difficult however, to draw any firm conclusions at this stage because, as far as we are aware, the survey data that were collected are unique. The data should therefore be regarded as a baseline against which data that are collected in future years will be compared.

### **Acknowledgments**

This work was made possible with funding from the Department of Biological Sciences, the University of Paisley. The authors would like to thank all of those farmers and landowners in the Lower Clyde Valley who took the time to reply to the survey.

## References

- CLEMENTS, R.O., ASTERAKI, E. and JACKSON, C.A. 1988. A method to study the effects of chlorpyrifos on predatory ground beetles in grassland. In *Field Methods for the Study of Environmental Effects of Pesticides*. (Eds.) M.P. Greaves, P.W. Greig-Smith and B.D. Smith. BCPC Publications. 167-174.
- CURTIS, D.J., BIGNAL, E.M., DREWITT, A., MOOS, C.J. and Wilson, M.J. 1991. Agricultural use, vegetation and bird assemblages in low intensity agricultural land in northern England. In *Birds and Pastoral Agriculture in Europe*. (Eds.) D.J. Curtis, E.M. Bignal and M.A. Curtis. JNCC. 80-91.
- HAINES, M. 1982. *An Introduction to Farming Systems*. Longman.
- JEPSON, P.C. and THACKER, J.R.M. 1990. Analysis of the spatial component of pesticide side-effects on non-target invertebrate populations and its relevance to hazard analysis. *Func. Ecol.* 4: 349-355.
- LUFF, M.L. and RUSHTON, S.P. 1989. The ground beetle fauna of managed and unimproved upland pasture. *Agric. Ecosys. Environ.* 25: 195-205.
- POLLARD, E., HOOPER, M.D. and MOORE, N.W. 1974. *Hedges*. Collins.
- POTTS, D. 1990. Pesticides. In *The Partridge*. Game Conservancy.
- THACKER, J.R.M. and JEPSON, P.C. 1993. Pesticide risk assessment and non-target invertebrates: Integrating population depletion, population recovery, and experimental design. *Bull. Environ. Contam. Toxicol.* 51: 523-531.
- TIVY, J. 1990. *Agricultural Ecology*. Longman Scientific and Technical.
- WILSON, J. 1812. *General View of the Agriculture of Renfrewshire*. G. & W. Nichol.
- WRATTEN, S.D. 1987. The effectiveness of native natural enemies. In *Integrated Pest Management*. (Eds.) A.J. Burn, T.H. Coaker & P.C. Jepson. Academic Press. 89-112.

## Book reviews

### **Collins Photoguide to Lakes, Rivers, Streams and Ponds of Britain and North-West Europe.**

R. FITTER & R. MANUEL.

Harper Collins, Hong Kong, 1994. 382 pp., 350 colour photographs, many line drawings. Hardback, ISBN 0 00 219999 8, £14.99.

This is a re-issue of the well-known *Field Guide to the Freshwater Life of Britain and North-West Europe* which was first issued by Collins in 1986 and can be regarded as one of the standard texts useful for the general study and preliminary sorting of freshwater organisms. A useful feature of a text such as this is its bibliography which provides access to the specialised literature usually needed for critical identification. It is regrettable, therefore, that the publishers, in re-issuing this book under a different title and ISBN number, did not update the references, many of which are hopelessly out of date. How much more useful the book could have been.

RONALD M. DOBSON

**Collins Field Guide: Land Snails of Britain and North-West Europe.**

M.P.KERNEY and R.A.D. CAMERON, illustrated by GORDON RILEY.

Harper Collins, Hong Kong, 1994, 288 pp., 400+ colour illustrations, 276 distribution maps, numerous line drawings. Hardback, ISBN 0 00 219676 X, £14.99.

This is a reprint of the well established and much-cherished *A Field Guide to the Land Snails of Britain and North-West Europe* which was first published by Collins in 1979 and was reprinted in 1987. Only the title has been changed from the original and it is regrettable that the contents have not been updated.

RONALD M. DOBSON

**Collins Field Guide: Caterpillars of Britain and Europe.**

D.J. CARTER and B.HARGREAVES

Harper Collins, Hong Kong, 1994, 296 pp., 35 + 3 colour plates. Hardback, ISBN 0 00 219080 X, £14.99.

This is a corrected reprint of *A Field Guide to Caterpillars of Butterflies and Moths in Britain and Europe* published by Collins in 1986 and fully reviewed by the present reviewer in 'Glasg. Nat.' 1986, vol.21, p.227.

Changes are few: some 16 species names have been updated and recent additions to the Harley Books Monographs (Heath, J. *et al.*, (1976-1991) are referred to. The name change is not wholly welcome: the original production indicated clearly that only caterpillars of Butterflies and Moths were dealt with whereas the present title does not and new readers might well expect to find some coverage of sawflies. The distinctions between sawfly and lepidopterous caterpillars are, however, indicated.

RONALD M. DOBSON.

**The Barn Owl.**

COLIN SHAWYER

Hamlyn, London, 1994, 128 pp., numerous colour plates, line drawings and diagrams. Softback, ISBN 0 600 57949 2, £9.99.

Britain is at the northern limit of the breeding range of the Barn Owl which is unfitted to survive prolonged cold, snow-cover or rainfall. Human activities, notably traditional farming practices, were helpful to these owls, but recent changes have reduced availability of nest sites and the availability of prey. Traffic casualties while hunting roadside verges add to mortality. The declining population is vulnerable to small changes in conditions, though its capacity for rapid breeding in favourable circumstances enables rapid recovery. The systematic description and discussion in this fifth monograph in the Hamlyn Species Guides maintain the high standards of the series.

NORMAN R. GRIST.

## Common Skate and Tope: First Results of Glasgow Museum's Tagging Study

W. LITTLE

39 Knockburnie Rd., Bothwell, G71 8LW

Tagging, followed by release and recapture, has long been used to investigate the longevity, growth-rates and migratory routes of fish and it also provides data on the number of days at liberty, on minimum distances travelled and on directions of movement. In 1974, D.L. Burkel began a tagging programme to investigate two elasmobranch species found off the west coast of Scotland: Common Skate, *Raja batis* (L.), the largest N. Atlantic ray, and Tope, *Galeorhinus galeus* (L.), a small shark. The biology of these species has been little studied although both are vulnerable to over-fishing (Brander, 1981; Earl, 1992).

Common Skate are large bottom-living fish which frequent the N.E. Atlantic from the Straits of Gibraltar and the W. Mediterranean in the south to Norway, Iceland and the Faroes in the north. Normally found in deep water, Skate are predatory, feeding mainly on bottom-living fish, crustaceans and molluscs. They are extremely effective hunters, despite their bulk and shape, and some very active prey species are taken. They can grow to huge sizes, with specimens over 3m long, 2m across the wings and 200kg in weight having been caught commercially.

Common Skate are oviparous, laying on average 40 eggs at a time (they do not breed every year) and these hatch in 2-5 months depending on temperature. Formerly it was believed that most, if not all, Skate move offshore in winter (Wheeler, 1969); however commercial boats still catch them, albeit in reduced quantities, in inshore waters during the winter. It has also been assumed that, because of their shape and bottom-living habits, they remain in the same area throughout their lives. Stephen (1929), however, suggested that some individuals may make long migrations.

Tope frequent the N.E. Atlantic from the Canary Isles and the Azores in the south, through all parts of the Mediterranean to Norway and (rarely) Iceland in the north. They are generally found in shallow water (up to 55m) and feed mainly on bottom-living fish. They can grow to a length of 2m and a maximum weight of 45kg. Viviparous, they give birth to 20-30 live young during the warmer months.

Most Tope remain within British and Irish waters throughout the year but some make long coastal migrations, with tagged fish turning up off the Azores, the Canary Isles, Algeria, Morocco and the Iberian Peninsula. The discovery that at least some make long migrations was not unexpected - their closest relatives, the School Shark, *G. australis* from Australian waters (Olsen, 1954) and the Soupfin Shark, *G. zyopterus*, from the W. coast of the U.S.A. (Ripley, 1946), show similar behaviour. However, commercial Tope catches show that they arrive in northern waters in September, not from the south, but from a westerly direction. This is deduced from the fact that the first catches are made off N.W. Scotland and are followed by a gradual increase in numbers in the east until they peak in October to November before withdrawing to deeper water in January (Rae & Wilson, 1956). If it was a straightforward north-south migration then the fish would surely come up the east coast as well, arriving at approximately the same time as the west coast fish.

### Materials and methods

Fish were tagged by anglers at 3 locations: the Isle of Mull, the Mull of Galloway and the Isle of Lewis (Stornoway). On capture they were weighed, measured, sexed, tagged and released and the location, depth and date was recorded against each tag number. Initially, JUMBO ROTOTAGS (normally used for ear-tagging livestock) were used, but their large size resulted in barnacle encrustation which caused abrasion of the fishes' skin. This problem was more important on Tope than on Skate (apparently because the latter tend to rub off the barnacles during bottom feeding) so it was decided to suspend Tope tagging during 1980. In the late 1980s it was realised that these tags damaged the wings of Skate during growth, so in 1988 they were replaced by the FLOY FT-1 DART TAG which, being a flexible plastic tube anchored in the fin musculature at one end only, allowed unrestricted growth. Also the small size and lack of flat surfaces of these tags minimised barnacle encrustation so that Tope tagging could be resumed.

## Results and discussion

### Common Skate

Between 1975 and 1988, 219 Skate were tagged using JUMBO ROTOTAGS. Seven were tagged by Stornoway Sea Angling Club at the Shiant Bank between March 1975 and February 1976 and the remaining 212 were tagged between August 1975 and December 1988 by Brian Swinbanks out of Tobermory.

Relatively few small fish (of either sex) were taken and this was a result of the angling technique. To ensure that the anglers had a good chance of catching large specimens, most angling was done offshore, well away from any breeding/ nursery areas. Also, very large baits were used to attract the bigger Skate and to deter smaller fish such as dogfish.

Recapture sites are shown in Fig. 1. Of the 219 fish tagged and released, 61 were recaptured by 31 December 1992, a recapture rate of 27.9%. One fish was recaptured 3 times and 9 were recaptured twice, making a total of 72 recaptures. Of the 61 fish recaptured, 16 were caught by commercial boats with 14 of them being killed and 2 being re-released. All other recaptures were made by Brian Swinbanks with the fish being re-released. None of the Stornoway fish reappeared.

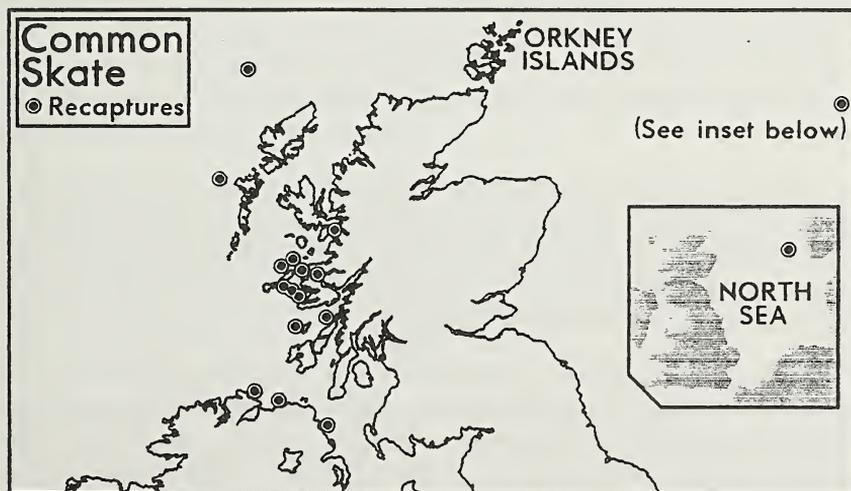


Figure 1: Recapture sites for tagged Common Skate in British and Irish coastal waters.

Of the 72 recaptures, 54 (75%) fish were caught at or near the release site and 89% of these were taken by Brian Swinbanks' boat from which they had been originally tagged. The periods of liberty of these ranged from 1 hour 20 minutes at one extreme to 4486 days at the other. A further 10 (14%) were taken within 70km of the release site, having been at liberty for between 205 and 1736 days. Five fish (7%) were taken between 70 and 200km from the tagging site: No. 263 was recaptured almost 10km south of Haskier Is., N. Uist, after 988 days; No. 643 was found in a consignment of fish in N. Ireland after 898 days; No.566 was taken off N. Ireland, near Greencastle, County Donegal, in June 1983, having been tagged off Mull in 1979; No. 728 was recovered in the N. Channel after approximately 2172 days and No. 537 reappeared in the Firth of Lorne after 1190 days.

Two fish made very long northerly journeys. No. 697 turned up 240km away, N.W. of Lewis after 581 days and of particular interest, the other, No. 729 tagged in July 1985, reappeared in November 1990, 900km away from its release point and 130km off S.W. Norway.

Of the Skate which travelled north, the month of recapture is known for 5. These were mature fish, of both sexes and all were commercially caught. Four were recaptured between January and April and one was caught in November. Much more intensive tagging would be required to explain these extended northerly migrations - possibly after moving offshore during winter some fail to return to the original location ("accidental displacement") or possibly some follow the edges of the continental shelf. They may also intercept and follow the spawning migrations of Hake from the N. Atlantic to the N. Sea as suggested by Ritchie (1923).

Recapture dates are known for each of the 3 skate which travelled south. All were recovered off the north and east coasts of Northern Ireland between March and June and, like those which headed north, were a mixture of mature males and females. Again this may have simply been caused by "accidental displacement".

These results support a hypothesis that individual Skate may be associated either permanently or seasonally with specific sites for long periods, but give no information on possible seasonal migrations. The angling effort is from May to October and all the commercial recaptures in the Mull area occurred in the second half of the year. The data

therefore probably reflect the intensity of fishing at different times of the year rather than the availability of fish. It may be noted, however, that 3 Skate were captured off Stornoway in February and March at depths of between 42 and 64m. This does not support the theory that Skate migrate "en masse" to deep water in winter.

The suggestion of Stephen (1929) that some Skate make long migrations seems amply supported.

The sex-ratio of catches off Mull was roughly 1:1 (97 males/ 104 females) and, as most recaptures were made over the same grounds, the recapture rate was very similar (25/ 31). The data, therefore, provide no definite evidence that Skate gather in single sex shoals although there is some circumstantial evidence for this. For example, 5 Skate were tagged on 13 June 1977. The first was an immature female; an hour and a quarter later what appeared to be a different group of immature males passed through, with two being captured within 15 minutes; just under two hours later, another group of mature females arrived with two being taken within 20 minutes.

In common with most elasmobranchs, Common Skate are long-lived but slow-growing. According to Du Buit (1977), it takes them approximately 11 years to reach sexual maturity. Fig. 2 shows the annual weight increases for specimens tagged between 1977 and 1988 along with their subsequent recaptures up to 31 December 1992, and Fig. 3 shows the weight distribution for all male and female Skate tagged plus their recapture weights.

Clearly, males grow more slowly than females, increasing by from 2.7 to 9.1kg per year with an average of from 3.2 to 4.5kg. and, with most, growth slows down or stops when they reach around 50 to 54kg. Their normal maximum weight appears to be from 52 to 54kg with only an occasional specimen reaching 61kg.

Females, however, grow much more rapidly, adding from 4.1 to 14.1kg per year (average from 5.4 to 8.2kg.) and only two of those tagged and recaptured showed any signs of decelerated growth. The heaviest specimen taken in the present work weighed 103kg.

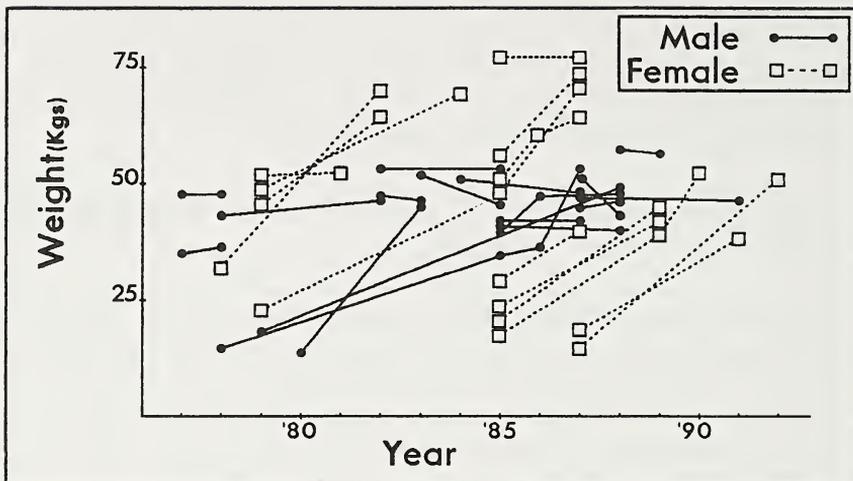


Figure 2: Growth rates for tagged and recaptured Common Skate.

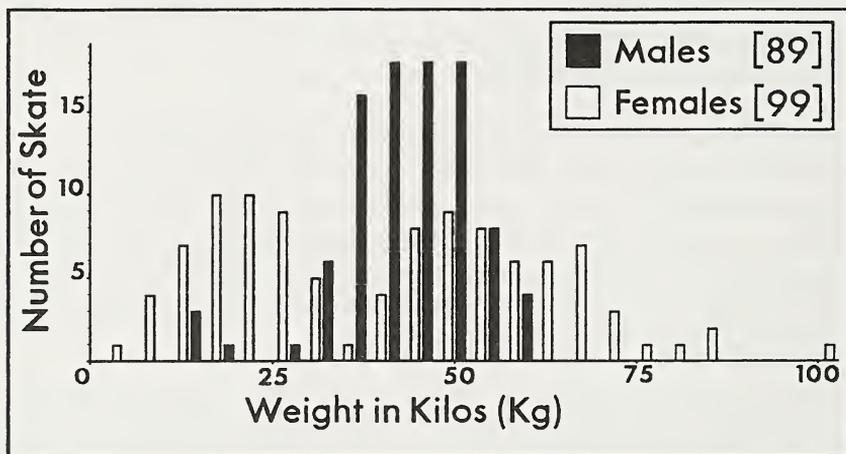


Figure 3: Weight frequencies of individual Common Skate, by sex.

An estimate of longevity can be made from the longest period of freedom observed. No. 659, a female, was tagged in August 1980 and was recaptured in November 1992 after approximately 4486 days (12.3 years). This fish originally weighed 17.3kg and at that time would have been at least 5 years old, giving an age at the time of its demise of 17+ years. A life span in excess of 20 years therefore seems reasonable.

One Skate, No.764, released off Mull, was subsequently recaptured in a trawl and re-released only to be recaptured again by Brian Swinbanks at the original release site. This is of interest, because it shows that "commercially unwanted" Skate returned to the sea can survive, even after the trauma of being caught in a trawl.

### Tope

Between mid-1974 and September 1980, 64 Tope were tagged using JUMBO ROTOTAGS. Twenty-two were tagged by Dr. Burkel and associates in the Mull of Galloway area between 1974 and 1977 and the remaining 42 were tagged between 1975 and 1980 by Brian Swinbanks at Tobermory. The results obtained provided the only currently available data for Scottish waters.

Of the 64 fish tagged and released, 12 were subsequently recaptured by 31 December 1992. This represents a recapture rate of 18.7% which is comparable with the results of Stevens (1990) which had a 15% return rate. Such high recapture rates can be expected in tagging studies of localised shark populations according to Davis & Joubert (1967) and Kato & Carvalho (1967). Of the recaptures, 7 were originally released off the Mull of Galloway and the remaining 5 off Mull.

Only one fish, No.201, turned up in the area of its original release, west of Mull, after being at liberty for 765 days. Of the remainder, 4 (Nos. 182, 555, 581 & 582) were recaptured off the north and west coasts of Ireland between April and October, between 220 and 500km from the release sites after periods of from 79 to 926 days. A further 2 were taken off west Wales (No.620) and north Cornwall (No.186), in January and November - an average movement of 420km. Two more (Nos. 143 & 281) were recaptured in the English Channel, in January and October, a movement of approximately 800km. One of these was tagged around 1977 in Luce Bay and it reappeared off Hastings in January 1990, having been at liberty for about 12 years.

Three fish, originally released near the Mull of Galloway, made long southerly migrations: No.189 to Lisbon (1800km) in approximately 62 days; No.192 to Feurteventura, Canary Isles (3000km) after 268 days and No.171 to West Tipasa, Algeria (3200km) after approximately 9 years (Fig.4).

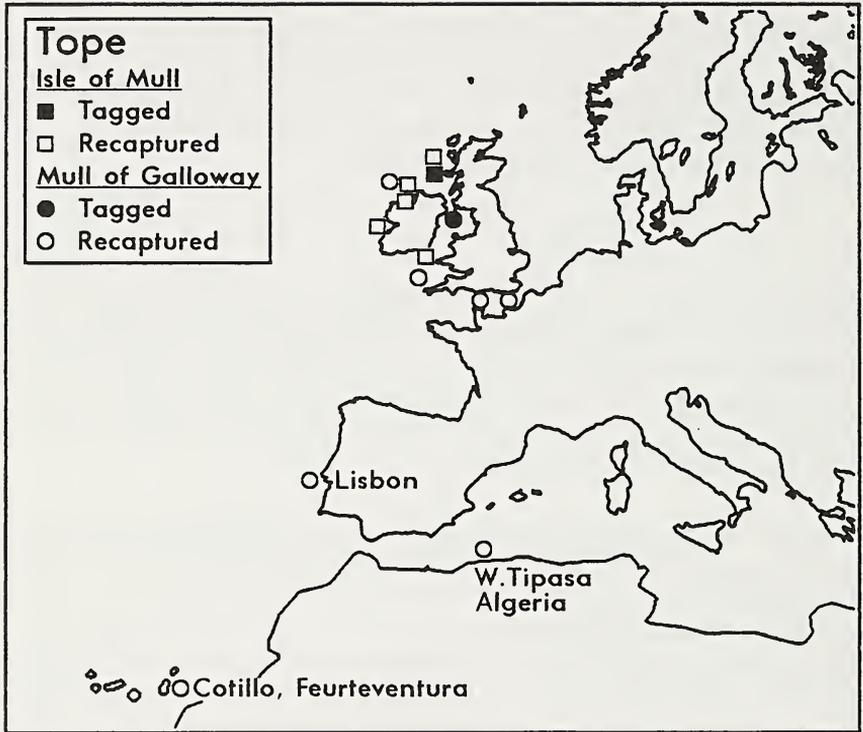


Figure 4: Recapture sites for tagged Tope in the North-East Atlantic.

In common with the findings of Holden & Horrod (1979) and of Stevens (1990) the results do not show any evidence of a mass migration of Tope to the south in winter. If that were the case then Fig. 5(B) would show that the majority of fish recaptured north of latitude  $45^{\circ}\text{N}$  (i.e. about the middle of the Bay of Biscay) were made between May and September and south between October and April. However, this was not so.

The greatest numbers of recaptures south of  $45^{\circ}\text{N}$  were made in April and May and are possibly part of a migration of pregnant females heading for the pupping areas. There is no evidence supporting the assertion that Tope regularly breed in British inshore waters. Newly born "pups" measure approximately 35cm long and, although they are recorded in British waters, their occurrence is extremely rare. While working long lines off Galloway, the author never saw a Tope smaller than about 90cm.

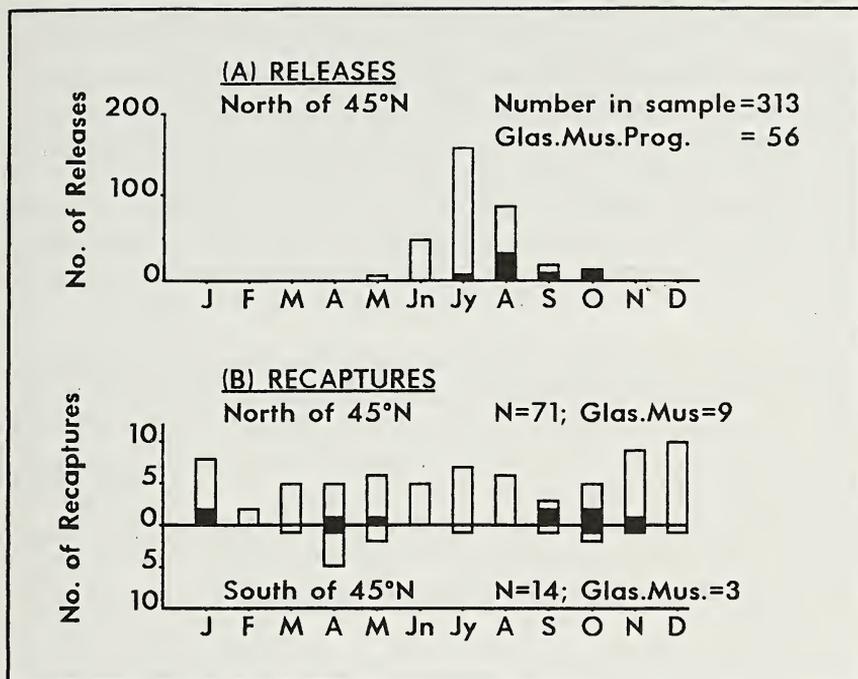


Figure 5: Month of release and recaptures of tagged Tope, by latitude. (A) Releases north of 45 degrees N. (B) Recaptures north and south of 45 degrees N. Black shaded areas represent Glasgow Museums' tagging programme. Unshaded areas represent data from Holden & Horrod (1979) and Stevens (1990).

Out of the 12 recaptures, 3 made long distance journeys south of 45°N. All of these were tagged off Galloway and at least one was female. None of the many males tagged off Mull moved very far south, the furthest travelled being recaptured off the Pembroke coast. Possibly long migrations are made only by females which leave the cooler northern waters in autumn of one year in preparation for "pupping" in warmer waters during the following spring/ summer. Such migrations can be rapid: one fish tagged off Galloway in August 1974 was found at Lisbon 62 days later, having travelled 1800km at an average speed of about 29km/day. This pattern of behaviour seems similar to that of the closely related *G. zyopterus*, of N. American waters, in which, during the breeding period, May to July, large numbers of females congregate in southern Californian waters where the pupping areas occur (Ripley, 1946).

Fitzmaurice (1979) suggested that Tope produce young every other year after a gestation period of approximately one year. This could explain the presence of a mature female, No.182, west of Donegal in April, since she could have been in a non-breeding year. Fitzmaurice also suggested that, on reaching a certain stage in their life history, Tope could migrate southwards and not return. However if this were true, then they would be caught only up to a certain size in British waters. On the contrary, fish weighing up to 45kg have been taken commercially here, this weight being close to the maximum for the species.

There were interesting differences in the sex ratios amongst the Tope catches at the two tagging sites. Off Galloway, males made up 29% of the catch (where sex was recorded) whereas to the West of Mull, males made up 90% of those tagged. This difference was probably exaggerated because of the style of angling off Mull. Here most Tope were captured whilst anglers were pursuing Skate in deep water offshore. The author's experience off Galloway showed that females prefer shallower water inshore, whereas males occur in greater numbers offshore.

Studies on the related *G. zyopterus* (Ripley, 1946) and *G. australis* (Olsen, 1954) suggest that Tope may be long-lived and slow-growing. The limited data from the present programme support this hypothesis. Two fish, Nos.143 and 171 were at liberty for over 10 years but on recapture weighed only 11 and 18 kg respectively. The first of these figures may, however, be low, as this fish was caught commercially and this could be the "gutted" weight.

If it be assumed that when released, these fish weighed over 4.5kg (lighter fish are very rare in Galloway) then average growth rates would be 0.7 - 1.4kg/ year. Thus a female would take over 20 years to attain a weight of 27kg.

Amongst fish at liberty for shorter periods No.192, a female, increased in weight by 1.6kg (15.4 to 17.0) in 9 months and No.281, a sexually immature female, increased by 4.3kg (7.7 to 12.0) in 13 months. Possibly, like sexless "Triploid" rainbow trout used in fish farming, immature female Tope grow more quickly than mature ones because all the food intake goes towards growth rather than to reproduction.

One male, No.201, increased by 1.4kg in just over 2 years.

Since 1989 tagging has continued with Floy Tags allowing a further 230 Common Skate and 44 Tope to be tagged. Sponsorship from the Angling Foundation, Deep Sea World, and Knotless Fishing Tackle (Tobermory) has allowed more tagging agents to be involved at more locations, enabling a more complete picture of fish movements to be constructed. It is hoped that the imbalance between the numbers of Skate and Tope tagged will be redressed in 1994 utilising the services of a professional "Tope" skipper in S.W. Scotland.

Anyone interested in helping with the tagging programme should contact Mr Richard Sutcliffe at the Art Gallery and Museum, Kelvin-grove, Glasgow G3 8AG.

## References

- ANON., 1972-76. Tagging Cartilaginous Fishes. *Ann. Repts., Irish Inland Fisheries Trust*.
- BRANDER, K., 1981. Disappearance of Common Skate *Raja batis* from the Irish Sea. *Nature, Lond.* 290: 48-49.
- DAVIES, D.H. & JOUBERT, L.S., 1967. Tag evaluation and shark tagging in South African waters, 1964-65. In *Sharks, Skates & Rays*, chapter 7: 111-140. Maryland: John Hopkins Press.
- DU BUIT, M.H., 1977. Age et croissance de *Raja batis* & de *Raja naevus* en Mer Celtique. *Journal Cons. int. Explor., Mer.* 37: 261-265.
- EARLL, R., 1992. The need for conservation of sharks and rays in British waters. *British Wildlife*, 1992: 15-25.
- FITZMAURICE, P., 1979. Tope migrations from Irish coastal waters. *Ann. Rep., Irish Specimen Fish Committee*, 1979: 26-33.
- HOLDEN, M.J. & HORROD, R.G., 1979. The migrations of Tope (*Galeorhinus galeus*) in the eastern North Atlantic as determined by tagging. *J. Cons. int. Explor., Mer.* 38: 314-317.
- KATO, S. & CARVALLO, A.H., 1967. Shark tagging in the eastern Pacific Ocean, 1962-65. In *Sharks, Skates & Rays*, chapter 6: 93-109. Maryland: John Hopkins Press.
- OLSEN, A.M., 1954. The biology, migration and growth rate of the school shark *Galeorhinus australis* (Macleay) (Carcharhinidae) in South-eastern Australian waters. *Aust. J. mar. Freshwat. Res.*, 5: 353-410.
- RIPLEY, W.E., 1946. The Soupfin Shark and the fishery. *Fish Bull. Calif.*, 64: 7-37.
- RAE, B.B. & WILSON, E., 1956. Rare and exotic fishes recorded in Scotland during 1955 (including analysis of tope landings at Aberdeen). *Scott. Nat.*, 68: 106-108.
- RITCHIE, J., 1923. Migrations in the sea - hake. *Scott. Nat.* Combined edition 133-134: 15-17.
- ROBINSON, L., 1970. *Sea Angling in Scotland*. Ernest Benn.

- STEPHEN, A.C., 1929. Large skate from the Firth of Clyde. *Scott. Nat.*, 175: 94.
- STEVENS, J.D., 1990. Further results from a tagging study of pelagic sharks in the north-east Atlantic. *J. mar. biol. Ass. U.K.*, 70: 707-720.
- WHEELER, A., 1969. *The Fishes of the British Isles and North West Europe*. Macmillan.

## Book Reviews

### **The Complete Guide to Ireland's Birds.**

ERIC DEMPSEY, art work by MICHAEL O'CLERY.  
Gill & Macmillan, Dublin, 1993, 254pp., many colour drawings and photographs, maps. Hardback, ISBN 07171 1973 4, £14.99.

Listing in detail 310 common and 100 less common species of birds of Ireland, this book is informative. It highlights factors, such as Ireland's mild winters, which affect the success or otherwise of Irish bird life and it explores and maps habitats. Illustrations provide standard identification charts and there are useful field portraits of birds in their likely habitats.

This is a good, readily accessible, book and is a significant contribution to the history of Irish bird watching. A high level of research is very evident from its content and it is suitable for anyone interested in birds. The quick reference layout for each bird might usefully be copied by other authors.

BRIAN S. SKILLEN.

### **Seashores and Shallow Seas of Britain and Europe**

ANDREW CAMPBELL, illustrated by JAMES NICHOLLS  
Hamlyn, London, 1994, 320pp., many colour illustrations and line drawings, 1 map. Softback, ISBN 0 600 58376 7, £9.99.

This is an updated edition of the well-known and popular *Hamlyn Guide to Seashore Plants and Animals* first published in 1976. The new version closely resembles the earlier one but has undergone a slight change of title, has a newly designed cover and a revised ISBN number.

Names and references have been updated and the colour printing has been improved. The use of a better quality of paper and the provision of a plastic loose jacket gives the book a more attractive appearance and will make it more durable than its forerunner. At the bargain price of £9.99 it is still the best available production in its class.

RONALD M. DOBSON.

## Erigeron acer L. (Blue Fleabane) and Rabbits in Central Glasgow

J.H. DICKSON

Botany Building, University of Glasgow,  
Glasgow G12 8QQ

The botanical interest of areas of rubble waste ground in Glasgow has been discussed by Dickson (1992). Such habitats can quickly accumulate rich floras with high proportions of alien species (Crawley, 1987; Gilbert, 1989). Some of these aliens can be little known or even unknown in the region in question. Such a species is Blue Fleabane, found in Glasgow in early July 1993.

The locality is in the heart of the built up city between Renfield, West Nile and Renfrew Streets and Renfrew Lane (NGR NS 589 658). The habitat is the debris- and rubbish- strewn basement of the former Apollo building demolished in 1988 and left undeveloped. The approximately 0.24ha have been colonised by about 50 species of vascular plants as well as rabbits, the presence of the latter made obvious by droppings and nibbled plants. The 50 species include many of the commonest plants of the Glasgow area and for the most part are familiar as colonists of waste ground.

There was only one small plant of Blue Fleabane; the top part of the inflorescence had been removed probably by a rabbit. A 2x2m quadrat placed over the plant had Domin cover-abundance values as follows.

Bare ground	6
<i>Chamerion angustifolium</i> (L.) Holub	6
<i>Cerastium fontanum</i> Baumg.	4
<i>Ceratodon purpureus</i> (Hedw.) Brid.	4
<i>Epilobium ciliatum</i> Raf.	4
<i>Hypochaeris radicata</i> L.	4
<i>Sagina procumbens</i> L.	4
<i>Agrostis capillaris</i> L.	3
<i>Holcus lanatus</i> L.	3
<i>Taraxacum</i> sect. <i>Ruderatia</i>	3
Rabbit droppings	2
<i>Erigeron acer</i>	1
<i>Poa annua</i> L.	1
<i>Senecio squalidus</i> L.	1
<i>Sonchus asper</i> (L.) Hill	1
<i>Tussilago farfara</i> L.	1

There are few records of Blue Fleabane now and have been few in the past in Scotland. Last seen in Angus last century, it is considered extinct there by Ingram and Noltie (1981). At the well-botanised Yellowcraig, East Lothian, it was first recorded in 1960 (Silverside and Jackson, 1988) and in 1991 was still present and "plentiful on dune banks" (Silverside, pers.comm.). At New Stevenson, Lanarkshire it grows with other calcicoles on alkaline (sodium silicate) waste from an iron foundry (Macpherson, 1994).

In Britain Blue Fleabane is a southern calcicole considered native in England where it is commonest in the southeast but only casual in Scotland (Stace 1991) where it may be alien; casual is hardly a description that fits the Yellowcraig plants persistent for more than 30 years.

In those areas where it is native its growth in waste places and railways is often mentioned in local Floras such as those by Kent (1975), Philp (1982), Crackles (1990), Wynne (1993) and Swan (1993). In urban Sheffield (Clarkson and Garland, 1988), it was recorded with 50% frequency on industrial tips with strongly alkaline, freely draining substrata. In central Stockholm it is strongly connected with railways (Lindberg, 1983) and in Berlin it has a variety of habitats including those strongly influenced by man (Bocker *et al.*, 1991).

For the Glasgow rectangle (Dickson *et al.*, forthcoming) there have been almost no records of the genus *Erigeron* and the closely related *Conyza*, both very familiar in more southerly parts of Britain. This is the first record of *E. acer* in the Glasgow rectangle.

Designating Blue Fleabane as "An effective colonist" that is "narrowly restricted to dry, unproductive, usually calcareous habitats", Grime *et al.* (1988 p.262) discuss the highly mobile fruits and cite individual plants 15km from the nearest known populations. The Glasgow plant is some 20km northeast of New Stevenson. The very scattered Scottish localities are or were separated from each other by many tens of km or more and separated by even greater distances from the nearest more or less continuous occupancy of 10km squares in north-eastern England (Perring and Walters, 1990, Swan, 1993).

Grime *et al.* (1988) also mention susceptibility to grazing. Though the species can be polycarpic, the Glasgow individual is unlikely to have acted as a source of spread within the city; on my second visit it could not be seen, perhaps having been totally destroyed by the resi-

dent rabbits and thus having had no chance to shed ripe achenes, which can be produced by the thousand, even as many as 5,000 or more in the case of a large plant (Grime *et al.*, 1988); Salisbury (1942) gave about 2,000 as an average.

## References

- BOCKER, R. *et al.*, 1991. Liste der wildwachsenden Farn- und Blütenpflanzen von Berlin (West). Pages 57-88 in Auhagen, A. *et al.* *Rote Listen der gefährdeten Pflanzen und Tiere in Berlin Schwerpunkt Berlin (West)*. Landschaftentwicklung und Umweltforschung. Sonderheft S 6.
- CLARKSON, K. and GARLAND, S., 1988. Colonisation of Sheffield's wastelands - Vascular Plants. *Sorby Record* 25, 5-21.
- CRACKLES, E., 1990. *Flora of the East Riding of Yorkshire*. Hull University Press.
- CRAWLEY, M.J., 1987. What makes a community invisible? Pages 429-453 in GRAY, A.J., CRAWLEY, M.J. and EDWARDS, P.J. *Colonisation, Succession and Stability*. Blackwell Scientific publications, Oxford.
- DICKSON, J. H., 1992. *Wild Plants of Glasgow*. Mercat Press, Edinburgh.
- DICKSON, J.H., MACPHERSON, P. and WATSON, K. in preparation. *The Changing Flora of Glasgow*.
- GILBERT, O., 1989. *The Ecology of Urban Habitats*. Chapman and Hall.
- GRIME, J.P., HODGSON, J.G. and HUNT, R. 1988. *Comparative Plant Ecology; a functional approach to common British species*. Unwin Hyam, London.
- KENT, D.H., 1975. *The Historical Flora of Middlesex*. London, The Ray Society.
- INGRAM, R. and NOLTIE, H., 1981. *The Flora of Angus. (Forfar, V.C.90)*. Dundee Museums and Art Galleries.
- LINDBERG, P.S., 1983. *Stockholms floran*. P.A. Norstedt & Soners forlag.
- MACPHERSON, P., 1994. Baserich grassland in Lanarkshire. *Glasg. Nat.* 22, 425-427.
- PERRING, F. and WALTERS, S.M., 1990. *Atlas of the British Flora*.
- PHILP, E.G., (1982). *Atlas of the Kent Flora*. The Kent Field Club.
- SALISBURY, E. J., 1942. *The Reproductive Capacity of Plants*. London G. Bell & Sons Ltd.
- SILVERSIDE, A.J. and JACKSON, E.H., 1988. *A Check-list of the Flowering Plants and Ferns of East Lothian*. Botanical Society of Edinburgh.
- STACE, C., 1991. *New Flora of the British Isles*. Cambridge University Press.
- SWAN, G.A., 1993. *Flora of Northumberland*. The Natural History Society of Northumbria, Newcastle upon Tyne.
- WYNN, G. (1993). *Flora of Flintshire*. Gee & Son, Denbigh.

## Book Reviews

### **Mediterranean Wild Flowers**

MARJORIE BLANEY and CHRISTOPHER GREY-WILSON  
Harper Collins, 1993, 560 pp., numerous colour plates and line drawings. Hardback, ISBN, 0 00 219901 7, £25.00.

This beautifully illustrated field guide to the wild flowers of the Mediterranean is a book worth having. As one who has travelled with Marjorie on some of her excursions I cannot but admire the botanical knowledge her drawings illustrate. It is possible to identify many of the plants from these, many of which show the diagnostic features, together with the accompanying text.

There are no keys, which is unfortunate, and it is a pity that the main illustrations are separate from the text. However the diagnostic line drawings with the text are useful.

I had hoped that with the coming out of this book I would have only had to take one book on my next holiday to the Mediterranean. However I think I am still going to have to take a local guide, if one is available, along with this book.

AGNES WALKER

### **The Swallow**

ANGELA K. TURNER  
Hamlyn, London, 1994, 128 pp., numerous colour plates and black & white illustrations. Softback, ISBN 0 600 57979 4, £9.99.

This most interesting and readable book about one of our best loved and most familiar birds provides a wealth of information. The first chapter introduces the reader to Swallows and their related species, in a wide range of countries. Thereafter, following chapters deal with their behaviour and general biology in considerable detail. Many of the data are compiled from a study of Swallows on farms in the general vicinity of Stirling University. Many of the findings are compared with facts derived from research in other parts of the world.

Swallows live in close proximity to human beings and nowadays are largely dependent on man-made structures for their nest sites. Modern farming methods are not always advantageous to the insect life which is essential for a healthy population of Swallows. These facts, and many others, are discussed in the text and give rise to some concern as to the future of the species.

This book is extremely well illustrated with excellent photographs, colour pictures by Hilary Burn and black & white illustrations by Norman Arlott. Also included are a bibliography, index and a list of scientific names of all birds mentioned in the text. At £9.99 this book is very good value for money.

JANE CHRISTIE

## The Seasonal Occurrence of Some Prominent Zooplankton Species in Rough Firth. I. Scyphomedusae

T. G. SKINNER

'Calluna', Merse Road, Rockcliffe, Kirkcudbrightshire DG5 4QH

Six species of scyphomedusae, or larger jellyfish, occur around the British Isles. Four of these are found normally in Rough Firth, Kirkcudbrightshire, two being especially abundant: *Chrysaora hysoscella* (L.) and *Rhizostoma octopus* (L.). The other two species, *Aurelia aurita* (L.), the common jellyfish, and *Cyanea capillata* (L.), the brown jellyfish, are much less common, the latter entering Rough Firth only rarely. Despite their large size these are truly planktonic animals capable of changing depth and direction but otherwise at the mercy of wind and tide.

The long trailing tentacles of *Chrysaora* and *Cyanea* are used to capture food, the former preferring smaller medusae and arrow worms, the latter fish. In contrast, *Aurelia* and *Rhizostoma* are ciliary feeders. The upper and lower surfaces of the umbrella of *Aurelia* trap small planktonic organisms such as barnacle larvae and copepods in sticky mucus which is driven by cilia to the umbrella margin where the food collects in eight food pouches. The tips of the mouth lobes then pick up the food. Apparently the marginal tentacles play a minor part only in food capture. Unlike any other of our jellyfish the manubrium of *Rhizostoma* bears many thousands of minute openings through which water is continually drawn by cilia. These openings are surrounded by small tentacles bearing nematocysts, so that a huge trapping area is presented to the plankton as the animal swims through the water.

*Aurelia* provides a typical example of a scyphomedusan life-history (Fig. 1). The free-swimming planula larva, which develops from the fertilised egg, gives rise to a short-stalked primary polyp found attached to mussels, fucoid sea-weeds and other substrata. Ring-like

constrictions develop round the polyp so that it resembles ultimately a pile of saucers, the margins of each becoming eight-lobed. This is the scyphistoma and is about 2-7mm high. Each saucer separates from the scyphistoma, turns upside down and swims off as an ephyra which then grows into the familiar jellyfish.

This paper describes the occurrence of ephyrae and their subsequent development in Rough Firth.

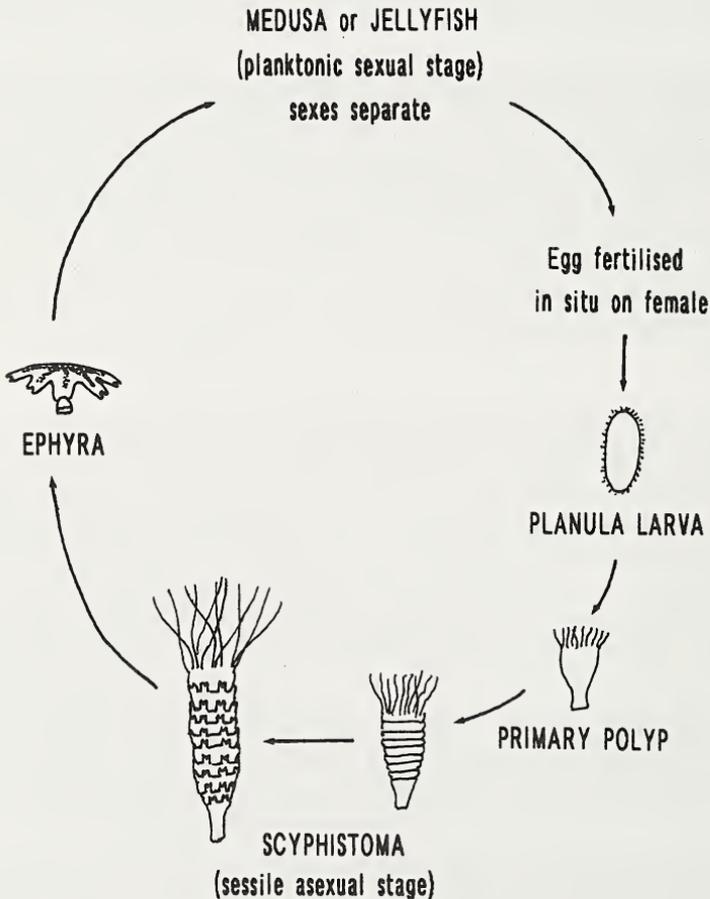


Fig. 1: Life-history of *Aurelia aurita*.

## Methods

Weekly samples were taken over a two year period from March 1984 to March 1986 using a 0.5mm diameter plankton net of mesh size 287 $\mu$ m which was towed behind a dinghy in the same sample area as described in a previous report (Skinner, 1984). On each occasion two samples were taken at around high water, one sample being preserved immediately, the other taken home for examination live. Any ephyrae present in the latter were picked out, anaesthetised in an isotonic 7.5% solution of magnesium chloride, then fixed and preserved in 4-5% formalin.

All tows were horizontal, just below the surface. The total towing time on each occasion was about 23 min. and the total distance towed just under 1km.

Identifications were made with the aid of Russell (1970). Nomenclature is that of the Marine Biological Association (1957).

## Results and discussion

The numbers of ephyrae caught per 15 min. haul per month are summarised in Fig.2. However, as ephyrae of different ages were caught, those which appeared to have been released recently (stage 1 ephyrae) were segregated from the older stages and the numbers of each recorded (Table 1).

As ephyrae develop they pass through a number of distinctive stages before the characteristic form of the adult is reached. The three principal species pass through five such developmental stages, some examples of which are shown in Fig.3.

The contrast in numbers of stage 1 ephyrae caught during the investigation mean the peaks shown in Fig. 2 have different meanings. Thus about 68% of *Aurelia* ephyrae caught in March were stage 1 ephyrae, whereas about 69% of *Chrysaora* ephyrae caught in June and 76% of *Rhizostoma* ephyrae caught in July were stage 4 and 5 ephyrae. One month was very unusual: no ephyrae of *Chrysaora* were caught in June 1985. However, all jellyfish are liable to swarm as a result of wind, tide and wave movement and the failure to capture any *Chrysaora* ephyrae may be attributed to the consequent uneven distribution.

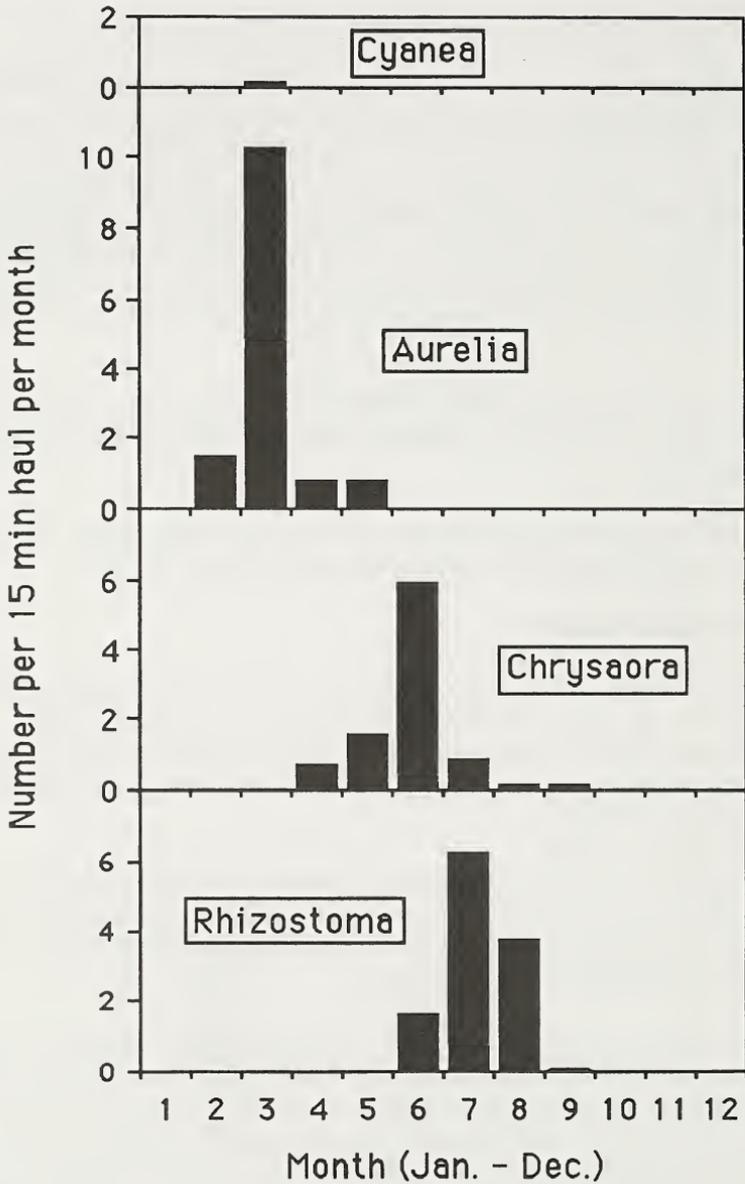


Fig. 2: Seasonal occurrence of ephyrae. Each value is the mean of four weekly samples taken each month from March 1984 to March 1986. Data from the same month in different years were pooled.

Interesting differences can be seen in the release of stage 1 ephyrae of the three main species. Those of *Aurelia* appear during two months only (February/March), but those of *Rhizostoma* and *Chrysaora* occur over a longer period: three months (June-August) for the former and six months (April-September) for the latter. Furthermore, the numbers of each species caught differ considerably, *Aurelia* stage 1 ephyrae being the most plentiful, those of *Chrysaora* and *Rhizostoma* less so (the latter much less) while none at all were taken of *Cyanea*. This suggests that the release of the three latter species takes place outwith the sampling area. Russell (1970) refers to the possibility that *Cyanea* scyphistomas live in deeper water in the Irish Sea. It seems likely that the scyphistomas of *Chrysaora* and *Rhizostoma* occur nearer, in the Solway Firth.

Some idea of the rate of growth of jellyfish under natural conditions may be obtained by comparing the size and date of capture of the largest adult or juvenile with the size and earliest date of capture of stage 1 ephyrae (Table 2). Although *Aurelia* ephyrae were known to be present in February 1984, the investigation proper did not start until March. The date of capture of the first stage 1 ephyrae is thus not known but has been taken to be the same as in 1985. *Rhizostoma* has been omitted as capture of the first stage 1 ephyrae was accompanied by older stages. The figures suggest a rapid rate of growth for both *Aurelia* and *Chrysaora*.

**Table 1: Numbers of stage 1 Ephyrae and older stages. March 1984 to March 1986. Data from the same month in different years were pooled.**

	<i>Cyanea</i>		<i>Aurelia</i>		<i>Chrysaora</i>		<i>Rhizostoma</i>	
	Stage 1 ephyrae	Older stages	Stage 1 ephyrae	Older stages	Stage 1 ephyrae	Older stages	Stage 1 ephyrae	Older stages
February	0	0	15	0	0	0	0	0
March	0	2	107	50	0	0	0	0
April	0	0	0	8	7	0	0	0
May	0	0	0	0	6	14	0	0
June	0	0	0	0	2	75	1	20
July	0	0	0	0	2	7	1	66
August	0	0	0	0	2	0	2	57
September	0	0	0	0	1	1	0	1

Table 2: Rate of growth of *Aurelia* and *Chrysaora*.

	Stage 1 ephyrae Date of first capture	Mean live diameter (mm)	Largest adult (A) or juvenile (J) Date of capture	Diameter (mm)	Estimated period of development (days)	Increase in size (approx.)
<i>Aurelia</i>	? 20.2.85	3.4* ?	14.6.84 16.5.85	200 (A) 97 (A)	114 85	x 59 x 29
<i>Chrysaora</i>	17.4.84 15.4.85	2.9** ?	27.6.84 1.7.85	125 (J) 60 (J)	71 77	x 43 x 21

\*  $n = 45$ \*\*  $n = 2$

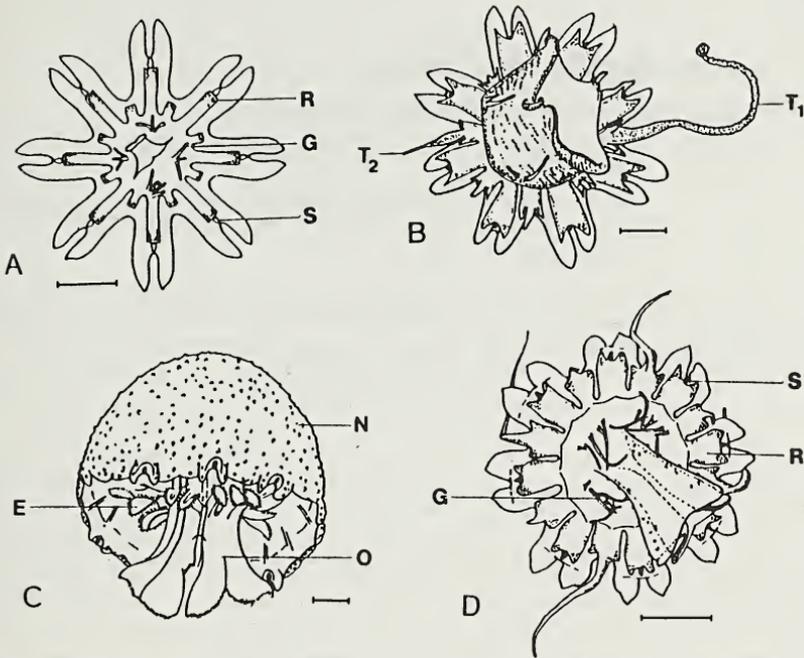


Fig. 3: Drawings of ephyrae at different developmental stages. A, *Aurelia aurita*: stage 1; B, *Cyanea capillata*: early stage; C, *Rhizostoma octopus*: stage 4 (no longer flat and disc-like, but still with one mouth opening); D, *Chrysaora hysoscella*: stage 3. E, epaulettes; G, gastric filaments; N, nematocyst warts; O, oral arms; R, radial canal; S, sense organ; T<sub>1</sub>, first tentacle; T<sub>2</sub>, second tentacle. All scale bars = 1 mm.

Finally it should be mentioned that many large fully grown specimens accompanied the arrival of *Rhizostoma* ephyrae in June. These must have developed from the previous year's production of ephyrae and then overwintered in deeper water. *Aurelia* and *Cyanea* also survive the winter in deeper water (Russell, 1970) but the appearance and size of the three adult *Aurelia* caught during the investigation indicated that they came from the February/March generation of the year of capture.

## References

- MARINE BIOLOGICAL ASSOCIATION 1957 *Plymouth Marine Fauna*. 3rd edn. Plymouth.
- RUSSELL, F.S. 1970. *The Medusae of the British Isles, Vol. II. Pelagic Scyphozoa, with a supplement to the first volume on Hydromedusae*. Cambridge University Press.
- SKINNER, T.G. 1984. Winter occurrence of Solway Hydromedusae. *Glasg. Nat.* 20: 439-450.

## Book Reviews

### Central Scotland - Land, Wildlife, People

Ed. L. CORBETT, D.M. BRYANT, D.S. McLUSKY, B.J. ELLIOT & N.L. TRANTER

Pub. by Forth Naturalist and Historian, 1993, 230 pp., numerous photographs, drawings and maps. Softback, ISBN 1 898008 00 0, £12.50, postage & packing, £2.50.

Marking the occasion of Stirling University's first 25 years, this book is a welcome successor to *The Stirling Region* produced by the university for the British Association meeting held there in 1974. Without wishing to appear unkind or decry its value, the earlier BA edition had an air of being 'rushed through', whereas a considerable amount of backstage planning has undoubtedly gone into the revised version. The new edition is an improvement on its predecessor in several respects. For example, the whole of Central Region is covered and not just the Upper Forth catchment area. Also, the text is enhanced by a number of quality black & white photographs and vignettes. The inclusion of an index is a particularly useful addition.

Completely rewritten, the new handbook comprises 14 sections prepared by specialists in their own fields. Naturalists will understandably find most to catch their eyes in the first 9 chapters - geology, climate, soils, vegetation & flora, birds, mammals, butterflies & moths, aquatic life, nature conservation - but the other 5 contributions on Central Region at work and play make equally interesting reading.

For any member of our society seeking an authoritative and up-to-date introduction to the natural history of the 'Heartland of Scotland', this modestly priced reference work is for you.

JOHN MITCHELL

### Ladybirds

MICHAEL E.N. MAJERUS

Collins, New Naturalist, 1994, 367 pp., 16 pages of colour photographs, many black & white photographs and line drawings. Paperback, ISBN 000 219935 1, £14.99.

This recent addition to the 'New Naturalist' library is impressive. Written by a devotee of his subject and amply supported by references to further reading - 370+ titles, with the author contributing to 55 of them - this book must be the definitive work on ladybirds.

Topics covered include history, structure, the annual cycle, life history strategies, food, death, habitats, wintering, geographical distribution, colours and patterns, evolution, use of ladybirds in biological control and conservation.

The author is deeply interested in genetics and variation and this is considered in great depth (74 pages). This section and that following, on evolutionary ecology, could prove heavy going for the arm-chair reader, but a gold-mine of information for the serious student.

The colour photographs are excellent but some of the monochrome ones are lacking in lustre. There is a useful glossary of technical terms at the end.

RONALD M. DOBSON

## The Seasonal Occurrence of Some Prominent Zooplankton Species in Rough Firth. II. Chaetognatha

T.G. SKINNER

“Calluna”, Merse Road, Rockcliffe, Kirkcudbrightshire DG5 4QH

Chaetognatha or arrow worms can occur in huge numbers in the plankton. They are transparent and have a very distinctive appearance (Fig. 1). The head has two pigmented eyes on the upper surface and two sets of bristles on the underside which function as jaws for seizing prey. The trunk bears two pairs of horizontal lateral fins and the tail ends in another horizontal fin. Prey items are usually copepods but other small animals, such as medusae, crustaceans and fish larvae are also taken. The fins are thought to play no part in locomotion but simply act as flotation devices (Pierrot-Bults and Chidgey, 1988).

Arrow worms are hermaphroditic with ovaries in the trunk and testes in the tail. Cross fertilisation takes place and the eggs are fertilised *in situ*. The eggs are then released into the water. A larva about 1mm long is set free from each and this develops gradually into the adult.

Two species occur in Rough Firth, Kirkcudbrightshire: *Sagitta setosa* J. Müller and *S. elegans* Verrill. Older individuals are easily recognised (Fig. 1). Younger immature stages lack the distinctive sperm vesicles, but the thread-like gut of *S. setosa* is still a valuable aid to identification and with very small specimens (under 4mm long) the vacuolated gut cells and upward retraction of the head of *S. elegans* after preservation are especially helpful characteristics.

### Methods

The same methods were used as reported in Skinner (1995). In addition, sea surface temperatures were taken at the start and end of each tow. From March 1985 surface salinities were recorded at the

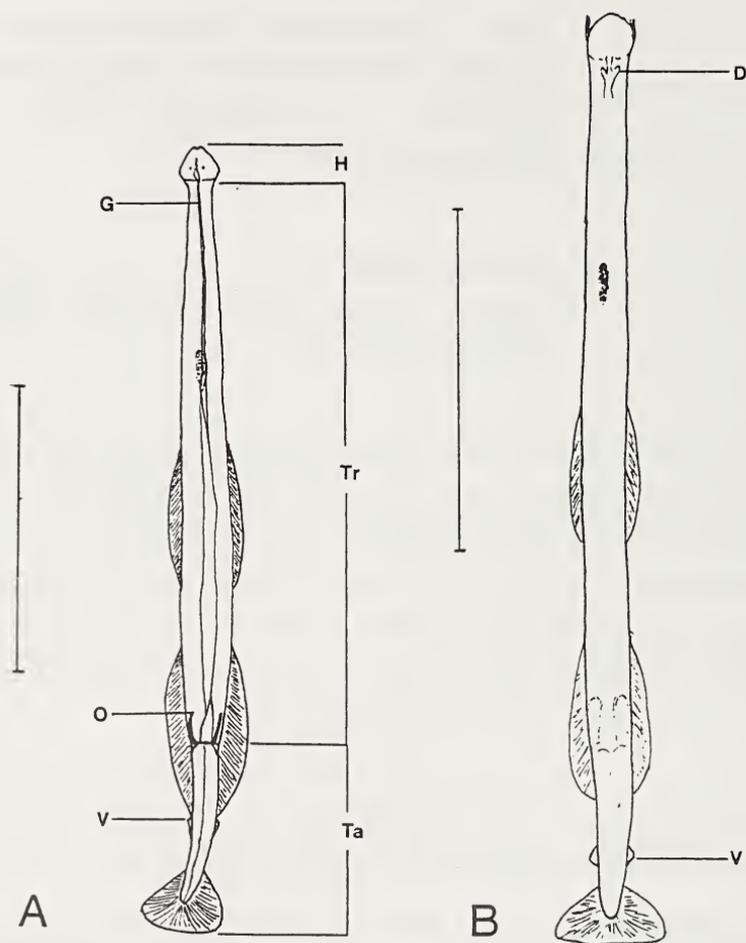


Fig. 1: Drawings of (A) *Sagitta setosa* (dorsal side) and (B) *S. elegans* (ventral side). D, anterior gut diverticula; G, gut; H, head; O, ovary; Ta, tail; Tr, trunk; V, sperm vesicle (wedge-shaped in *S. setosa* and cone-shaped in *S. elegans*). Scale bars - 5mm.

same time, using a purpose-built hydrometer accurate to about 1 part per thousand. The numbers of *Sagitta* caught were standardised for a 15 min. hauling time and their lengths overall measured. Where numbers were large a random sub-sample of convenient size was taken.

Identifications were made with the help of Fraser (1957).

## Results and discussion

The results are summarised in Figs. 2-4.

The total number of *Sagitta* caught throughout the survey amounted to 61,148 of which only 1,826 or about 3% were *S. elegans*. *S. setosa* is a neritic species associated with water of low salinity whereas *S. elegans* is characteristic of mixed oceanic and coastal waters such as occur in the Irish Sea (D.I. Williamson in Bruce *et al.*, 1963) and it was the unexpected occurrence of *S. elegans* that prompted the writer to take measurements of surface salinity. According to Fraser (1952) the presence of *S. setosa* is correlated with a temperature range of 5-16°C and a salinity range from "about 35 parts per thousand to at least as low as 29 parts per thousand", whereas *S. elegans* tends to be associated with temperatures of 0-13°C and salinity values about 35 parts per thousand and "its extension into lower salinity waters is much less than with *S. setosa*". The results are in broad agreement with this: peak numbers of *S. setosa* occurred earlier than peak numbers of *S. elegans* and few of the former were caught in February when the water temperature was at its lowest (less than 5°C).

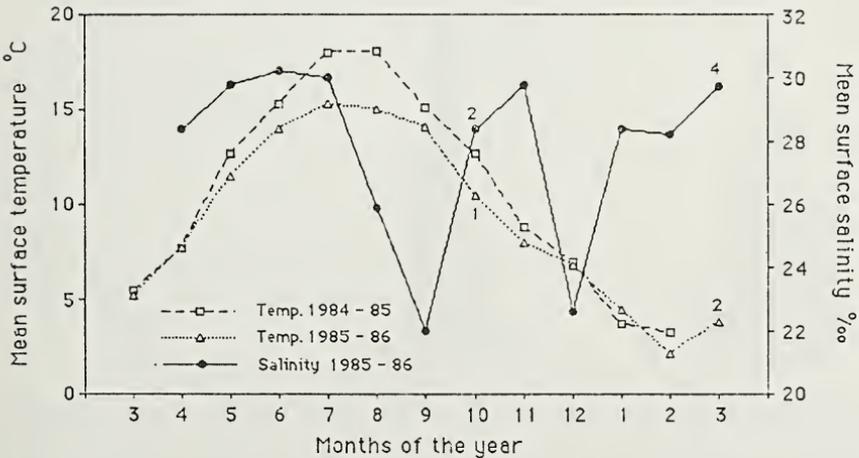
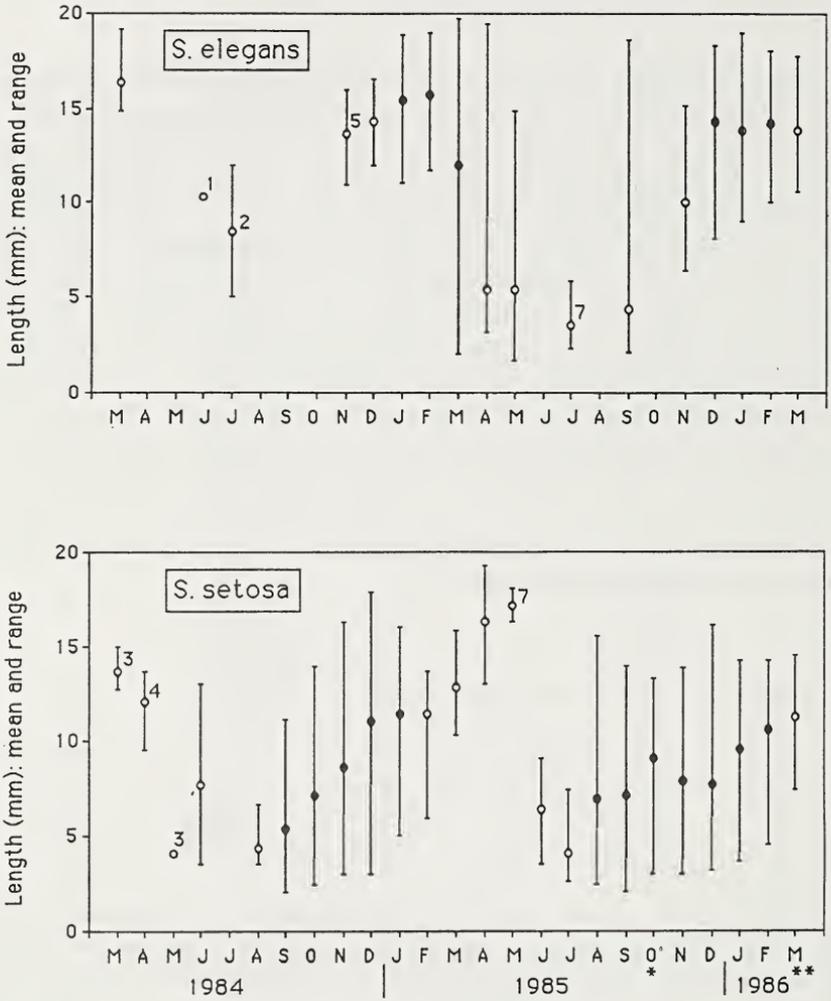


Fig. 2: Mean surface temperature and salinity. Each value is the mean of usually four observations. Only one observation was made in October 1985, and only two in March 1986.



**Fig. 3:** Size data from *S. setosa* and *S. elegans*. Mean length and range of length are given for each month. When the total number of animals was below 10, the actual number is given beside the mean; for *S. setosa*, open circles indicate numbers from 10-95, filled circles 207-1751; for *S. elegans*, open circles indicate numbers from 10-50, filled circles 90-193. Only one sample was taken in October 1985, and only two in March 1986.

The results also show that there is a gradual increase in the size of *S. setosa* as the season progresses from autumn to winter; this is most noticeable in the results for 1984-85. The less striking increase shown in 1985-86 may be connected to the lower water temperature but no doubt other factors are involved.

*S. elegans* arrived in significant numbers in the winter only when more turbulent conditions cause greater mixing of different water

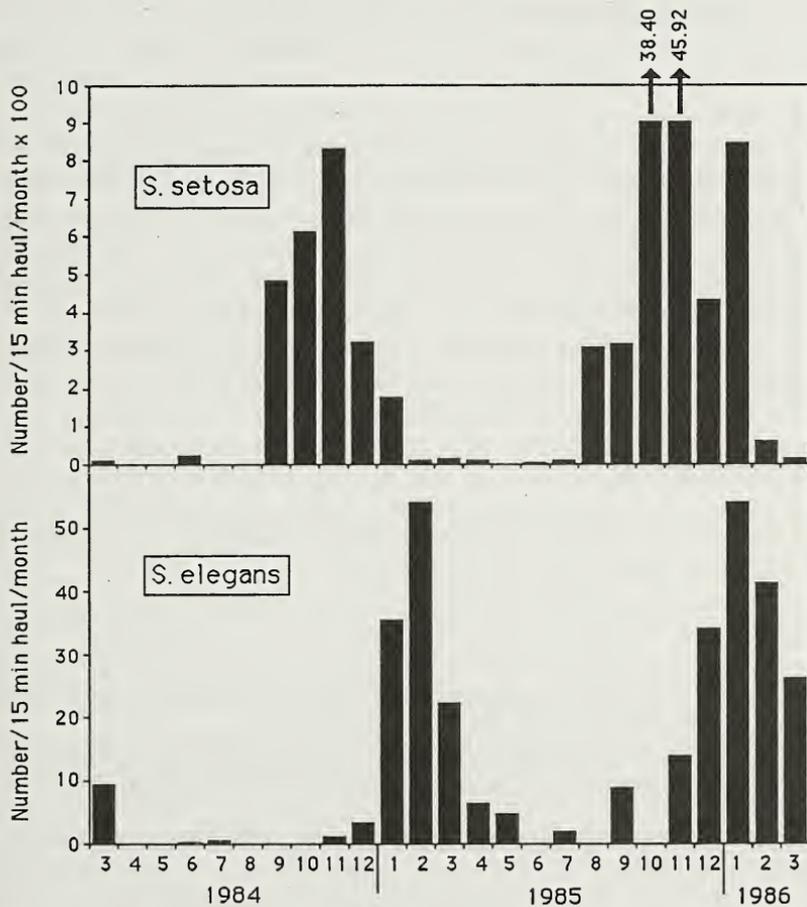


Fig. 4: Seasonal occurrence of *S. setosa* and *S. elegans*. Each value represents the mean of usually four weekly samples taken each month from March 1984 to March 1986. Only one sample was taken in October 1985, and only two in March 1986).

masses in the Irish Sea and adjacent areas. These were of greater size than the few specimens caught during the summer months so the evidence, scanty though it is, does suggest a pattern of development similar to that of *S. setosa*.

Nevertheless, there were some striking differences between the two species. Observations made on live samples during 1985-86 showed that by December/January *S. elegans* was at a more advanced stage than *S. setosa* as shown by size of the ovaries, the well-developed seminal vesicles, the abundance of spermatocytes (which could be seen circulating in some specimens), and the shedding of sperm by several specimens during February. In contrast, few or no signs of spermatocytes were seen in *S. setosa* during the winter months and sperm shedding was observed only in September and October 1984 and May, August and September 1985. Furthermore, the earliest appearance of the smallest specimens (under 4mm) of *S. elegans* in the catches was March 1985 and these continued to be caught up to September, whereas similar sized *S. setosa* were first caught in May 1984 through to December and from June 1985 to January 1986. All these points indicate that the winter population of *S. setosa* was immature, spawned mainly in the summer months outwith the Rough Firth area, and started and stopped spawning later than *S. elegans*.

### Acknowledgment

The author is grateful to Mr. A. Edwards for advice on salinometers and for providing a copy of sigma T tables.

### References

- BRUCE, J.R., COLMAN, J.S. & JONES, N.S. 1963 *Marine Fauna of the Isle of Man and its surrounding Seas*. Liverpool University Press.
- FRASER, J.H. 1952. The Chaetognatha and other zooplankton of the Scottish area and their value as biological indicators of hydrographical conditions. *Mar. Res.* 2. H.M.S.O.
- FRASER, J.H. 1957. Chaetognatha (First Revision). *Fich. Ident. Zooplancton* 1. I.C.E.S. Copenhagen.
- PIERROT-BULTS, A.C. & CHIDGEY, K.C. 1988. *Chaetognatha*. Synopsis Br. Fauna 39. E.J. Brill/Dr W. Backhuys.
- SKINNER, T.G. 1995. The seasonal occurrence of some prominent zooplankton species in Rough Firth. I. Scyphomedusae. (*Glasg. Nat.* 22, 471-478)

## **Old Cornstone Workings in Dunbartonshire and West Stirlingshire, with Notes on their Associated Flora**

**JOHN MITCHELL**

22 Muirpark Way, Drymen, by Glasgow G63  
ODX

In Scotland the use of lime as an agricultural fertiliser dates from the first half of the 17th century, as subsistence farming began to slowly evolve into an agribusiness to provide for the growing towns and industrial villages. With the need for a mineral fertiliser to sustain the increased yield, farmers in the southernmost parts of Dunbartonshire and West Stirlingshire purchased their requirements from the lime works at Baljaffray, Baldernock, Lennoxton and Kilsyth. All of these commercial establishments in the central belt were sited on the main seams of Carboniferous limestone underlain by coal. Before the advent of crushing machines, burning the quarried limestone with coal in special kilns and then slaking the resultant calcined lime (quicklime) with water was the only practicable method available for reducing the hard rock into a soluble powder.

At a disadvantage compared with their southern neighbours, landowners and tenants who farmed in the more distant parts of the two counties faced prohibitive charges for transportation of the professionally prepared lime. It is implied in one agricultural report (Ure, 1794) that the extra cartage involved more than doubled the product's selling price at the works' gate. Not surprisingly, some of these farmers turned to nearer to hand calcium carbonate rich deposits, both the quarrying and the burning of the rock (usually with peat turves) being carried out by farm labourers in their employ. Four alternative sources of mineral fertiliser were exploited - the Glen Fruin and Ardenconnel blue-black limestone which outcrops in the southern highland slates, carbonated serpentinite associated with the Highland Boundary Fault, cementstones of the Ballagan Beds and cornstone known locally as 'moor limestone'.

## **The origin, history and distribution of cornstone.**

The derivation of the term cornstone is obscure. Its use as a fertiliser in the cultivation of cereal crops might seem the most obvious explanation, but it is equally likely that the name comes from cornstone's granular texture (Arkell & Tomkeieff, 1953). Atypical in being a terrestrial rather than a marine limestone, cornstones are fossil soils formed under semi-arid conditions. During periods of sustained drought lime-rich water is drawn up by capillary action to the land surface, where the calcium carbonate is precipitated in the sub-soil by evaporation. A more detailed description of the process - under cornstone's other name of caliche - is given by Bluck (1992).

The place of cornstone in the history of science was firmly established when, during a visit to the Isle of Arran in August 1787, the Edinburgh-born pioneer geologist James Hutton observed horizontally bedded cornstone and sandstone resting directly on top of steeply inclined and worn-down highland schist. This discovery, the first of Hutton's world-famous 'unconformities', was to greatly influence future thinking on the never-ending cycle of erosion and deposition of the earth's surface.

Cornstones in Scotland are almost entirely confined to the Upper Old Red Sandstone laid down during the Devonian period over 360 million years ago. In Dunbartonshire and Stirlingshire the Upper Old Red Sandstone occurs in two broad bands, the southernmost running ENE from Dumbarton - Cardross to within a few kms of Stirling. The other runs NE from Helensburgh to the west side of Loch Lomond, with outlying outcrops on several of the islands and on the opposite side of the loch just north of the Conic - Gualann ridge. Both bands contain concretionary masses of cornstone.

### **Local cornstone working**

Unlike commercial lime works, the 'do-it-yourself' quarrying and burning of cornstone by non-professionals lacks the trade documentation so valuable to industrial archaeological research. Never-the-less, enough fragmentary descriptions of the practice have been published (e.g. Ure, 1794) to be able to piece together its operation and time-

scale in Dunbartonshire and West Stirlingshire. The first mention of cornstone quarrying and burning in the area is to be found in the Balgair Barony Court records for 1707 (Dunlop, 1957), the same Balgair Muir workings (Plate 1a, page 493) also providing the last known occasion when the quarry was reported to have been temporarily reopened in 1862, after lying neglected for 60 years (*Stirling Journal* 15 August 1862).

All the available documentary evidence suggests that cornstone working for agricultural fertiliser reached its peak during the second half of the 18th century, virtually ceasing with the collapse of grain prices which followed the end of the Napoleonic wars in 1815. Apart from economic reasons, there can be little doubt that by the turn of the 19th century most of the readily quarried deposits of cornstone in the area were already exhausted. So complete was the removal of all surface cornstone, that only a few above-ground outcrops remain today. The largest undisturbed remnant by far (Plate 1b, page 493), occurs just to the south-west of the Lang Dyke on Dumbarton Muir. With its water-worn fissures or 'grikes', this untouched exposure illustrates the relative ease with which cornstone could be quarried using only the most basic hand tools such as crowbars and stone hammers.

### Site Survey

Beginning in 1982, a field survey of the old cornstone workings in Dunbartonshire and West Stirlingshire proved not a moment too soon. One of the sites was damaged by forestry operations almost immediately after it had been located and examined. The object of the project was twofold:

- (i) To archive a permanent record of this long disappeared industry with the Drymen and District Local History Society. A copy of the report (Mitchell & Mitchell, 1983) has been placed in the Glasgow Natural History Society library.
- (ii) To pin-point those former cornstone workings which today provide a habitat for plants of calcareous grassland, flushes and mire. The present account includes a short list of the less common plant species associated with the Dunbartonshire and West Stirlingshire cornstone quarries, spoil heaps and wet hollows.

As a preliminary desk study, every piece of documented information on cornstone working in the study area was extracted from parish records contained in the first *Statistical Account of Scotland*, the first and second editions of county agricultural reports, large-scale ordnance and geological maps. For site detail, the original mid-19th century geological survey field slips proved to be particularly valuable. A mineral resource report *The Limestones of Scotland* (Robertson *et al*, 1949) lists cornstone deposits and former workings in Renfrewshire, Lanarkshire, Ayrshire and Bute, but unfortunately none in Dunbartonshire or Stirlingshire. The regional memoir *Geology of the Stirling District* (Francis *et al*, 1970) briefly describes one cornstone quarry on the study area's eastern fringe.

To date, at least ten former cornstone quarries and surface workings have been identified in Dunbartonshire and West Stirlingshire. In Table 1, only a central map reference is given where the workings are extensive or scattered.

### Notes on the cornstone flora in the study area

The botanical interest of cornstone is almost exclusively confined to where the calcium carbonate availability to plants is enhanced by quarrying operations, surface flushing resulting from rainfall permeating through the bedrock, and mire formation where the lime-rich water has collected in natural or man-made hollows.

In common with all herb-rich pastures, a moderate level of grazing by farm stock is essential to hold in check the more vigorous herbaceous species and scrub. In recent years however, there has been a trend towards using such fields for stock grazing for twelve months in the year. Under continual trampling by cattle, any mire development present can be severely damaged. But without question the principal threat to cornstone open grassland habitat is forestry ploughing and planting. Whichever the change in management, most of the botanical diversity of the original habitat is soon lost.

Many of the plants to be found on the cornstone are widespread throughout Dunbartonshire and West Stirlingshire. The twenty-one species selected for the list below (Table 2) have been chosen because

of their localised distribution within the two counties. Individual cornstone workings where these plants have been recorded are identified by the site number given in Table 1.

**Table 1. Cornstone workings in Dunbartonshire and West Stirlingshire.**

**Dunbartonshire:**

1. Garrawy Glen	NS315830	Wooded.
2. Kipperoch	NS368783	Kiln Present.
[Note: site currently heavily poached by cattle].		
3. Carman Muir	NS372785	
[Note: site partially drained for forestry in 1986, but planting not carried out].		
4. Upper Dalquhurn	NS382786	Wooded.
[Note: site currently heavily poached by cattle].		
5. Merkins Muir	NS441809	Kilns present.

**West Stirlingshire:**

6. Tom nam Buachaille	NS425932	Kilns nearby.
7. Mar and Cross Burns	NS437935	Kilns present.
8. Wester Balgair	NS592897	Kilns present.
9. Balgair Muir	NS610910	Kilns present.
[Note: western half of site partially drained and afforested in 1983].		
10. Powside	NS623915	Kilns present.

**Table 2. Local species occurring in Dunbartonshire and West Stirlingshire cornstone workings.**

Species	Sites
<i>Selaginella selaginoides</i> (Lesser Clubmoss)	2,3,5,6,7,9,10.
<i>Sagina nodosa</i> (Knotted Pearlwort)	3,9.
<i>Anagallis tenella</i> (Bog Pimpernel)	2,3.
<i>Saxifraga aizoides</i> (Yellow Mountain Saxifrage)	6,7.
<i>Parnassia palustris</i> (Grass-of-Parnassus)	3,5,6,10.
<i>Gentianella campestris</i> (Field Gentian)	9,10.
<i>Galium uliginosum</i> (Fen Bedstraw)	8,9,10.
<i>Antennaria dioica</i> (Mountain Everlasting)	9,10.
<i>Eriophorum latifolium</i> (Broad-leaved Cottongrass)	2,3,6,8,9,10.
<i>Eleocharis quinqueflora</i> (Few-flowered Spike-rush)	2,3,4,5,6,7,8,9,10.
<i>Carex diandra</i> (Lesser Tussock-sedge)	9,10.
<i>C. dioica</i> (Dioecious Sedge)	2,3,5,6,7,8,9,10.
<i>C. hostiana</i> (Tawny Sedge)	2,3,4,5,6,7,8,9,10.
<i>C. viridula</i> ssp. <i>brachyrrhyncha</i> (Long-stalked Yellow Sedge)	2,3,5,6,8,9,10.

Table 2 continued on next page

**Table 2 continued**

<i>Helictotrichon pubescens</i> (Downy Oat-grass)	2,9.
<i>Listera ovata</i> (Common Twayblade)	2,4.
<i>Platanthera chlorantha</i> (Greater Butterfly-orchid)	9.
<i>P. bifolia</i> (Lesser Butterfly-orchid)	2,3,8,10.
<i>Gymnadenia conopsea</i> (Fragrant Orchid)	2,3,8,9,10.
<i>Coeloglossum viride</i> (Frog Orchid)	9.
<i>Dactylorhiza incarnata</i> (Early Marsh-orchid)	8,10.

### **Cornstone workings elsewhere in the Clyde Area**

No systematic coverage of old cornstone workings elsewhere in the west of Scotland was undertaken as part of the project. However, the opportunity was taken by the writer of examining three former cornstone quarries during visits to Bute, Arran and south Ayrshire.

By the middle of the last century the Kelspoke quarry on the Isle of Bute was already partially flooded, the site being subsequently adopted as a permanent water supply for the nearby village of Kilchatton. The same horizon of cornstone does, however, outcrop along the shore line in the south-east corner of the island, with some evidence of quarrying near Hawk's Nib. There the botanical interest lies in the lime-influenced flushes below the cliffs of the raised beach. On the Isle of Arran, the Clauchan Glen cornstone quarry to the east of Shiskine was virtually obliterated when it was planted over by the Forestry Commission in 1974. Fortunately, the Auchalton cornstone workings near Crosshill in Ayrshire have fared considerably better than the two quarries above, the spoil heaps with their species-rich flora having been managed as a grassland nature reserve since the site was acquired by the Scottish Wildlife Trust in 1979.

Further survey work on old cornstone workings throughout the southern half of the Clyde area would almost certainly prove worth while. With the combination of the rock's unusual origin, its early role in regional agricultural development and more recently as a refuge for plants of calcareous and unimproved grassland, cornstone has much to offer of interest to geologists, local historians and botanists alike.

### **Acknowledgments**

I am particularly grateful to Ian Hall of the British Geological Survey for his assistance in locating long forgotten cornstone quarries in

Dunbartonshire and West Stirlingshire, and to Ken Mackay for helpful discussion on the local limestone industry of the past. Special thanks also go to Allan Stirling, Bill Brackenridge, Anne Carstairs and Keith Futter for sharing my interest in the vegetation associated with the old cornstone workings and providing a number of additional botanical records.

## References

- ARKELL, W.J. & TOMKEIEFF, S.I., 1953. *English Rock Terms*. Oxford.
- BLUCK, B.J., 1992. 'Upper Old Red Sandstone of the Firth of Clyde' in *Geological Excursions around Glasgow & Girvan* (Ed. Lawson, J. D. & Weedon, D. S.) pp.200-229. Glasgow.
- DUNLOP, J. (Ed.), 1957. *Court Minutes of Balgair 1706-1736* (Scottish Record Society). Edinburgh.
- FRANCIS, E.H. et al, 1970. *The Geology of the Stirling District* (HMSO). Edinburgh.
- MITCHELL, J. & MITCHELL, A., 1983. *Limestone burning for agricultural fertiliser in the Parishes of Kilmanorock and Buchanan, Loch Lomondside, from the mid-18th to the early 19th century*. Unpublished report to the Drymen & District Local History Society.
- ROBERTSON, T. et al, 1949. *The Limestones of Scotland* (HMSO). Edinburgh.
- URE, REV.D., 1794. *General View of the Agriculture in the County of Dumbarton*. London.

## Book Reviews

### Urban Nature Magazine

Urban Environmental Trust Ltd., 40 Milford Rd., Birmingham, 1992-, 44pp. per part, 2 parts annually, illustrated. ISSN 0965 2086, individual sub. £17.50; corporate sub. £30.00.

This magazine is concerned with nature and ecological processes in the urban environment. First published in Spring 1992, the magazine examines environmental policies and experience, Articles have covered city pollution, problems arising from over-managed landscapes and green politics. The susceptibility of environmental studies to other forces are fairly shown and also the way in which this creates difficulties for urban ecology as a subject and a science in the politically green world. These concerns are balanced by interesting articles, e.g. on Magpies' use of man-made structures as nest sites and as nest material. Highlighting birds' and animals' experience in the urban environment is important and it is good to escape the plethora of cosy wildlife magazines. The Urban Nature Magazine contributes to the understanding of wildlife and the politics which surround it and is recommended.

BRIAN S. SKILLEN

### **Wildfowl**

MALCOLM OGILVIE, illustrated by BRUCE PEARSON  
 Hamlyn Bird Behaviour Guides, Hamlyn, London, 1994., 160 pp.,  
 numerous coloured & monochrome illustrations. Hardback, ISBN  
 0 600 57973 5, £14.99.

It only takes a visit to any local park where there is a duck pond to appreciate that waterfowl are fascinating birds. They fight, display, feed, call and otherwise go through many different behaviour patterns, often in a short space of time. This book will answer many of the questions posed by wildfowl behaviour and much more. There are chapters covering feeding, flying, social behaviour and care of plumage as well as a gazetteer of places in western Europe where amazing concentrations of wildfowl can be found. Virtually all European wildfowl species are covered at some point in the text.

Malcolm Ogilvie has produced an excellent review of wildfowl behaviour in a style which will be easily understood by novice and expert alike. This well-written book is complemented by the illustrations. The artist, Bruce Pearson, conveys life and action in his studies and sketches of the birds.

All in all I highly recommend this book, and it is a reasonable price.

BERNARD ZONFRILLO

### **Hedgehogs**

NIGEL REEVE  
 T. & A.D. Poyser Ltd., 1994, 313pp., many line drawings and  
 figures, 28 colour plates. Hardback, ISBN 0 05661 081 X, £25.00

Most people have a warm affection for hedgehogs and there have recently been a number of scientific studies carried out on these engaging animals. Nigel Reeve has carried out radio-tracking studies on their movements and on other aspects of their ecology and has now written a popular account which summarises recent studies and also gives a good account of their general natural history and folklore. The book starts with a general description of the various hedgehog species around the world and then gives chapters on the types of food which they eat, the way in which they forage, their behaviour, breeding cycle, hibernation periods and population dynamics. It is clearly written and well illustrated with line drawings, figures & photographs.

Apparently the spines not only give the animals protection, but also serve as excellent shock-absorbers which allow them to fall safely from a great height. Hedgehogs are also resistant to snake venom, which allows them to include adders in their diet. The book gives you information on how to look after sick animals and also tells you how to unroll a hedgehog: you bounce it gently up and down in your hand. It is produced to the very high standard that we have come to expect from Poyser publications and is a joy to read, full of unexpected and interesting facts, and will be appreciated by anyone with an interest in these delightful animals.

DAVID C. HOUSTON

## Plate 1



**a: Balgair Muir cornstone quarry before afforestation in 1983.**



**b: Undisturbed exposure of cornstone on Dumbarton Muir.**

Plate 2



**a: Part of the orchid colony at Lanarkshire's "Nose".**



**b: Close-up of the orchid colony**



**c: Common Spotted-orchid x Northern Marsh-orchid**

## Lanarkshire's Nose Update

PETER MACPHERSON

Ben Alder, 15 Lubnaig Road, Glasgow G43 2RY

Record has previously been made of the topography and of the plants at the tip of Lanarkshire's Nose for the period 1983-88 (Macpherson and Teasdale, 1986; Macpherson, 1990). In the latter article it was anticipated that the main part of the site would soon be developed but this is still pending. However, during 1991 a channel was excavated from a point 50 yards from the road on the east to the beginning of the large heathy section. Presumably the intention was to make an access roadway. It is over 20 feet deep. As the eastern part is lower than that further west, 75 yards of it is permanently under some inches of water and this has produced a habitat new to the area. The old playing field attached to an industrial estate was included in a small housing development built in 1992.

### Additional plants recorded in the 1989-94 period

#### a] As a result of habitat change

It is of interest that within 12 months, plants of Reed Mace (*Typha latifolia*) had not only colonised the wet dug-out section but were already flowering. These have now become well established as has Celery-leaved Buttercup (*Ranunculus sceleratus*) which vary from tiny individual plants to patches four feet tall. Mare's-tail (*Hippuris vulgaris*) arrived in 1993. The bank of the dug-out section has been colonised by Butterfly-bush (*Buddleja davidii*) and Snapdragon (*Antirrhinum majus*), and supports one small Osier (*Salix viminalis*).

Red Dead-nettle (*Lamium purpureum*) has been recorded in an area of recently sown grass between two sections of the new housing development.

#### b] Other records

In addition to the above seven species a further 35 taxa have been recorded, distributed throughout most of the habitats previously categorised (Table 1).

During 1989 and 1990 a few plants of Northern Marsh-orchid (*Dactylorhiza purpurella*) were reckoned to be just outside the V.C.77 boundary, but in 1991 one was definitely within Lanarkshire since when there has been explosive spread. By 1993 there were over 1,000 on the heathy grassland which prior to 1942 had been part of a golf course (Plate 2a p.494). In addition there are many hybrids with Common Spotted-orchid (*D. fuchsii*) (Plate 2b, c, p.494). Common Spike-rush (*Eleocharis palustris*) grows in a very small damp patch and could easily have been overlooked in the past.

Jacob's Ladder (*Polemonium caeruleum*) now grows right in the centre of the heathy grassland. The same habitat supports one small Rhododendron (*Rhododendron ponticum*) and there are two small patches of American Blue-eyed-grass (*Sisyrinchium montanum*), and a small colony of Fox-and-cubs (*Hieracium aurantiacum* ssp. *carpathicola*). There are also scattered plants of Russell Lupin (*Lupinus x regalis*). While it is probable that some of the above plants were dumped, they are all at different parts of the heath suggesting the possibility of natural dispersal.

Siberian Squill (*Scilla siberica*) and Londonpride (*Saxifraga x urbium*) have been seen at the edge of a wood, presumably as a result of fly tipping.

Fen Bedstraw (*Galium uliginosum*) has now been recorded from a wet area on a long abandoned railway line.

There is now a small seedling Wild Cherry (*Prunus avium*) and there was a slightly larger seedling of a Pear (presumably *Pyrus communis*).

The Hybrid St John's-wort (*Hypericum x desetangsii*) was almost certainly present before but not identified until another such V.C.77 record was drawn to my attention (Watson and Dickson, 1992).

Polypody (*Polypodium vulgare*) has now colonised a pile of build-ers rubble, composed mainly of stone and mortar, dumped many years ago about ten yards into a wooded section. Ivy-leaved Toadflax (*Cymbalaria muralis*) grows in relation to bricks in another part of the same wood.

## Extensions of plants previously recorded

Two of the plants seen for the first time in the period 1986-88 (Macpherson, 1990) have extended appreciably. Pendulous Sedge (*Carex pendula*) had been seen first in 1986 as a single plant and there are now over 30 clumps, and Common Yellow-sedge (*Carex demissa*) which had appeared in 1988 in a damp hollow caused by an alteration to one of the streams, has now spread throughout the habitat. Broad-leaved Helleborine (*Epipactis helleborine*) and Common Spotted-orchid (*Dactylorhiza fuchsii*) which were present throughout the 1983-88 period have since extended their range to a considerable extent.

## Regained plants

Of those listed as having been lost during the period 1986-88 only two have been seen again and both at new sites. Smith's Pepperwort (*Lepidium heterophyllum*) had been lost from its station at a roadside, but in 1992 it appeared on ground disturbed by machinery gaining access to the abortive roadworks. Perennial Cornflower (*Centaurea montana*) had been lost from its roadside station, but a further patch now grows at the edge of one of the wooded sections, presumably another example of fly tipping.

## Recent losses

Soil from the section dug out in 1991 was thrown on to the bank on the north side and into part of the adjacent wood with the loss of French Crane's-bill (*Geranium endressii*), known since 1983, and Hybrid Quince (*Chenomalis x superba*) and Grape Hyacinth (*Muscari armeniacum*) both of which had been new records during the 1986-88 period. Also obliterated by the soil dumping, were Pear (*Pyrus communis*), Londonpride (*Saxifraga x urbium*) and Siberian Squill (*Scilla siberica*) all of which had been recorded for the first time during the present survey period. Hedge Mustard (*Sisymbrium officinale*) had been on the section which had been dug out. During 1992 the housing development resulted in the loss of Variegated Horsetail (*Equisetum variegatum*). Habitat overgrowth has exterminated Nettle-leaved Bellflower (*Campanula trachelium*) and Small Toadflax (*Chaenorhinum minus*). The two annual grasses Two-rowed Barley (*Hordeum disti-*

Table 1 Update of plant species recorded from Lanarkshire's Nose

HABITATS	ADDITIONS 1989-94	Gained '89-94	Total '83-88	TOTAL '83-94
Open Ground	Fool's Parsley ( <i>Aethusa cynapium</i> )			
	Pale Persicaria ( <i>Persicaria lapathifolia</i> )			
	Common Vetch ( <i>Vicia sativa</i> ssp. <i>nigra</i> )	3	54	57
Grassy	Common Comfrey ( <i>Symphytum officinale</i> )			
	Red Dead-nettle ( <i>Lamium purpureum</i> )			
	Great Mullein ( <i>Verbascum thapsus</i> )	3	36	39
Roadside	Dove's-foot Crane's-bill ( <i>Geranium molle</i> )			
	Black Currant ( <i>Ribes nigrum</i> )			
	Wild Pansy ( <i>Viola tricolor</i> )			
	Honesty ( <i>Lunaria annua</i> )	4	33	37
Old Railway	Fen Bedstraw ( <i>Galium uliginosum</i> )			
	Hybrid St John's-wort ( <i>Hypericum</i> x <i>desetangsii</i> )			
	Hybrid Willow-herb ( <i>Epilobium montanum</i> x <i>E. obscurum</i> )	3	20	23
Wood	Honeysuckle ( <i>Lonicera periclymenum</i> )			
	Ivy-leaved Toadflax ( <i>Cymbalaria muralis</i> )	2	14	16
Bush/Hedge	Large Bindweed ( <i>Calystegia silvatica</i> )	1	7	8
Water-side	Marsh Yellow-cress ( <i>Rorippa palustris</i> )	1	7	8
Heath	Northern Marsh Orchid ( <i>Dactylorhiza purpurella</i> )			
	Hybrid Orchid ( <i>D. fuchsii</i> x <i>D. purpurella</i> )			
	Creeping Yellow-cress ( <i>Rorippa sylvestris</i> )			
	Common Spike-rush ( <i>Eleocharis palustris</i> )	4	5	9
Water	Celery-leaved Buttercup ( <i>Ranunculus sceleratus</i> )			
	Water Horsetail ( <i>Equisetum fluviatile</i> )			
	Reed Mace ( <i>Typha latifolia</i> )			
	Mare's-tail ( <i>Hippuris vulgaris</i> )	4	3	7
Garden Weed		0	1	1
Grasses		0	32	32
Trees	Wild Cherry ( <i>Prunus avium</i> )			
	Hybrid Oak ( <i>Quercus petraea</i> x <i>Q. robur</i> )			
	Pear ( <i>Pyrus communis</i> )			
	Osier ( <i>Salix viminalis</i> )			
	Hybrid Willow ( <i>S. caprea</i> x <i>S. cinerea</i> )	5	23	28
Rushes		0	6	6
Sedges	Common Sedge ( <i>Carex nigra</i> )	1	5	6
Ferns	Polypody ( <i>Polypodium vulgare</i> )	1	4	5
Wood-rushes		0	2	2

Table 1 continued on next page

Table 1 continued

HABITATS	ADDITIONS 1989-94	Gained '89-94	Total '83-88	TOTAL '83-94
Alien/ Exotics	Butterfly-bush ( <i>Buddleja davidii</i> )			
	American Blue-eyed-grass ( <i>Sisyrinchium montanum</i> )			
	Jacob's ladder ( <i>Polemonium caeruleum</i> )			
	Cherry Laurel ( <i>Prunus laurocerasus</i> )			
	Russell Lupin ( <i>Lupinus x regalis</i> )			
	Rhododendron ( <i>Rhododendron ponticum</i> )			
	Siberian Squill ( <i>Scilla siberica</i> )			
	Fox-and-cubs ( <i>Hieracium aurantiacum</i> ssp. <i>carpathicola</i> )			
	Londonpride ( <i>Saxifraga x urbium</i> )			
	Snapdragon ( <i>Antirrhinum majus</i> )	10	37	47
<b>TOTALS</b>		<b>42</b>	<b>289</b>	<b>331</b>

chon) and Bread Wheat (*Triticum aestivum*) have not been seen since 1988. This gives a total loss of 12, of which three had been recorded for the first time, only in the present survey period.

## Discussion

Intensive recording of this small area at the north-west tip of Lanarkshire has proved to be an interesting project. Some of the gains and losses are directly attributable to alterations of habitat while others are due to natural changes.

The comparison of the two periods 1983-85 and 1986-88 had shown a loss of 25 and a gain of 23; overall 298 taxa had been recorded over the six year period. During the present survey period 12 plants have been lost and there have been 42 gains (although three of these have already been obliterated as described above). A total of 331 taxa have been seen on this area of only 39 hectares (96 acres) at least sometime during the 1983-94 period.

## References

- MACPHERSON, P. & TEASDALE, E. 1986. Plant recording at the tip of Lanarkshire's nose. *Glasg. Nat.* 21, 201-214.
- MACPHERSON, P. 1990. Lanarkshire's nose revisited. *Glasg. Nat.* 21, 503-507.
- WATSON, K.J. & DICKSON, J.H. 1992. Some naturally occurring flowering plant hybrids in the Glasgow area. *Glasg. Nat.* 22, 125-131.

## Acknowledgments

I am grateful for help with identification received from E.J. Clement, J.H. Dickson, K.M. Goodway, R.D. Meikle, A. McG. Stirling and K. Watson.

## Book Review

### The Fieldfare

DAVID NORMAN Hamlyn Ltd., London, 1994, 127 pp., 3 colour plates, colour photographs, black & white drawings & maps. ISBN 0 600 57961 1, £9.99.

This is one of an attractive new series of Species Guides issued by Hamlyn. The author has been ringing Fieldfares in Cheshire (in winter) for many years.

There is a good description of the bird and its plumage and comparisons with the other thrushes. A long section discusses distribution and population. Fieldfares are gregarious & successful and have been spreading south & west across Europe since the beginning of the century. Most accounts of breeding, feeding etc., are from studies in Germany and Scandinavia. Nesting habitat is usually in birch woodland, also mixed woods, and sometimes on rocky fells. The bird is hardy and has been recorded breeding at up to 2,000m altitude in the Alps. It seems strange that breeding has been noted so seldom in Scotland (or Britain), where it is so frequently seen as a winter visitor.

Colonial breeding is common in Fieldfares and they have a spectacular group dive-bombing (and defaecating) technique for defence against predators - there are accounts of buzzards being made flightless by soiling of their feathers. Another new fact (to me) was the association of other species nesting within, or near, Fieldfare colonies, presumably to benefit from the communal defence from predators. Species recorded include Bramblings, Siskins, Redpolls and even Merlins!

The chapter on movement and migration, I found rather difficult to follow, whereas the section on winter feeding and hard weather movements was more interesting. As so often timing of leaving the breeding area is dictated by depletion of food supply: in this case mostly Rowan berries.

This is an excellent book with much useful and interesting information.

ROBERT BURN

## Insect Records from the West of Scotland in 1993

Compiled by E.G. HANCOCK

Art Gallery and Museum, Kelvingrove, Glasgow,  
G3 8AG.

In this list, specific names and reference numbers of the Lepidoptera are as in Bradley, J.D. and Fletcher, D.S., 1979, *A Recorder's Log Book of British Butterflies and Moths*, London. As these entries are numbered, family names have been omitted. Other insects are as in Kloet, G.S. and Hincks, W.D., 1976 (Diptera and Siphonaptera), 1977 (Coleoptera and Strepsiptera) and 1978 (Hymenoptera).

Ten years have elapsed since this series of reports was begun, initially covering just butterflies and moths in the Strathclyde region. Gradually the coverage has expanded both geographically and in terms of the groups covered. It is not easy to define the west of Scotland without clear political boundaries or topographical features on such an axis. Embodied in this report are a few records of what might be regarded as eastern in origin. It is intended that future records will be accepted from the whole of Scotland, with a minor change in the article's title to accommodate this.

### LEPIDOPTERA

163. *Adscita sticticus* (L.). Rascarrel Bay, V.C.73, 23/6/93, MNR.

169. *Zygaena filipendulae* (L.). 'The Cunyon', (NS5563), V.C.77, 6/7/93; Frankfield Loch, V.C. 77, 13/7/93; Early Braes, V.C. 77, 15/7/93, IPG; Dalbeth, V.C. 77, 24/7/93, RS; Erskine, V.C.76, Dumbarton, V.C.99; Saltings, Clydebank, V.C.99; Baronshaugh, V.C.77, 1993, KF.

496 *Coleophora milvipennis* Zeller. Rannoch Moor, Perthshire, larval cases on *Betula nana*, new foodplant record, (NN4155), V.C.88, 18/7/93, KPB.

593 *Elachista regifcella* Sircom. Dura Den, Fife, larval blister mines in *Luzula sylvatica* (NO4115), V.C.85, 28/3/93, New to Fife, KPB.

1246 *Cydia tenebrosana* (Dup.). Haughend, Angus, one female to light, V.C.90, 2/7/93, KPB.

1553. *Anthocharis cardamines* (L.) Orange Tip. Emerged early and continuing to expand its range. Balmaclellan, V.C.73, 26/4/93, MNR; Renton, V.C.99, 28/4/93; Inveroran Wood, Helensburgh, V.C.99, 29/4/93, CB; Dumbarton, V.C.99, 6/5/93, CB; 8/5/93, KF, SE; Balloch, V.C.99, 9/5/93, JE; Great Cumbrae, V.C.100, 9/5/93, SW; Ross Priory, V.C.99 (ova on *Cardamine pratensis*, 16/5/93, RS; north of Girvan Mains, V.C.75, 30/4/93; south of Dunure, V.C.75, 6/6/93, AMcGS.

1555. *Callophrys rubi* (L.) Green Hairstreak. 20+ at Ballantrae, V.C.75, 29/4/93, JPB: 30+ at Largiebaan, V.C.101, May-June 1993, CMcH: 128 counted at Blackhill Mire, Helensburgh, V.C.99, 9/5/93, KF: Great Cumbræ, V.C.100, 9/5/93, SW: Clochrie Moss, Dumfries, 'abundant' on remnant bog near gravel pits (NX982812), V.C.72, 9/5/93, GNF & MS: Auchencorth Moss, Midlothian, single adult (NT2056), V.C.83, 16/5/93, new to Midlothian, KPB.

1574. *Polyommatus icarus* (Rott.) Common Blue. Saltings, Clydebank, (NS4672), V.C.99, 28/6/93, KF.

1590. *Vanessa atalanta* (L.) Red Admiral. Fairly common. Early records: Carsegowan Moss, V.C.74, 1/4/93, (very worn individual), JMcC: south of Ayr, V.C.75, 29/4/93, JPB.

1591. *Cynthia cardui* (L.) Painted Lady. Carman Muir, Renton, V.C.99, (3 seen), Dumbarton, V.C.99, 6/5/93; Poachy Glen, Renton, V.C.99, 7/5/93, CB: Ailsa Craig, V.C.75, 25/5/93, BZ: Sallas, N.Uist, V.C. 110, 26/6/93, JC: Grangemouth, V.C.86, 29/6/93, WB.

1597. *Inachis io* (L.) Peacock. North Alderston, V.C. 77, 27/9/93, KW.

1600. *Boloria selene* (D.& S.) Small Pearl-bordered Fritillary. Possible sighting Cathkin Braes, V.C.77, 22/6/93, LPR.

1607. *Argynnis aglaja* (L.) Dark Green Fritillary. Largiebaan, V.C.101, July 1993, CMcH.

1618. *Erebia aethiops* (Esp.) Scotch Argus. Near Faslane, V.C.99, early August 1993, Duchess Wood, Helensburgh, V.C.99, 2/9/93, CB.

1621. *Hipparchia semele* (L.) Grayling. Old Lanarkshire Steelworks, Wishaw, V.C. 77, -/7/93, LA.

1629. *Aphantopus hyperantus* (L.) The Ringlet. Failford, V.C.75, 26/6/93, Fiddlers Glen, V.C.77, and Craignethan Castle, V.C.77, 27/6/93, EGH.

2441. *Autographa gamma* (L.) Silver Y. Three at Cruggleton Castle, V.C.73, 9/6/93; Port Muddle, V.C.73, 21/8/93; Torr Point, V.C.73, 30/8/93, MNR.

## COLEOPTERA

### CARABIDAE (all from pitfall traps)

*Blethisa multipunctata* (L.). Castle Douglas, Kirkcudbright, grassland (NX7361), V.C.73, 3/5 - 1/6/93; Caerlaverock, Dumfries, rank grass (NY0265), V.C.72, 20/4 - 18/5/93, SB.

*Dyschirius luedersi* Wagner. Caerlaverock, Dumfries, saltmarsh (NY0666), V.C.72, 17/3 - 8/7; 13/8 - 13/9/93, SB.

*D. nitidus* (Dejean). Caerlaverock, Dumfries, saltmarsh (NY0666), V.C.72, 29/4 - 4/6/93, SB.

*D. salinus* Schaum. Caerlaverock, Dumfries, saltmarsh (NY0666), V.C.72, 17/3 - 8/7/93, SB.

*Bembidion properans* Stephens. Caerlaverock, Dumfries, saltmarsh (NY0666), V.C.72, 29/4 - 8/7/93, SB.

*B. varium* (Olivier). Caerlaverock, Dumfries, saltmarsh (NY0666), V.C.72, 17/3 - 4/6/93, SB.

*B. minimum* (Fabr.). Caerlaverock, Dumfries, salt marsh (NY0666), V.C.72, 17/3 - 4/6/93, SB.

*B. obtusum* Serville. Dumfries, grassland (NX9974), 18/5 - 17/6/93, SB.

*Stomis pumicatus* (Panzer). Dumfries, grassland (NX9974), V.C.72, 18/5 - 15/7/93, SB.

*Pterostichus cupreus* (L.). Dumfries, grassland (NX 9873), V.C.72, 20/4 - 17/6/93, SB.

*P. minor* (Gyll.). Caerlaverock, Dumfries, rank grass (NY0265), V.C.72, 20/4 - 18/5/93, SB.

*P. versicolor* (Sturm). Dumfries, grassland (NX9974, NX9873), V.C.72, 20/4 - 17/6/93, SB.

*Laemostenus terricola* (Herbst). Dumfries, grassland (NX9974), V.C.72, 20/4 - 17/6/93, SB.

*Synuchus nivalis* (Panz.) Dumfries, grassland, (NX9974), 17/6 - 15/7/93; Caerlaverock, Dumfries, saltmarsh (NY0666), V.C.72, 13/8 - 8/10/93, SB.

*Agonum nigrum* Dejean. Caerlaverock, Dumfries, salt marsh (NY0666), V.C.72, 17/3 - 4/6; 13/8 - 13/9/93, SB.

*Anisodactylus binotatus* (Fabr.). Dumfries, grassland (NX9974), V.C.72, 18/6 - 15/7/93, SB.

## HALIPLIDAE

*Haliplus lineolatus* Mannerheim. Souleat Loch, Wigtown, rainbow trout angling loch (NX101583), V.C.74, 17/9/93, GNF.

## DYTISCIDAE

*Graptodytes granularis* (L.). Barloke Moss, Kirkcudbright, shallow mossy *Carex* marsh (NX652476), V.C.73, 14/3/93, GNF.

*Agabus conspersus* (Marshall). Mersehead Farm, Southwick Merse, Kirkcudbright, V.C.73, 9/5/93, GNF & MS.

*A. unguicularis* Thomson. Clochrie Moss, Dumfries, bog remnant near gravel pit (NX982812), 9/5/93, GNF & MS.

*Ilybius guttiger* (Gyll.). Swamps Plantation, Wigtown, wooded bog in an oxbow (NX144564), V.C.74, 27/3/93; Barloke Moss, Kirkcudbright (NX652476), V.C.73, 14/3/93, GNF.

## HYDROPHILIDAE

*Helophorus fulgidicollis* Motschulsky. Mersehead Farm, Southwick Merse, Kirkcudbright, V.C.73, 9/5/93, GNF & MS.

*Cercyon ustulatus* (Preysslner). Mersehead Farm, Southwick Merse, Kirkcudbright, V.C.73, 9/5/93, GNF & MS.

*Laccobius atrocephalus* Reitter. Ardrossan, Ayrshire, nature reserve in railway cutting managed by the Academy (NS238425), V.C.75, 9/10/93, GNF.

## DRYOPIDAE

*Dryops similis* Bollow. Syllodioch Wood, Sandgreen, Kirkcudbright, exposed pond dominated by crowfoot (NX587528), V.C.73, 14/3/93, second Scottish record, GNF.

## LYMEXYLIDAE

*Hylecoetus dermestoides* (L.). Glen Nevis, adults emerging from spruce stumps (NN141685), V.C.97, 17/4/93, EGH.

## CERAMBYCIDAE

*Alosterna tabacicolor* (Degeer). Fiddlers Glen, Lanark, adults on umbelliferous flowers in sunshine, V.C.77, 27/6/93, EGH.

*Judolia cerambyciformis* (Schrank). Fiddlers Glen, Lanark, on umbellifers, V.C.77, 27/6/93, EGH.

## DIPTERA

### ANISOPODIDAE

*Sylvicola zetterstedti* (Edwards). Fiddlers Glen, Lanark, larvae in roots of wood angelica, V.C.77, 27/6/93, EGH.

### MYCETOBIIIDAE

*Mycetobia pallipes* Meigen. Little Sorn Wood, near Galston, Ayrshire, larvae under elm bark, V.C.75, 26/6/93, EGH.

### HYBOTIDAE

*Tachydromia umbrarum* Haliday. Sandford, near Strathaven, Lanarkshire, adults on fallen ash, V.C.77, 25/6/93, second Scottish record, DR.

### SYRPHIDAE

*Brachyopa scutellaris* Rob.-Des. Little Sorn wood, near Galston, Ayrshire, larvae in sap on elm, V.C.75, 26/6/93, GER.

### HIPPOBOSCIDAE

*Ornithomya fringillina* Curtis. Ailsa Craig, on tree creeper (*Certhia familiaris*), V.C.75, -/9/93, BZ.

## HYMENOPTERA

### CIMBICIDAE

*Zaraea fasciata* (L.). Fiddlers Glen, Lanark, V.C.77, 27/6/93, EGH.

## Contributors

Leonie Alexander (LA); Chris Balling (CB); James P. Black (JPB); Keith Bland (KPB); Shona Blake (SB); Bill Brackenridge (WB); Jane Christie (JC); Jean Ebdon (JE); Sue Ebdon (SE); Garth Foster (GNF); Keith Futter (KF); David Galbraith (DG); Iain P.Gibson (IPG); Geoff Hancock (EGH); Jim McCleary (JMcC); Claire McHardy (CMcH); Laura Parker (LP); David Robertson (DR); Graham Rotheray (GER); Neil Rankin (MNR); Linn Park Ranger Service (LPR); Allan Stirling (AMcGS); Magnus Sinclair (MS); Richard Sutcliffe (RS); Keith Watson (KW); Sue Wilkinson (SW); Bernard Zonfrillo (BZ).

**A Specimen of the Deep-sea Anglerfish *Cryptopsaras couesi* Gill (Teleostei, Lophiiformes, Ceratiidae) Caught on the Eastern Flank of the Rockall Trough, with Comments on the Distribution of the Species in the North-eastern Atlantic.**

**G. N. SWINNEY<sup>1</sup>, R. SUTCLIFFE<sup>2</sup> & K. P. BLAND<sup>3</sup>,**

<sup>1</sup> National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF.

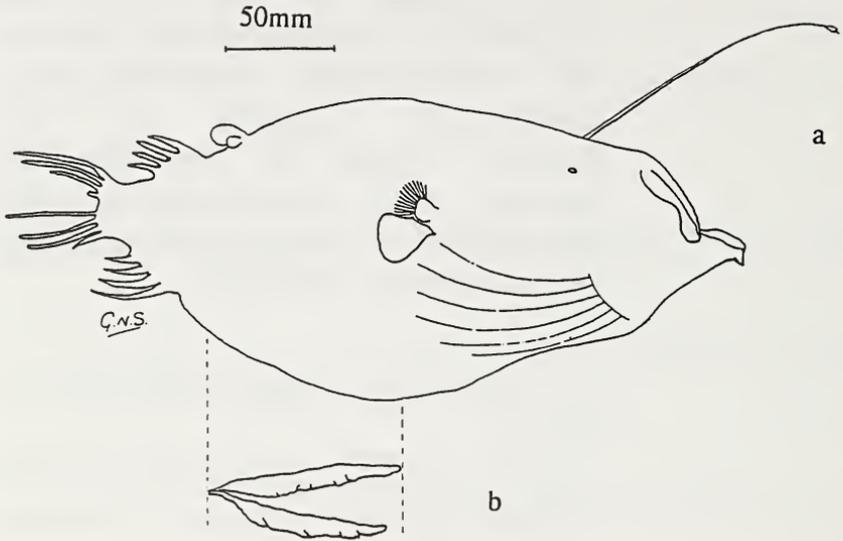
<sup>2</sup> Glasgow Museums, Art Gallery & Museum, Kelvingrove, Glasgow G3 8AG.

<sup>3</sup> Royal (Dick) School of Veterinary Studies, Summerhall, Edinburgh EH9 1QH.

This paper reports the capture of an adult female *Cryptopsaras couesi* Gill, 1883 (Fig. 1a) by the vessel 'Oruna' whilst fishing for mixed white fish at approximately 55°30'N 09°35'W, about 120 kilometres west of Bloody Foreland, Co. Donegal. The fish, 247mm standard length, SL, (measurement taken after fixation in 10% formalin and transfer to 70% industrial methylated spirit for long-term storage), was caught on 20 April 1994 in a rock-hopper trawl (a light white-fish bottom-trawl adapted for use over rough ground) fished at a depth of approximately 150-200 fathoms (275-366m). The specimen, which apart from a large tear in the body wall on the left flank, is in good condition, is deposited in Glasgow Museums as Z.1994.98. (Any correspondence regarding it should be addressed to the second author).

### **General Biology of Ceratioids**

Adult ceratioids are mesopelagic and bathypelagic fish. As they metamorphose from their epipelagic larval stage and descend into the depths these anglerfish develop a striking sexual dimorphism. Females



**Figure 1:** a) Free-hand sketch of *Cryptopsaras couesi* (Glasgow Museums Z.1994.98) and b) its ovaries.

are readily identified by the presence, in most species, of a modified anterior dorsal fin ray, the illicium, which bears a bulb-shaped light organ at its tip. This is thought to act as a lure attracting prey towards the cavernous mouth, hence the common-name of 'anglerfish'. They are believed to grow slowly and to live for several years. By contrast ceratioid males are dwarf, in most species growing to less than 10% of the length of the female, and are believed, at least in some species, to be subannual (Marshall, 1979). They lack the 'angling' apparatus of the females and in many species their jaws are used not for feeding but for attachment to metamorphosed females, i.e. they are so-called 'parasitic' males (Regan, 1925; Bertelsen, 1951; Pietsch, 1976). The larvae, unattached males and even the adult females of most species are small and are caught usually only by nets designed or adapted for research purposes. Adults of the large species which comprise the family Ceratiidae are occasionally caught during commercial fishing but, since these fish normally inhabit the deep ocean, they are generally inaccessible to fisheries.

## General Biology of *Cryptopsaras couesi*

*C. couesi* is the only species recognised within its genus. Females are readily distinguished from all other ceratioids by the presence of three bulbous swellings or caruncles, actually modified fin rays containing bioluminescent tissue, in advance of the second dorsal fin. The largest caruncle is in the midline and it is flanked on either side by a smaller one (Pietsch, 1986).

*C. couesi* is the second largest species of ceratioid. Females may reach 450mm SL. (Quéro & Vayne (1989) list a specimen 820mm total length, TL, but this would seem to be an error). It is one of the most commonly caught ceratioids. Pietsch (1986) notes 378 adolescent and adult females in collections worldwide, mostly caught between 500 and 1000m. In the Atlantic it has been recorded from approximately 35°S to approximately 65°N, (Pietsch, 1986; Quéro & Vayne, 1989; Du Buit et al., 1989), although larvae and unattached males seem to have a more restricted distribution occurring only in lower latitudes, between 35°S and 40°N (Bertelsen, 1951). Quéro & Vayne (1989) list a total of 56 records of *C. couesi* from the north-eastern Atlantic and Nigel Merrett (pers. comm.) informs us that small specimens are not uncommon in midwater trawl catches. Most records of large females, defined by Quéro & Vayne (1989) as >120mm SL, are from around Iceland. Their data suggest that they are present in these high latitudes throughout the year. Reports of large females south of Iceland are rare and they list only four from south of 63°N. Since their paper three further specimens have been reported:

1). 60°05'N 07°20'W, 500m, 15 April 1989, 195mm SL., BMNH 1994.10.31:1 (Minchin & Isaev, 1989).

2). 30 miles west of Eshaness, Shetland [approx. 60° 30'N 02°N 30'W], approx. 150 fathoms [275m], 15 May 1994, 212mm SL. BMNH 1994.9.28:5 (Blackadder, 1994a & b).

3). Rockall Bank, >200m, June 1994, 218mm SL. Collections of Department of the Marine, Fisheries Research Centre, Dublin (Ciaran Kelly, pers. comm.).

Many of the records listed by Quéro & Vayne (1989) quote only TL. The relationship between TL and SL for *C. couesi* is expressed in Fig. 2 and, although based on a small amount of data, this regression equation has been used to estimate SL so as to make data from different sources comparable.

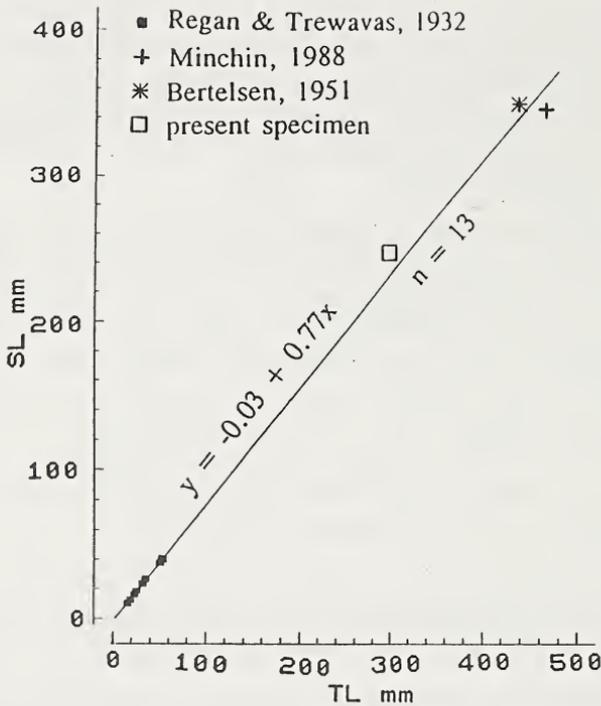


Figure 2: Total length (TL) plotted against standard length (SL) for *Cryptopsaras couesi*. Data are from Regan & Trewavas (1932), Minchin (1988), Bertelsen (1951) and the present specimen.

The north-eastern Atlantic distribution of *C. couesi* in relation to length is shown in Fig. 3.

For ceratioids generally, it has been assumed that the area where larvae and unattached males occur represents the breeding area of the species (eg. Bertelsen, 1951). Quéro & Vayne (1989) suggest that the apparent concentration of large female *C. couesi* off Iceland and their absence from within the breeding zone reflects merely differences in sampling effort and the kind of gear used in these two areas. Large females collected far outside the presumed breeding area are thought to be individuals which are lost to the breeding population, having drifted out of the area in surface or intermediate currents during their epipe-

lagic larval, metamorphosis or early adult stages. *C. couesi* may be more susceptible than other anglerfish to being carried in surface currents as there is evidence in the literature that this species spends a longer part of its early life at shallower depths than do other ceratioids. Regan & Trewavas (1932) specifically comment on the presence of small females relatively near the surface while Bertelsen (1951) reports that about 60% of young female *C. couesi* captured by the Danish 'Dana' Expedition were caught at depths of less than 1000m, compared with only 13% of other ceratioids. In the surface and intermediate waters of much of the subtropical and temperate North Atlantic major currents flow in a north-easterly direction.

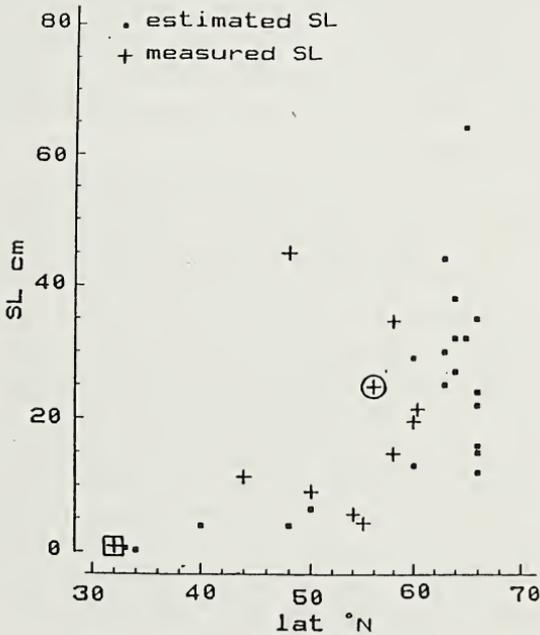


Figure 3: Plot of latitude °N against fish length for female *Cryptopsaras couesi*. Data are from Quéro & Vayne (1989), Minchin & Isaev (1989), and Blackadder (1994a). Lengths recorded as TL have been converted to estimates of SL using the relationship expressed in Fig.2. Estimated SL values are indicated by squares to distinguish them from measured SL values which are indicated by crosses. The data point for the present specimen is encircled. That for another previously unpublished specimen, from off Madeira, (Swinney, in prep.) is enclosed in a square.

### Reproductive Status of the Specimen

Pietsch (1976) notes that female Ceratiidae which lack attached males never have well developed gonads. He suggests that, in this family, '...females probably never become gravid until stimulated by the permanent parasitic attachment of a male'. The present specimen carries neither attached males nor any apparent scars indicating the former presence of males which might have become detached. Yet, despite the lack of a male, its ovaries are moderately large (maximum dimensions of left ovary - length 85mm (34% SL), depth 10mm, thickness 7mm; Fig. 1b). They are paired sac-shaped structures each opening into the cloaca via an oviduct approximately 12mm in length.

Comparative data on the size of mature ovaries are lacking from the literature but the relative length of the ovary is similar to that reported by Bertelsen & Krefft (1988), i.e. 20-41% SL, for individuals of various species of *Himantolophis* which they considered to be approaching maturity. However, those of the present specimen are considerably smaller in both depth and thickness.

Ovarian eggs of mature or nearly mature ceratioids are reported to be small and slightly ovoid, measuring 0.5-0.8mm along their major axis (Bertelsen, 1980; 1984; Pietsch, 1984). Histological examination of a transverse section of the left ovary of the present specimen, taken about midway along its length, reveals that the ovarian cavity contains numerous lamellae in which oogenesis is taking place. The eggs are in clusters; each of which contains germ cells in various stages of maturation. The most mature oocytes (0.10-0.12mm diam.) are in the diplotene stage with several peripheral nucleoli. The acidophilic cytoplasm of these cells suggests that vitellogenesis has begun and this is supported by the presence of early yolk vesicle formation (Hibiya, 1982). Traces of a positive Periodic Acid-Schiff (PAS) reaction indicate that the chorion is beginning to form. Thus the present female appears to have been entering the final stages of oocyte maturation.

### Acknowledgments

We would like to thank Alex MacDonald and Geoff Byron for drawing this specimen to our attention and for donating it to Glasgow Museums' collections and also Donald Miller for information about the fishing gear used in its capture. We wish to thank Ciaran Kelly and Daniel Minchin for permission to quote unpublished data and Patrick Campbell, John Gordon and Nigel Merrett for information about specimens either in their care or known to them.

## References

- BERTELSEN, E. (1951). The Ceratioid fishes. Ontogeny, taxonomy, distribution and biology. *Dana Report* No.39, 1-276.
- BERTELSEN, E. (1980). Notes on Linophryniidae V: A revision of the deepsea anglerfish of the *Linophryne arborifera*-group (Pisces, Ceratioidei). *Steenstrupia* 6, 29-70.
- BERTELSEN, E. (1984). Ceratioidei: development and relationships. In *Ontogeny and Systematics of Fishes* (Moser, H.G., Richards, W.J., Cohen, D.M., Fahay, M.P., Kendall, A.W. & Richardson, S.L. eds.) American Society of Ichthyologists and Herpetologists, Special Publication No. 1, 325-334.
- BERTELSEN, E. (1986). Ceratiidae. In *Fishes of the North-eastern Atlantic and the Mediterranean* 3, (Whitehead, P.J.P., Bauchot, M.-L., Hureau, J.-C., Nielsen, J. & Tortonese, E. eds), 1403-1405. Paris: UNESCO.
- BERTELSEN, E. & KREFFT, G. (1988). The ceratioid family Himantolophidae (Pisces, Lophiiformes). *Steenstrupia* 14, 9-89.
- BLACKADDER, J.S. (1994a). Angling for the spotlight this week. Wildernews, *Shetland Times* 27 May 1994.
- BLACKADDER, J.S. (1994b). Eyeless fish is given an identity. Wildernews, *Shetland Times* 5 August 1994.
- DU BUIT, M.-H., OZOUF-COSTAZ, C. & QUÉRO, J.-C. (1989). Observations à Concarneau de *Cryptopsaras couesi* et *Cerantias* sp. (Pisces, Lophiiformes, Ceratiidae), espèces nouvelles pour la faune ichthyologique française. Leur distribution en Atlantique Nord-est. *Cybium* 13, 192.
- HIBIYA, T. (1982) Gonads. pp 104-111 in *An atlas of fish histology; normal and pathological features* (Hibiya, T. ed). Tokyo: Kodansha.
- MARSHALL, N. B. (1979). *Developments in deep-sea biology*. Poole: Blandford.
- MINCHIN, D. (1988). A record of the deep-sea anglerfish, *Cryptopsaras couesi* Gill, from the north-eastern Atlantic. *Journal of Fish Biology* 32, 313.
- MINCHIN, D. & ISAEV, N. A. (1989). Some fishes associated with blue whiting on the 1989 cruise of the R.V. 'Professor Marti'. *Report to the ICES Pelagic Fish Committee, CM 1989/H47*, 1-10 (unpublished).
- PIETSCH, T.W. (1976). Dimorphism, parasitism and sex: reproductive strategies among deepsea ceratioid anglerfishes. *Copeia* 1976, 781-793.
- PIETSCH, T. W. (1984). Lophiiformes: development and relationships. In *Ontogeny and systematics of fishes* (Moser, H.G., Richards, W.J., Cohen, D.M., Fahay, M.P., Kendall, A.W. & Richardson, S.L. eds.) American Society of Ichthyologists and Herpetologists, Special Publication No. 1, 320-325.
- PIETSCH, T. W. (1986). Systematics and distribution of bathypelagic anglerfishes of the family Ceratiidae (order: Lophiiformes). *Copeia* 1982, 479 - 493.
- QUÉRO, J.-C. & VAYNE, J.-J. (1989). Les petits et grands pêcheurs abyssaux (Pisces, Ceratiidae) pêchés dans les eaux européennes. *Mésogée* 48 [1988], 173 - 181.
- REGAN, C.T. (1925). Dwarfed males parasitic on the females in oceanic anglerfishes (Pediculati, Ceratioidea). *Proc. R. Soc. B* 97, 386 - 400.
- REAGAN, C.T. & TREWAVAS, E. (1932) . Deep-sea anglerfish (Ceratioidea). *Dana Report* No.2, 1-113.

## Book Reviews

### Scottish Birds

VALERIE THOM

Collins Guide / Total Oil Marine, Harper Collins, 1994, 256 pp., numerous colour illustrations. Softback, ISBN 0 00 219983 1, £7.99.

This is essentially a bird guide for absolute beginners with field-guide illustrations of the commoner species found in Scotland and a gazetteer of places to visit. The guide contains much useful information which will be a big help to those starting the pastime of bird watching.

The birds are described according to habitat preferences which, I feel, tends to lead to confusion, since birds can frequently turn up in atypical habitats. One would have to look up "Woodland" to identify a Treecreeper on Ailsa Craig or a Spotted Flycatcher on the Isle of May, and Grasshopper Warbler is placed under the same heading although it seldom, if ever, is seen in woodland. A straightforward systematic list would have been much better since the relationships of one species to another are not difficult to understand.

All in all though, it is a good inexpensive present for a youngster or visitor starting bird watching.

BERNARD ZONFRILLO

### Torridon

LEA MACNALLY

Swan Hill Press, 1993, 176 pp., 29 colour plates, index. Hardback, ISBN 1 85310 3500, £17.95.

This is a fascinating account of the life of a Ranger / Naturalist in Torridon. Written with a strong autobiographical element, this book records the heartbreaks and joys of working with wild life. The section on deer is fascinating, the author describing the rare event of the birth of twin Red Deer in his animal sanctuary and the dangerous nature of stags during the rutting season. The necessity of culling deer in order to alleviate hardship for the animals is discussed.

Interesting accounts of the exploits of a rescued Pine Marten upsetting milk and cakes in the author's kitchen and of observing Golden Eagles are given. Tribute is paid to the mountain rescue team who, among its rescues, included that of a 13-stone Irish Wolfhound.

This easily read and enjoyable book was marred by some grammatical and printer's errors. The inclusion of a map would have also been helpful.

MARGARET M. H. LYTH

## The Natural History of the Muck Islands, North Ebudes 10. Insecta: Diptera

**RONALD M. DOBSON**

Institute of Biomedical & Life Sciences, Graham Kerr Building, University of Glasgow, Glasgow G12 8QQ

The following list details all the species of Diptera recorded during some 36 visits to the islands since work started in 1977. Methods of collecting include sweep-netting, ultra-violet light trapping, Tullgren funnel extraction of litter and pit-fall trapping. All months of the year, except October are represented.

Species names, with few exceptions are as in Kloet & Hincks' 1976 checklist. Syrphidae, however, follow the list of Stubbs & Falk, 1983. Some recent name changes, as noted in the Royal Entomological Society journal, *Antenna*, have also been incorporated. To facilitate comparisons, published records of the species listed here from other islands within the "Small Isles" group and from the Outer Hebrides are indicated. These came from the following sources: Canna - Bertram (1939); Eigg - Kevan (1940); Rum - Wormell (1982), Whiteley (1994); Outer Hebrides - Waterston (1981), Whiteley et al. (1994), Skidmore (in Whiteley, 1994), MacGowan (in Whiteley, 1994).

Place names are as in Dobson & Dobson (1985) and Dobson (1987). M = Muck; L = Lamb Island; H = Horse Island; Ea = Eagamol; C = Canna; E = Eigg; R = Rum; OH = Outer Hebrides, V.C 110; 37,38,47,48 = 10km National Grid square (NM). Months are indicated by Roman numerals but where records came from pitfall traps (which sometimes stood for several months) only the season is indicated.

Identifications were based on the literature and, where possible, by comparison with named specimens in the Hunterian Museum, Glasgow University. Assistance by specialists is indicated in the text. Species marked \* were verified by dissection of the genitalia.

## List of species

### TIPULIDAE

- \**Prionocera turcica* (F.); M,H; 38,47; Central Lochan W., 2/ii/80; Horse Isl., 19/vi/87; not common; (OH).
- Nephrotoma appendiculata* (Pierre); M; 48; one at Gallanach, 13/vi/82; (OH).
- \**N. flavescens* (L.); M; 48; one at light. Gallanach, 29/vi/88.
- \**Tipula marmorata* Mg.; M; 47; few at light in swamp. mid-Muck, 9/ix/83; (OH).
- T. pagana* Mg.; M; 47; one at Port an t-Seilich, 13/xi/80
- \**T. rufina* Mg.; M; 47,48; uncommon; Beinn Airein, 2/viii/80; Gallanach, 23/v/86 (OH,R).
- \**T. varipennis* Mg.; H; 38; one, 24/vi/82; (OH,R).
- T. scripta* Mg.; M; 47; Central Wood traps, autumn '80; larva in Port Mor Wood, 27/v/86; Square Wood, 10/viii/92; (C,E,OH,R).
- \**T. lateralis* Mg.; M; 48; in N. Muck, 16/v/80; (OH).
- T. oleracea* L.; M,H; 38,47; common and widely distributed, v - ix; (E,OH, R).
- T. paludosa* Mg.; M; 48; near N. coast, vii - viii; (OH,R).
- T. maxima* Poda; one wing, Square Wood, 1978; (C).
- Limonia mitis* (Mg.) f. *affinis* (Schummel); M; 47; one in swamp near fank, 17/v/80; (OH,R).
- Pedicia rivosa* (L.); M; 47,48; at light Central Wood, 17/ix/79; swamp near Gallanach, 9/ix/83; (OH,R).
- Limnophila ferruginea* (Mg.); M; 48; one in swamp 11/vii/81 at Bagh; (C,OH,R).
- L. fulvonervosa* (Schummel); M; 37; common in Gleann Mhartein, 10/vii/81; (OH,R).
- Gonomyia simplex* Tonnoir; M; 47; one at Central Lochan E. 12/vii/81; (R).
- Erioptera gemina* Tjeder; M; 47; common at Central Lochan E. 12/vii/81; (R).

### PSYCHODIDAE

- Pericoma nubila* (Mg.); M; 37; on Iris at foot of Gleann Mhartein, 11/vii/81.

### PTYCHOPTERIDAE

- \**Ptychoptera albimana* (F.); M; 47; two in swamp near Central Wood, 24/v/87; (OH).

### CULICIDAE

- Anopheles claviger* (Mg.); M; 47; one in swamp near fank, 17/v/80.

### CERATOPOGONIDAE

- Culicoides impunctatus* Goetghebuer; M,H; 38,47; Central Wood, 1/viii/80; Horse Isl., 19/vi/82; occasionally abundant; (OH,R).

### CHIRONOMIDAE

- \**Macropelopia notata* (Mg.); M; 48; in swamp at Bagh, 11/vii/81; (OH).
- \**Procladius culiciformis* (L.); M;48; in bay at Am Maol, 13/v/82; (Dr. P. Langton comments that this is the species of Edwards and Pinder, but as the genus *Procladius* is in need of revision, he has reservations as to this species which he has yet to rear. Until he has done this he does not know whether it is but a form of *choreus*).
- \**Arctopelopia griseipennis* (Wulp) (det. Langton); M; 47; swamp near fank, 17/v/81; Central Lochan E., 18/vii/81; (OH).

- \**Natarsia punctata* (F.); M; 47; by Central Lochan E., 12/vii/81.  
 \**Trissopelopia longimana* (Staeger); M; 47; in Central Wood, 14/vii/81.  
 \**Psectrocladius obvius* (Walker); M; 47; in swamp by fank, 17/v/80.  
 \**P. sordidellus* (Zetterstedt); M; 47; by Central Lochan E., 12/vii/81.  
 \**Camptochironomus pallidivittatus* (Malloch); several at Am Maol Lochan, 23/v/83.  
 \**Camptochironomus tentans* (F.); M; 47; by Central Lochan W., 16-18/vii/82.  
 \**Chironomus pseudothummi* Strenzke; M; 47; by Central Lochan E., 12/vii/81. (Langton comments that the identification is likely to be correct. Most of the *thummi* group are, however, so far unidentifiable as adults and there are more in Britain than are keyed by Pinder.)  
 \**Endochironomus impar* (Walker); M; 47; by Central Lochan W., 16-18/vii/82.  
 \**Micropsectra fusca* (Mg.); M; 47,48; adults emerging from pools on Am Maol, 16/ii/81; by Central Lochan E., 12/vii/81.  
 \**Paratanytarsus penicillatus* (Goetghebuer); M; 47; by Central Lochan E., 12/vii/81. (Det. Langton).

#### BIBIONIDAE

- Bibio lanigerus* Mg.; M; 47,48; Am Maol traps; south of Gallanach, 18/v/80.  
*B. lepidus* Loew; M; 47; one on beach near Iron Age fort, S. Muck, 13/xi/80 (checked by E.G. Hancock); (R).  
*B. nigriventris* Haliday; M; 47; swamps S. of Gallanach, 17-18/v/80; on birch, Pt. Mor Wood, 26/viii/88; Central Wood traps v-vii/80; (R).  
*B. pomonae* (F.); M; 47; in light trap, Wire Park Wood, 29/vii/80; (OH,R).  
*Dilophus febrilis* (L.); M; 47; pair in cop. near fank, 24/v/83; on Hawthorn Central Wood, 21/v/85; (OH).  
*Dilophus femoratus* Mg.; M,H; 38,47; south Horse Isl., 27/v/87; several on birch, Port Mor Wood, 26/v/88; (R,OH).

#### STRATIOMYIDAE

- Beris vallata* (Forster); M; 47; field edge, Cnoc na Curran, 14/vi/82.  
*Sargus splendens* Mg.; M; 47; one in S. Muck, 23/vii/84; (R).

#### RHAGIONIDAE

- Chrysopilus cristatus* (F.); M; 47; few near Port an-t Seilich, 23/vii/84; Central Wood, 15/vii/85. (R,OH).  
*Rhagio lineola* F.; M; 47,48; Square Wood, 1978; on Rowan, Central Wood, 1/viii/80; (R).  
*Rhagio scolopacea* (L.); M; 37,47,48; common and widely distributed, v - vii; (OH,R).

#### TABANIDAE

- Haematopota pluvialis* (L.); M; 47; common, v - viii; (C,E,OH,R).

#### EMPIDIDAE

- \**Platypalpus minutus* (Mg.); M;47; one in bracken near Gallanach, 19/vii/79; Cnoc na Curran, 1/viii/80; (OH).  
 \**P. palliventris* (Mg.); M;47; one male in bracken, near Gallanach, 19/vii/79; (OH,R).

*Bicellaria vana* Collin; M; 47; one near Central Lochan E., 12/vii/81.

*Empis punctata* Mg.; M; 47; one by Central Lochan E., 12/vii/81.

*E. trigramma* Mg.; M; 47; Central Wood, 23/v/88; (E).

*E. livida* L.; M; 47,48; widely distributed, vii; (C,OH,R).

#### DOLICHOPODIDAE

*Dolichopus atratus* Mg.; M; 47; two in grass, Port Mor Wood, 18/vii/82; (R,OH).

*D. plumipes* (Scopoli); Ea,M; 38,47; common on Egamol, 1/vii/86; on grass at Port Mor, 18/vii/82; (R,OH).

*D. popularis* Wiedemann; M; 47; in grass near Port Mor, 18/vii/82; (R,OH).

*D. trivialis* Haliday; M; 47,48; widely distributed, vi - vii; (OH).

*D. unguatus* (L.); M; 47; in grass near Gallanach, 20/vii/79; (E,OH,R).

*D. vitripennis* Mg.; M; 47; one on bracken near Gallanach, 19/vii/79; (C,OH,R).

#### LONCHOPTERIDAE

*Lonchoptera lutea* Panzer; H,M; 38,47; common and widely distributed, 17-18/v/80; (OH,R).

#### SYRPHIDAE

*Melanostoma mellinum* (L.); M; 37,47,48; widely distributed, vii - viii; (C,E,OH,R).

*M. scalare* (F.); M; 47,48; widely distributed, v - vi; (OH,R).

*Platycheirus albimanus* (F.); M; 47; frequent, v - xi; (R,OH).

*P. angustatus* (Zetterstedt); M; 47; one female, 15/vii/82; (R,OH).

*P. clypeatus* (Mg.); H,M; 38,47,48; common and widely distributed, vi - vii; (C,E,OH,R).

*P. manicatus* (Mg.); M; 47,48; common and widely distributed, vi - vii; (C,E,OH,R).

*Episyrphus balteatus* (Degeer); M; 47,48; widely distributed, vi - vii; (R,OH).

*Leucozona lucorum* (L.); M; 48; N. Muck, 18/v/80; (R).

*Metasyrphus corollae* (F.); M; 38; one, N.E. Muck, 24/v/84; (R,OH).

\**Sphaerophoria menthrastri* (L.) sensu Vockeroth; H,M; 37,38; widely distributed, v - vii; (OH,R).

*Syrphus ribesii* (L.); M; 47; Central Wood, 1/viii/80; (C,OH,R).

*Cheilosia illustrata* (Harris); M; 47; near Gallanach, 1/viii/80 & 15/vi/82; (C,OH).

*Rhingia campestris* Mg.; M; 47; widely distributed, vi - viii; (C,OH,R).

*Chrysogaster hirtella* Loew; M; 37,47,48; common and widely distributed, vi - vii; (C,E,OH,R).

*Lejogaster metallina* (F.); M; 47; one male, Port Mor, 17/vi/82; (R,OH).

*Neoascia tenor* (Harris); H,M; 38,47; common and widely distributed, v - vii; (OH,R).

*Eristalinus aeneus* (Scopoli); M; 38,48; one over rocks off Lamb Island, 20/v/85; (OH).

*Eristalis arbustorum* (L.); M; 47; in Central Muck, v - vi; (R,OH).

*E. horticola* (Degeer); M; 47; common, widely distributed; v - vii; (C,E,OH).

*E. intricarius* (L.); M; 47,48; common, widely distributed; v - vii; (E,OH,R).

*E. nemorum* (L.); M; 47; one near Gallanach, 10/vii/89; (R).

*E. pertinax* (Scopoli); M; 47; common in Central Muck, v - vii; (OH,R).

*Helophilus pendulus* (L.); M; 47,48; widely distributed in v; (E,OH,R).

*Sericomyia silentis* (Harris); M; 47,48; common, widely distributed, v - ix; (C,E,OH,R).

*Syritta pipiens* (L.); M; 47,48; widely distributed, vi - ix; (OH).

#### TEPHRITIDAE

*Xyphosia miliaria* (Schrank); M; 47; by sweeping grass etc., near Gallanach, 20/vii/79; (R).

#### OTITIDAE

\**Herina frondescentiae* (L.); M; 37; Gleann Mharteinn, 10/vii/81; (C,OH,R).

#### COELOPIDAE

*Coelopa frigida* (F.); H,M; 38,47; mainly on shore, vii - viii; (C,E,OH,R).

#### HELEOMYZIDAE

*Suillia notata* (Loew) var. *hilaris* (Zetterstedt); M; 48; abundant at Gallanach, '78; (OH,R).

#### SEPSIDAE

\**Themira annulipes* (Mg.); M; 47; near Gallanach, 19/vii/79; (C,OH).

\**Sepsis cynipsea* (L.); M; 47; near Gallanach, 19/vii/79 & 10/vii/81; (C,E,OH,R).

*S. flavimana* Mg.; M;47; field near Wire Park Wood; 9 & 10/vii/81; (OH).

\**S. neocynipsea* Melander & Spuler; M;47; on bracken, Rock Park Wood; 19/vii/79.

*S. orthocnemis* Frey; M;47; one near Wire Park Wood, 9/vii/81; (det. Pont); (OH).

#### SCIOMYZIDAE

*Knutsonia albiseta* (Scopoli); M; 47; occasional by Central Lochan E.; (OH).

#### SPHAEROCERIDAE

*Sphaerocera denticulata* (Mg.); M; 47; widespread; v - ix.

*Crumomyia nitida* (Mg.), M; 47; Rock Park Wood, -/xi/83; numerous in Am Maol traps, winter 83/84.

#### OPOMYZIDAE

*Geomyza tripunctata* Fallén; M; 47; field edge S. of Gallanach, 18/v/80; (OH,R).

\**Opomyza germinationis* (L.); M; 47; few near Gallanach, 19/vii/79; (C,OH,R).

#### CALLIPHORIDAE

*Calliphora uralensis* Villeneuve; M; 47; on carrion, Camas Mor, -/vii/78; (OH).

*C. vicina* Robineau-Desvoidy; M; 47,48; in building, Port Mor, 17/xi/80; Am Maol, 16/ii/81; (C,E,OH,R).

\**Lucilia caesar* (L.); M; 47,48; abundant and widely distributed; v - vii; (C,E,R,OH).

*L. sericata* (Mg.); M; 47; on carrion, Camas Mor, -/vii/78; (C,E,OH).

*Protophormia terraenovae* Robineau-Desvoidy; M; 47; Port Mor 24/vi/82.

#### SCATHOPHAGIDAE

*Pogonota barbata* (Zetterstedt); M; 47; several by Central Lochan W., 16-18/vii/82.

*Scathophaga furcata* (Say); M; 47; one, 13/ii/81; (OH,R).

\**S. litorea* Fallén; M; 47,48; widely distributed, active even in xi - ii; (C,OH,R).

*S. stercoraria* (L.); M; 47;48; common and widely distributed, ii - xi; (C,E,OH,R).

#### MUSCIDAE

*Morellia hortorum* (Fallén); M; 47; common and widely distributed, v - vii; (C,OH,R).

*Drymeia hamata* (Fallén); M; 47; occasional, v - vii; (R,OH).

*Hydrotaea irritans* (Fallén); M; 47; common and widely distributed, vi - viii; (C,E,OH,R).

*Phaonia rufipalpis* Macquart; M; 47; Central Wood traps summer '80.

*Helina intermedia* (Villeneuve); M; 47; in heather, 25/ix/80.

*H. laetifica* (Robineau-Desvoidy); M; 47; Gleann Mhartein traps, summer '80; (OH,R).

*H. obscurata* (Mg.); M; 47; near Gallanach, 19/vii/79; Gleann Mhartein traps summer-autumn '80. & near Gallanach, vii - ix; (OH).

*Graphomya maculata* (Scopoli); M; 47,48; by Central Lochan E., 5/viii/82; on carrion, near Gallanach, 24/v/83; (R,OH).

#### Discussion

The above list, of some 116 species, is clearly very incomplete but is comparable to other preliminary lists of Diptera from the Small Isles group, e.g. from Canna (Bertram, 1939) - 108 species, from Eigg (Kevan, 1940) - 81 species and from the much larger and more varied Rum (pre Steele & Woodroffe, 1969) - 259 species. The numbers, however, fall far short of those listed for Rum by Wormell (1982) - 550 confirmed species and the 108 additions noted by Whiteley (1994).

Many of the species recorded here were encountered repeatedly during the field work and comparatively few specimens in the collections could not be recognised so that the list probably fairly represents what might be reasonably achieved in the time available by a non-specialist worker using general collecting methods and recording all groups of insects at the same time.

Certain groups such as the Syrphidae, Scathophagidae and other conspicuous flies have probably been recorded fairly fully whereas more "specialist" groups such as Cecidomyiidae and Agromyzidae have not been noted at all. The Ceratopogonidae are almost certainly under-recorded although the biting midges, unlike those in Rum, do not dominate the insect fauna. Muck is largely wind-swept and, although midges can be troublesome on sultry calm days in summer, they are only a minor problem. The author and his family have camped

for many weeks on the island without inconvenience. Much more irritation was caused by the non-biting "Head Fly", *Hydrotaea irritans*.

It was surprising that only one species of Tabanidae was encountered because *Haematopota pluvialis* was quite common. It may be noted that this was also the only species noted on Canna by Bertram (1939).

The present list should, therefore, be regarded as preliminary and clearly there is much scope for specialist recording on this, largely unworked, island group.

### Acknowledgments

I am grateful to Mr and Mrs Lawrence MacEwen for their hospitality on Muck and to my wife Ruth for her support and encouragement. Dr P. Langton and Mr A.C. Pont assisted with the identifications of Chironomidae and Sepsidae respectively and Mr E.G. Hancock kindly read the first draft.

### References

- BERTRAM, D.S. (Ed.), 1939. The Natural History of Canna and Sanday, Inner Hebrides: A Report upon the Glasgow University Canna Expedition, 1936 and 1937. *Proc. R. phys.Soc. Ed.* 23: 1-72.
- DOBSON, R.H. & DOBSON, R.M., 1985. The Natural History of the Muck Islands, North Ebudes 1. Introduction and Vegetation with a list of Vascular Plants. *Glasg. Nat.* 21: 13-38.
- DOBSON, R.M., 1987. The Natural History of the Muck Islands, North Ebudes 4. Beetles. *Glasg. Nat.* 21: 335-349.
- KEVAN, D.K. McE., 1940. The Insect Fauna of the Isle of Eigg. *Entomologist* 73: 247-254.
- KLOET, G.S. & HINCKS, W.D., 1976. *A Check List of British Insects, Second Edition (Completely revised) Part 5: Diptera and Siphonaptera*. Royal Entomological Society of London.
- STEELE, W.O. & WOODROFFE, G.E., 1969. The Entomology of the Isle of Rhum National Nature Reserve. *Trans. Soc. Brit. Ent.* 18: 91-167.
- STUBBS, A.E. & FALK, S.J., 1983. *British Hoverflies*. British Entomological & Natural History Society, London.
- WATERSTON, A.R., 1981. Present knowledge of the non-marine fauna of the Outer Hebrides. *Proc. R. Soc. Edinb.* (B) 79: 215-321.
- WHITELEY, D. (Ed.), 1994. *Dipterists Digest No. 14. A Special Collection of Papers on the Outer Hebrides and Rum*.
- WORMELL, P. (Ed.), 1982. The Entomology of the Isle of Rhum National Nature Reserve. *Biol. J. Linn. Soc.* 18: 291-401.

## Book Reviews

### The Scottish Pearl in its World Context

FRED WOODWARD

Diehard, Edinburgh, 1994, 165pp., line drawings & maps.  
Softback, ISBN 0 946230 27 7, £6.50.

Pearl fishing evokes images as diverse as the tropical romance of Bizet's opera and the sophisticated luxury of Cartier jewellery. We can now include Scottish freshwaters in these romantic images. Fred Woodward worked in Glasgow at the Kelvingrove Art Gallery and Museum and is an acknowledged expert in the ecology of freshwater pearls and the mussels in which they grow. In this book he brings together in a fascinating account all aspects of the ecology of freshwater pearls: what they are; how they are formed; the taxonomy, life cycle and natural history of the host (the pearl mussel, *Margaritifera margaritifera*); the nature of competitors (artificial, culture and sea pearls). The book ends with information about conservation status of the mussels and an invitation for the reader to assist in this work. The subject is a clearly defined, comparatively restricted one and the book is of exactly the right size. No aspect is covered in excessive detail and all the questions I wanted to ask were well answered.

The author has read extensively through volumes of historical literature to make this most authoritative account, but if I were to make one criticism it is that I would have preferred to read more of Mr. Woodward's writing and less of the extensive quotations from other people's writings (including a namesake of his, writing in 1913 - any relation?).

In conclusion, this is an interesting and rewarding little book.

ROGER TIPPETT

### Where to Watch Birds in Britain and Europe

JOHN GOODERS

Hamlyn, London, 1994, 262 pp., line drawings & maps. Softback  
ISBN 0 600 58007 5, £12.99.

The author appears to have problems with geography because many of the bird-watching places in this "European" guide are in Africa and the Middle East! Thus Tunisia, Egypt, Gambia, Morocco, Israel and Turkey are somehow added to the true countries of Europe.

It is a useful book for the traveller and should be an asset for those seeking out special birds in particular areas. Britain is poorly covered and many of the best-sites are not even mentioned. Handa Island is noted as a prime site, but I wonder how many of the stated 100,000 breeding birds could be seen on a late October trip there?

This book is, however, a worthwhile first stop for those planning to travel in Europe and North Africa.

BERNARD ZONFRILLO

## Short Notes

Compiled by A. McG. Stirling

### Botanical

#### Plant records for Argyll, V.C.98, in 1994

B.H. THOMPSON

While no native species new to Argyll turned up during the year, previously unrecorded introductions continue to be found. Persian Ivy (*Hedera colchica*) is well established in estate woodland near Ford and almost certainly occurs in similar places elsewhere in V.C.98.

Des Etangs' St. John's-wort (*Hypericum x desetangsii*) occurs sparingly at the head of Loch Feochan and is assumed to be an introduction as neither parent is known in that area. Dr N.K.B. Robson thinks it most likely that this plant is the hybrid *H. maculatum* subsp. *maculatum* x *H. perforatum* (= *H. x desetangsii* nothovar. *carinthiacum*). Oxford Ragwort (*Senecio squalidus*) has managed to reach waste ground at Oban and in the same area, on railway ballast, Rat's-tail Fescue (*Vulpia myuros*) has established itself quite plentifully.

A single bush of the hybrid between Glaucous Northern Dog-rose (*Rosa caesia* subsp. *glauca*) and Sweet-briar (*R. rubiginosa*) was found by the main road in the Strath of Appin. As the last parent is thought not to be indigenous in the west of Scotland it is presumed that the bush was introduced or that the Sweet-briar parent was in cultivation locally.

A single bush of Dwarf Gorse (*Ulex minor*) was noted beside a forest track near Kilmartin and is the first modern record for the vice-county. The use of a construction machine which had previously been in Hampshire indicates the probable means of introduction. A good population of Bird's-foot (*Ornithopus perpusillus*) on a forest track east of Dalmally, the third record for V.C.98, is another example of this sort of introduction.

Visits during the year to the islands of Shuna, at the mouth of Loch Melfort, and to Lismore produced further interesting records of native species.

On the coastal limestone in north-west Shuna a small population of Common Gromwell (*Lithospermum officianale*) (Plate 3a., p.533), first noted here by A.A. Slack and A.McG. Stirling in 1964, continues to flourish. Only one other site is known for the species in V.C.98. In nearby rocky limestone woodland, Goldilocks Buttercup (*Ranunculus auricomus*) was growing more plentifully than at any other of its very few Argyll sites.

On Lismore Wild Basil (*Clinopodium vulgare*) was found to be much more frequent than previously supposed on the raised-beach cliffs of the east and north. A small colony has since been seen in a very similar habitat in north-east Kerrera. Another Lismore plant which proved to be more wide-spread than previously supposed is Small Cow-wheat (*Melampyrum sylvaticum*). First discovered on the island in 1991 by Slack and Stirling in hazel woodland on the north-west coast this has now been found in the same type of woodland habitat west of Kilcheran Loch and on the west coast south of Achadun. Coastal woodland in the north-west also produced Broad-leaved Helleborine (*Epipactis helleborine*) known elsewhere in the vice-county only at Port Appin on the mainland.

Southern Polypody (*Polypodium cambricum*), first found on a raised-beach cliff south of Achnacroish, Lismore, in 1974, was seen at two new sites on the cliffs further south. This fern is here at its furthest north known locality in the British Isles.

Round-fruited Rush (*Juncus compressus*) was refound on Lismore after a lapse of 45 years, having been seen west of Balnagowan by W.A. Sledge and E.C. Wallace in 1949. The only other Argyll record for this rush is from Insh Island but this needs confirmation as large plants of Saltmarsh Rush (*Juncus gerardii*) can be confused with this species.

Also on this splendid island an interesting hybrid rose was found: Burnet Rose (*Rosa pimpinellifolia*) x Soft Downy Rose (*R. mollis*) = *R. x sabinii* growing at the foot of the raised-beach cliff near Castle Coeffin accompanied by very large bushes of Burnet Rose, one of the parents.

Finally the elusive, and definitely rare, Adder`s-tongue (*Ophioglossum vulgatum*) was seen only once in 1994 (a few plants at one new locality on Lismore) and the even more elusive Bog Orchid (*Hammar-*

*bya paludosa*) twice (once north of Loch Avich and once south of Loch Awe).

### **A peculiar Foxglove - *Digitalis monstrosa***

JOHN.R.S. LYTH

On 17th June 1994, in the company of some students of L'Ecole des Plantes, Paris, I found some 24 to 30 specimens of a peculiar Foxglove growing on the machair beside the first fairway of Blackwaterfoot Golf Course, Arran. The terminal flowers of the spike had become fused together and resembled an upward-pointing Canterbury Bell.

It would appear from an article by Dr Stephen Buczacki in the August 1994 edition of the BBC publication *Gardeners' World* that they are *Digitalis monstrosa*, the Gloxinia-flowered Foxglove, an aberration which "apparently comes true if seed is collected from affected plants".

Some of the 30 specimens are now in Paris and elsewhere!

### **Hoary Mugwort (*Artemisia stelleriana*) in Ayrshire.**

A. McG. STIRLING

In late October 1994 Mr E. Nugent of Troon reported to me that he had found *Artemisia stelleriana* on the shore between Barassie and Gailes, Ayrshire, V.C.75. The plant, a white tomentose perennial with rhizomatose rootstock, is an introduction in the British Isles, being a native of Kamchatka.

On 27th October I visited the area Mr Nugent had indicated and had no difficulty finding the plants in kilometer square NS 32-34-. A number of clumps of varying size, the largest being up to 3 or 4 feet in circumference, were scattered along the beach over a distance of about 300 yards. They were growing in loose sand on the upper shore among Marram and Lyme Grass. Other accompanying plants included Sea Sandwort (*Honckenya peploides*), Sea Rocket (*Cakile maritima*) and Prickly Saltwort (*Salsola kali*). The more mature clumps had flowered freely, and even at this late date a few fresh flowers were noted.

This is the third locality where Hoary Mugwort has been found in south-west Scotland, the others being on the Solway shore in Kirkcubrightshire and at Brodick Bay, Arran. Interesting accounts of the plant

in the latter two localities are given by O.M. Stewart in BSBI *Scottish News Letters* Nos 4 and 5 (1982, 1983). It is difficult to imagine how and from whence this alien species came to be established on this stretch of beach some distance from any house or garden. The sandy habitat and association with Marram and Lyme grass is a common feature of all three localities. A herbarium specimen has been placed in the Glasgow Art Gallery and Museum, Kelvingrove.

**Common Knapweed (*Centaurea nigra*)  
new to Ailsa Craig**

B. ZONFRILLO

A strong-growing clump of this common plant was found in July 1994 growing near to the Gashouse building on Ailsa Craig, Ayrshire, V.C.75. It was on light soil among small boulders and was rather slender in appearance with thin leaves. This is the first record for the island and is additional to the recent list published in this journal (Zonfrillo, 1994; *Glasg.Nat.* 22: 307-344;). A few of the 10 or more stems were preserved and added to the other Ailsa Craig specimens in the herbarium of the Botany Department, Glasgow University.

**Betony in Lanarkshire**

P. MACPHERSON

In a previous article (Macpherson, 1994) I recorded plants seen in 1993 on an area of base-rich grassland at New Stevenston, Lanarkshire (V.C.77). During a visit in 1994 a further rarity was noted. There was one plant of Betony (*Stachys officinalis*) with four flowering spikes.

The first mention of the occurrence of Betony in V.C.77 was by Hopkirk (1813) who wrote of it (as Wood Betony - *Betonica officinalis*) "in woods, not infrequently". As his *Flora Glottiana* was "a Catalogue of the Indigenous Plants on the Banks of the River Clyde and in the Neighbourhood of the City of Glasgow" by implication the plant was to be found not infrequently in Lanarkshire. In 1832 Patrick wrote of *B. officinalis* as occurring in an island on the Clyde at Nethanfoot.

Hennedy (1865) considered Wood Betony to be very rare commenting that a few plants used to grow in Kenmuir Wood, Cambuslang Glen

and in woods about Hamilton. This implies that he no longer considered the plant to grow in the area, but Lee (1933), using modern nomenclature, wrote that the plant was very rare and gave as a location a wood near Hamilton. However he cited as reference Henedy's *The Clydesdale Flora*.

Perring and Walters (1962), when it had reverted to *Betonica officinalis*, gave one pre-1930 record for the 10km square NS/7.5. The Biological Records Centre at Monks Wood has an individual record card which simply states "near Hamilton 1933, NS/7.5 Clyde Area, Lee". All these slightly more recent records must relate back to the comment of Henedy (1865) as above. There has therefore been no record of the plant being seen in Lanarkshire for over 100 years. The present locality is in the same 10km square but, whereas Hamilton woods are in the SW quadrant, New Stevenston is in the NE quadrant.

The early authors referred to it as a woodland plant but Stace (1991) describes *S. officinalis* as a plant of hedgerows, grass-land and heaths; common in England and Wales but extremely local in Scotland.

As Betony is unlikely to have been confused with any other species, one must assume that it had declined to probable extinction in V.C.77 subsequent to the time of Hopkirk. I can offer no explanation, either for the decline or for the presence now of a single plant at New Stevenston. As was reported in the previous article the ground had been made up until 15 years ago with waste from an adjacent foundry but had never been seeded.

I am grateful to Mr C.D.Preston and Mrs J.M.Croft for supplying information.

## References

- HENNEDY, R., 1865. *The Clydesdale Flora*. Glasgow.  
 HOPKIRK, T., 1813. *Flora Glottiana*. Glasgow.  
 LEE, J.R., 1933. *Flora of the Clyde Area*. Glasgow.  
 MACPHERSON, P., 1994. Base-rich Grassland in Industrial Lanarkshire. *Glasg. Nat.* 22: 425-426.  
 PATRICK, W., 1832. *A Popular Description of the Indigenous Plants of Lanarkshire*. Edinburgh etc.  
 PERRING, F.H. & WALTERS, S.M., 1962. *Atlas of the British Flora*. London & Edinburgh.  
 STACE, C.A., 1991. *New Flora of the British Isles*. Cambridge.

## Yellow Bartsia in the Glasgow Area

J.A. McMULLEN  
& P. MACPHERSON

The hemi-parasite *Parentucellia viscosa* (Plate 3b, p.533) (Scrophulariaceae) is a rarity in Scotland with only a small number of past and present localities. The range of *P. viscosa* in the British Isles is largely restricted to the south-west of England and Ireland, particularly near the coast and its few, usually ephemeral, Scottish occurrences are often introductions from grass seed. In such situations it is probably susceptible to grazing and mowing. There are no previous records from the Glasgow area as defined by Dickson (1991) although it is of note that there are occurrences of a persistent nature in Dunbartonshire (V.C.99) dating from 1768 up to the present day (A.McG. Stirling, pers. comm.).

In September 1994, J.A.M. found the plant on a grassy bank between the foundations of the M77 road and the Brock Burn at Kenishead, Renfrewshire, V.C.76 (NS 538603). Only one specimen was found upon which dehisced pods were observed and it may be possible that the plant may regenerate from seed, although its maintenance is questionable given the cutting regime of the habitat. This occurrence is as an introduction with the seed mixture used to sow the newly laid banks upon which the M77 runs, the top soil being derived locally (pers. comm. Henry Boot Contractors Ltd.). The soil pH at this locality was 5.95, the aspect SW and associated plants include *Holcus lanatus*, *Lolium perenne*, *Phleum pratense*, *Persicaria maculosa*, *Ranunculus repens*, *Rumex obtusifolius*, *Trifolium repens* and *Tripleurospermum inodorum*.

In July 1994 P.M. noted a single plant of Yellow Bartsia at what had been the east car park at the time of the Glasgow Garden Festival in 1988. Prior to that it had been the General Terminus Quay. This site is just within Lanarkshire, V.C.77. Subsequent to the Festival a small housing complex was built at the east end of the old quay and two years ago the adjacent rough ground was sown with a clover mixture. It is presumed that this was the source of introduction. The three common clovers *Trifolium hybridum*, *T. pratense* and *T. repens* were present in abundance and five yards from the Bartsia was one plant of Crimson Clover (*Trifolium incarnatum* subsp. *incarnatum*) another new vice-county record, but like the Bartsia likely to be of casual occurrence.

## References

- DICKSON, J.H. 1991 *Wild Flowers of Glasgow*. Aberdeen.  
 STACE, C.A. 1991 *New Flora of the British Isles*. Cambridge.

(In his *Flora of the Clyde Area* (1933) J.R. Lee mentions an earlier Renfrewshire record from near Gourock. Compiler.)

## Zoological

### Return of Red Deer (*Cervus elaphus* L.) to the Kilpatrick Hills

J. MITCHELL

Twice before in this century Red Deer have spread south from highland Loch Lomondside to reach the Kilpatrick Hills just north of Glasgow. On these occasions the increase in deer numbers was attributed to the temporary cessation of culling due to the absence of gamekeepers and sportsmen during two world wars. In both cases all Red Deer to the south of Loch Lomond were shot-out once post-war control and sporting activities were resumed (*A Natural History of Loch Lomond*, 1974). The beginning of a third potential colonisation of the Kilpatrick Hills by Red Deer was first noted by Forest Enterprise ranger A. Fairweather in Auchineden Plantation in 1990. This was followed by further sightings in Merkins and Gartachorrans Plantations in 1992 and 1993 respectively.

Both public and private afforestation has been extensively carried out on the Kilpatrick Hills and surrounds since the mid-1960s, and additional plantings are proposed. With the substantial increase in woodland cover now available to the Red Deer there seems a much better chance that, despite some local culling being carried out, this time they will become permanently established in the Kilpatrick Hills area.

### Kingfisher near Bothwell Castle

MARGARET M.H. LYTH.

While walking by the bank of the River Clyde near Bothwell Castle, Uddingston, on the afternoon of 25 August 1994, I observed a Kingfisher (*Alcedo atthis*). The bird flew into thick vegetation on the river bank not far from where I was standing.

I last saw a Kingfisher in this vicinity on 7 November 1977 (Lyth, 1978; *Glasg. Nat.* 19: 425) despite visiting the area regularly during the past seventeen years in the hope of seeing a Kingfisher again.

The bird was at a spot about half a mile further downstream than that of the 1977 sighting and it was a delight to see on a sunny afternoon.

### **Fishing success rate of Otters in Argyll**

M. HANCOX

The decline of Otter populations (*Lutra lutra*) over much of Britain and Europe has been well documented. A gradual recovery is now under way, aided by reintroduction programmes, but it is a sad reflection that even such experienced naturalists as H.G. Hurrell only saw a handful of otters in a life time of Devon observation. By contrast, the western and northern coasts of Scotland have seemingly never suffered this decline, and observations on the ecology, distribution and behaviour of otters is remarkably easy in certain areas (Hancox, 1987; *Scott. Nat.* 99: 111-118).

One otter was observed near Drimnin, Morvern, Argyll in May 1994 for some eight minutes. After crossing the road, the otter fished off the shallow rocky coast for five or six minutes. Five dives were seen, and two of these each produced a 3 - 4 inch fish which was consumed while still "at sea" (larger fish are taken ashore for consumption). Clearly, otters can, by concentrating on optimal shallows, often where the turn of the tide has stirred up the fish and made them more vulnerable to predation, acquire a daily intake of fish prey adequate for their needs with perhaps as little as a half hour's fishing. Seasonal factors may make feeding more difficult and lengthy, but it is small wonder that otters are thriving in Argyll and can afford time for play and other leisure activities.

### **Pill Woodlice records from south-west Scotland**

A.McG. STIRLING

Mr J. McCleary, Newton Stewart, has confirmed the following records of woodlice belonging to the genus *Armadillidium* :-

*Armadillidium vulgare* (Latreille). Sandy shore at Pinbain Bridge, Lendalfoot, Ayrshire, V.C.75. (NX 137914), 6 June 1993, JMCC et al.

*A. pulchellum* (Zencker). Monreith, Wigtownshire, V.C.74 (NX3-4-), 1994, JMCC.

The latter species is the less common of the two, and is much smaller than *A. vulgare*; it has attractive orange and yellow markings. Both species characteristically roll into a ball when disturbed, hence the common name.

## Swordfish from Loch Fyne

R.SUTCLIFFE

The swordfish or broad-bill swordfish, *Xiphias gladius* Linnaeus, 1758, is the only member of the family Xiphiidae. It is characterised by its pointed snout (sword) which is flattened and oval in cross-section (Fig.1).

The swordfish is generally an uncommon fish in the seas of north-west Europe. It is found in temperate and warm-temperate seas throughout the world, and is relatively common off the Iberian Peninsula and in the Mediterranean. It occurs in cooler regions, such as around the British Isles only in summer and late autumn, and then only when oceanic currents have brought warm water further north than usual (Wheeler, 1975). It sometimes strays as far north as Iceland. They are only occasionally stranded and so the finding of the remains of one at the head of Loch Fyne in August 1994 is unusual and notable.

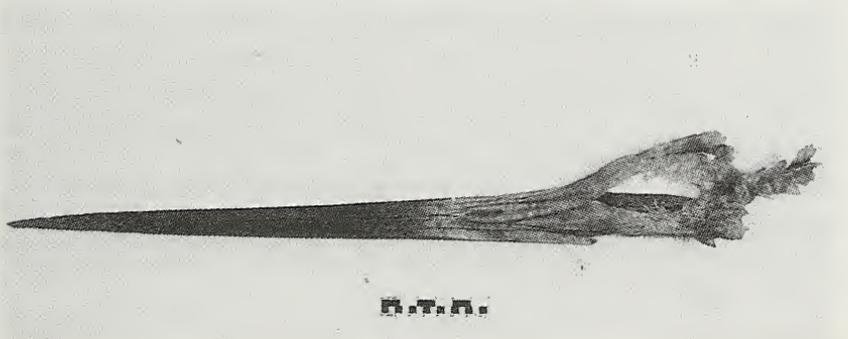


Fig.1: The skull and sword of the Loch Fyne Swordfish (Scale line = 15cms.)

The remains of the fish were discovered about 100m from the shore at the head of Loch Fyne, directly opposite Loch Fyne Oysters Ltd. The presence of large numbers of gulls around the spot for some time, alerted the local Ardkinglas Estate's head shepherd, Alastair McCallum, to the presence of the fish. When he investigated, he found that the fish has already been reduced to little more than a skeleton. The skull, vertebrae, some fins and a few other bones were collected and taken to Loch Fyne Oysters Ltd. Glasgow Museums were alerted to the presence of the fish and the author visited the site on 25 August and was able to find the remains of more fins, another vertebra and other fragments of bone.

Swordfish grow to a large size; specimens 11 feet (3.3m) long have been reported in British waters (Wheeler, 1969). The skeleton of the Loch Fyne swordfish measures 8 feet (2.4m) in length. It may have measured slightly longer than this, since a few vertebrae appear to be missing. The size suggests that the fish when alive may have weighed about 150-160lb (45.7-48.7kg). The skull and sword measured 3 feet 7 inches (1.09m) in length.

The skeleton has been donated to Glasgow Museums by Mr Andrew Lane of Loch Fyne Oysters Ltd. (accession number: Z.1994.118). It will be cleaned and put on public display in due course.

There are very few records of swordfish being stranded on the west coast of Scotland. One was stranded somewhere on the Ayrshire coast and another came ashore below Dundarave Castle above Inveraray, Argyllshire in 1904 (Hamilton, 1986). Gladstone (1914) reported the stranding of one at Annan, Dumfriesshire in 1913. Bagenal (1965), however, does not mention any records of the species from the Clyde Sea Area. One was stranded on the shore of Loch Caolisport, Kintyre in August 1972. The skull was collected and was supposedly later donated to Bradford Museum (Hamilton, 1986). However, there is no record of such a donation and the museum does not have a swordfish skull in its collection (M.M.Hartley, pers. comm.). Another specimen was apparently stranded in the same area within 3 weeks of it (W.Little, pers. comm.).

## References

- BAGENAL, T.B., 1965. *The Fauna of the Clyde Sea Area, Fishes*. Scottish Marine Biological Association, Millport.

- GLADSTONE, H.S., 1914. Sword-fish in Dumfriesshire. *Scott. Nat.* 25: 22.  
 HAMILTON F. 1986. *Kipper House Tales*. The Michael Press. Glasgow.  
 WHEELER, A., 1969. *The Fishes of the British Isles and North-West Europe*. Macmillan, London.  
 WHEELER, A., 1975. *Fishes of the World*. Ferndale Editions, London.

## Some records of myriapods and slugs new for the Glasgow area

GORDON B. CORBET

In 1991 a millipede of the genus *Brachychaeteuma* was found in a garden in Partickhill Road, Glasgow (NS 5566) by Dick Jones, organiser of the national millipede recording scheme. This was the first record of the genus in Scotland but unfortunately it was immature and could not be identified to species. Since then, two species have been found in Scotland : *B. bagnalli* Verhoeff in Kirkcudbrightshire, V.C. 73, and *B. bradeae* (Brolemann & Brade-Birks) in E. Perthshire, V.C. 89, (Jones, 1994). Unidentifiable immature specimens have also been found recently in Midlothian, V.C.83. A visit to the Partick site on 5 November 1994 failed to re-find *Brachychaeteuma* but produced several other scarce myriapods not hitherto recorded in the Glasgow area as shown in the preliminary atlases : British Millipede Group (1988), Barber & Keay (1988). They are all small species obtained by sieving leaf-litter and top-soil.

### Millipedes

*Melogona scutellare* (Ribaut). A cylindrical off-white species not shown north of the border in the Atlas but recently recorded at several sites in Fife and the Lothians.

*Blaniulus guttulatus* (Fabricius). A slender cylindrical millipede, white with bright red spots, well known in gardens in England but scarcer in Scotland although widely recorded from Argyll and Angus southwards.

*Archiboreoiulus pallidus* (Brade-Birks). A slender cylindrical white millipede with pale orange spots, recorded recently at several sites from Dundee to Berwickshire and Lanarkshire, but not elsewhere in the west of Scotland.

*Boreoiulus tenuis* (Bigler). Very similar to the last; widespread in Fife and the Lothians, sparsely recorded elsewhere in Scotland.

*Macrosternodesmus palicola* Brölemann. A tiny (4mm) white flat-backed millipede unrecorded in Scotland until recently when it has been found at a number of sites in the south and east.

### Centipedes

*Lithobius microps* Meinert. The smallest species of *Lithobius*, common in leaf-litter in England and recorded sparsely north to Perthshire in the east, but not hitherto in the west of Scotland.

*Geophilus oligopus* (Attems) (= *G. insculptus* auct. non Attems). One of the commoner subterranean centipedes, recorded widely but sparsely in Scotland, although apparently not hitherto in the Glasgow area.

## Slugs

*Boettgerilla pallens* Simroth. A small, pale slug, very long and worm-like when extended. It was first recorded in Britain in 1972 in NW England, and has spread rapidly through most of the country. There are scattered records from south and west Scotland but this is the first from Glasgow.

Voucher specimens of all species recorded have been deposited in the Art Gallery & Museum, Kelvingrove, Glasgow

## References

- BARBER, A.D. and KEAY, A.N. (1988). *Provisional atlas of the centipedes of the British Isles*. Institute of Terrestrial Ecology.  
 British Myriapod Group (1988). *Preliminary Atlas of the millipedes of the British Isles*. Institute of Terrestrial Ecology.  
 JONES, D. (1994). *Newsl. Br. Myriapod Group* no.21:2.

## The Cat Flea, *Ctenocephalides felis felis* (Bouché) NEIL REDGATE in Skye, a new Record for V.C 104

During a recent examination of ectoparasites held by Glasgow Art Gallery and Museum, Kelvingrove, I identified two fleas (male & female) as *Ctenocephalides felis felis* (Bouché) (Siphonaptera: Pulicidae: Archaeopsyllinae), the Cat Flea. These were collected in August 1991 from a house in Portree, Isle of Skye (inferred NGR NG4843), by the local Department of Environmental Health and were sent as an enquiry and subsequently donated to the Museum (Slide no. GLAMG Z1994-96).

*C. felis felis* is more widespread throughout Scotland than is indicated by the B.R.C. Atlas (George, 1974). There is now one other island record for this species, viz. South Ronaldsay, Orkney (George, pers. comm.). The record from Skye is the first known for this island and Vice County (George, pers. comm.)

The Scottish Insect Record Index (SIRI) lists published records of the species for Aberdeen and Midlothian but its occurrence on islands appears to be extremely rare. Whether this is a true reflection of its distribution or is simply due to under-recording is at present uncertain.

## Plate 3

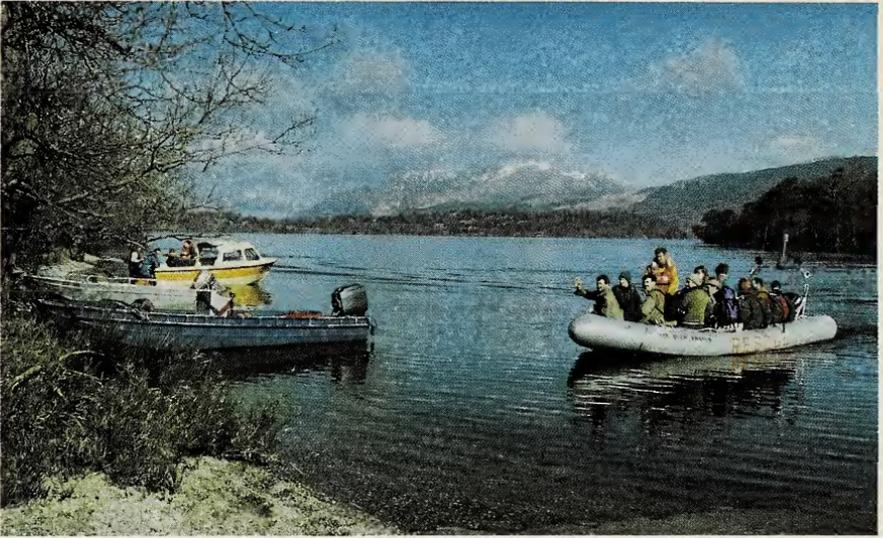


**a: Common Gromwell (*Lithospermum officinale*) in Argyll**



**b: Yellow Bartsia  
(*Parentucellia viscosa*)  
at the General  
Terminus Quay**

Plate 4



**a: Capercaillie survey teams landing on a Loch Lomond island**



**b: Male Capercaillie displaying on Loch Lomondside**

I would like to thank Mr. Geoff. Hancock, Glasgow Museum for arranging the loan of material and for providing the necessary data and Dr. Mark Shaw for consulting the SIRI on my behalf.

### Reference

GEORGE, R.S., 1994. *Provisional Atlas of the Insects of the British Isles, Part 4, Siphonaptera*. B.R.C. Huntingdon.

### Capercaillie on Loch Lomondside

NORMAN TAIT

Over the centuries, the turkey-sized Capercaillie *Tetrao urogallus* (Plate 4b p.534) has had variable fortunes. A member of the grouse family, the bird is mainly resident in pine woods hence the older name of Wood Grouse. The "English" name Capercaillie is derived from the Gaelic language and translates as "Cock of the Woods". Possible over-hunting, habitat destruction and the bird's life-long fidelity to a restricted home range, resulted in the Capercaillie becoming very rare between 1745-60 and eventually becoming extinct in Britain. Colonel George Montague, one of the most eminent ornithologists of his day, was present when the last known Loch Lomond Capercaillie was killed "near the upper end of the loch" in the early 1780's (Stephens, 1819). Early literature records that a few birds lingered on until around 1771 in the Abernethy and Glenmoriston forests and the last known indigenous Scottish Capercaillies were shot on Deeside in 1785 (Sharrock, 1976).

In 1837 Lord Breadalbane introduced 48 Capercaillies which he imported from Sweden over a period of three years. The birds were released at Taymouth Castle in Aberfeldy. Since then the Capercaillie has colonised much of its former ground assisted by later successful re-introductions in the north-east with a record of a pair breeding in 1877 as far south as Dougalston, Milngavie – 48 miles from the main centre of introduction at Taymouth! (Harvie-Brown, 1879). During this re-colonisation, females often preceded males into new areas where they occasionally paired with blackcock. One such blackcock-caper male hybrid, shot near Campbeltown, was exhibited to the Natural History Society of Glasgow in 1872 by Mr. James Lumsden. (Lumsden, 1876).

After the re-introductions in the north-east of Scotland, the Capercaillie was first reported on Loch Lomondside in 1867 when a

female was shot at Ross Priory by Sir George Leith-Buchanan who "did not meet with a bird there until 1877 where he again shot a female" (Harvie-Brown, 1879). Some Capercaillie were introduced on the Duke of Montrose estates around the south-east shore of Loch Lomond in the early 1870's with a pair recorded breeding there for the first time in 1878 (Perrie, 1951). About this time, the introduction of Capercaillies on a small scale was now a popular experiment on many estates throughout the country. No doubt the birds were introduced for sport but a report on their edibility written in 1871 states "from the rankness of their flesh they are not much esteemed for the table - a quality which in these degenerate poaching days must lessen the chances of their destruction" (Gray, 1871). Numbers continued to increase on Lomondside and a report of 1895 states that the bird "has within the past ten years become plentiful in all suitable woods around the loch" (Lumsden & Brown, 1895).

The "chieftain of the grouse tribe" reached a national population peak around 1914 but numbers declined during and between the two world wars. In the Loch Lomond area Capercaillie remained "plentiful" up to 1939 but decreased after that date due to tree-felling and to excessive shooting in some places, though a few breeding birds remained on the Loch Lomond islands and at Gartlea (Perrie, 1951). Between 40-50 breeding birds were reported around Luss in the late 1940's but on the islands numbers were still declining. This was believed to be due to increasing disturbance by campers and also due to the killing of many female birds at the annual Fallow Deer shoots held for the villagers by the late Sir Iain Colquhoun (Perrie, 1951).

The present status of this impressive bird on Loch Lomondside is currently being studied. (Plate 4a p.534). That they have survived at all is both fortunate and encouraging. Recent extensive surveys carried out collectively by the Scottish Ornithologist's Club, Scottish Natural Heritage, Glasgow University and the Loch Lomond Park Authority show a basically stable population. In 1992 the survey revealed 42 adult birds. The count in 1993 recorded a total of 48 adult birds on four islands - 33 males and 15 females (Zonfrillo, 1993). These numbers suggest a stable population but the count on the 1994 survey dropped to a lower figure. Isolated pairs have also been recorded breeding in suitable woodlands surrounding the lochside. The above results are calculated to represent around 2.5% of the national population based on the best current estimate of around two thousand birds.

The present surveys, supported by some GNHS members, confirm the national importance of Loch Lomondside for Capercaillie. Further research and continued surveying is required to establish what factors affect this unique population of these handsome and exciting birds.

## References

- GRAY, R., 1871. *The Birds of the West of Scotland including the Outer Hebrides*. Glasgow.
- HARVIE-BROWN, J.A., 1879. *The Capercaillie in Scotland*. Edinburgh.
- LUMSDEN, J., 1876. In *Proc. Nat. Hist. Soc. Glasg.* 2: 195.
- LUMSDEN, J. & BROWN, A., 1895. *A Guide to the Natural History of Loch Lomond*.
- PENNIE, I.D., 1951. Distribution of Capercaillie in Scotland. *Scott. Nat.* 63: 4-17.
- SHARROCK, J.T.R., 1976. *The Atlas of Breeding Birds in Britain & Ireland*. British Trust for Ornithology.
- STEPHENS, J.F., 1819. *Shaw's General Zoology* 2: 268.
- ZONFRILLO, B., 1993. Caper capers on the Bonnie Banks. *Scottish Bird News* 31: 10.

## Book Reviews

### Birds in Wales

R. LOVENGROVE, G. WILLIAMS & I. WILLIAMS  
T. & A.D. Poyser, London, 1994, 371 pp., black & white drawings,  
maps. Hardback, ISBN 0 85661 069 0, £28.00.

Essentially a companion volume to those of Scotland & Ireland. All species reliably recorded in Wales are dealt with in a brief but thorough manner. There are maps for some, but not all, breeding species. Important species are covered in greater depth than scarce vagrants, which are noted largely by their date of occurrence.

Like Scotland, Wales still has some relatively untouched upland areas and islands and some bird species thriving there are found in very few other places. This interesting book is essential for visitors to Wales and I can thoroughly recommend it, even if the reader never gets there. The authors are to be congratulated on a good job well done.

BERNARD ZONFRILLO

## Butterflies and Climate Change

ROGER L.H. DENNIS

Manchester University Press, Manchester, 1993, 302 pp., line diagrams & maps. Paperback ISBN 0 7190 4033 7, £19.99

This publication is a very thorough resume of all the different aspects of climate as they relate to butterflies, from atmospheric systems and butterfly biology, the effect of climate on butterfly populations and distributions, morphological adaptations to climate, past climates and the evolutionary history of butterflies and predictions and consequences of future atmospheric changes on butterflies.

A lot of the information is very technical and difficult to digest unless you happen to be quite knowledgeable on the subject. Having said that, Roger Dennis has covered just about every conceivable relationship between climate and its effect on butterflies. The book covers subjects as diverse as the effect of climate on hibernating butterflies to many more complex issues such as the differences between the size and wing patterns of butterflies in warm compared with cold parts of their range, and the possible effects of global warming.

There is an extensive list of references, which will be invaluable to anybody wanting to know more about related topics. This is not the sort of book you simply pick up and browse through, but it will be extremely useful to anyone seriously interested in this complex subject.

RICHARD SUTCLIFFE

## British Birds, Vol. 86, no. 10, October 1993, (Special Issue - Rare Birds of Great Britain in 1992).

ISSN 0007 0335, £8.00. (Annual personal subscription, £38.60).  
Orders to Mrs E. Sharrock, Fountains, Blunham, Bedford MK44 3JN.

An issue of this long-established bird journal covering all the acceptably recorded sightings of rare birds in the British Isles in 1992. It is lavishly illustrated with quality colour photographs.

These days birdy magazines can be bought over the counter in newsagents, so popular has become the vogue for rare bird watching. However many of them have a dubious pedigree and are produced by enthusiasts who have little in-depth knowledge of even the commonest species. *British Birds* caters for wide ornithological tastes and has an editorial board of distinction such that the material published is of consistently high standard. Anyone remotely interested in the serious side of bird-watching will enjoy "BB" and should subscribe to it. There are usually membership discounts for members of various wildlife bodies, perhaps the members of The Glasgow Natural History Society can be added to the list?

BERNARD ZONFRILLO

**Junior Nature Guides****Mammals of Great Britain & Europe.**

ISBN 1 85028 238 2. JOHN BURTON.

**Insects of Great Britain & Europe**

ISBN 1 85028 237 4. GEORGE C. McGAVIN.

Dragon's World Children's Books, London, 1994, 80pp. each, many colour illustrations. Hardback, £7.95 each.

These two new titles maintain the series' superb illustration standard and clear text. The wide range of mammals illustrated and the optimism of "You will be able to spot all sorts of mammals on a walk in the countryside and in towns and cities anywhere in Great Britain and Ireland" may perhaps raise the hopes of the young reader a bit too much. A comprehensive list of zoos, wildlife parks and museums with European mammal collections would have compensated for this.

However this book would be hard to beat for an entertaining and informative browse by a young animal lover.

It is very difficult to produce a simple guide to insect identification - and a valiant attempt at a branching key on page 6 and 7 of 'Insects' has been spoiled by a slip up in printing that classifies almost all insects as wingless. In spite of this the book will be used and enjoyed for illustrating the diversity of many common insects and for its readily accessible information on their habitat, diet and habits.

The activities suggested provide techniques for collecting and studying insects at first hand and the descriptions of habitats make a fine introduction to natural history. However if you want to know the name of the unusual six legged thing you found, you might do better to consult the natural history section of your local museum.

LYN DUNACHIE

**The Loch. A year in the Life of a Scottish Loch.**

ROY DENNIS, photographs by PETER MOORE

BBC Books, 1993, 192pp, many colour plates. Hardback.

ISBN 0 563 36940 X, £16.99.

This book was published to accompany the TV series first broadcast on BBC2 in Autumn 1993. The series, which was photographed and produced by Mike Herd, had a sound track of specially commissioned music, but no words. The images and atmosphere created in this way evoked the wild life of a small East Highland Loch in a new way. Having watched all four episodes of the TV series I was interested to look at the book.

Like the TV series the book is divided into four sections, each dealing with a different season of the year. The text is by Roy Dennis and I am not sure whether he is even describing the wildlife of the same loch as the TV series. The photographs by Peter

Moore *et al.* are of a very high standard, and illustrate well points in the interesting text.

An excellent book to read during the dark winter nights, to encourage us to go at all seasons to look at and enjoy Natural History.

JEAN M. MILLAR.

### **Waders**

NICHOLAS HAMMOND and BRUCE PEARSON  
Hamlyn Bird Behaviour Guides, Hamlyn London, 1994, 174 pp.,  
many colour drawings and line illustrations. Hardback,  
ISBN O 600 57974 3, £14.99.

The Hamlyn Bird Behaviour Guides are not intended for complete beginners at bird watching, and do not contain the usual information on how to identify birds. They are aimed at people who have progressed beyond recognising the common birds, and now want to learn more about ecology and behaviour and to get more enjoyment out of their birdwatching. The text of this latest volume on waders is well written. It is divided into sections on movements, feeding, flocking and roosting, plumage and moult, various behaviour patterns and breeding. Many of these are rather brief, but I liked the breeding chapter. It concludes with a review of the sites in Europe which hold important populations of waders. A particular feature of these books is the illustrations by Bruce Pearson, who is one of our leading bird artists and who has a wonderful ability to show birds in action. His illustrations are informative as well as making the book a delight to read. There is a formidable literature on waders, and there are many other books with far more detailed coverage, but this book is a good first introduction to the life of waders.

DAVID C. HOUSTON.

### **Hamlyn Young Ornithologists' Guides**

#### **Bird Identification & Fieldcraft.**

ISBN O 600 57963 8.

I. NETHERCOAT & M. LANGMAN.

#### **Migrants & Migration** ISBN O 600 57964 6.

P. HOLDEN & M. LANGMAN.

Hamlyn, London, 1994, 48pp each, many colour photographs and drawings, some line drawings. Hardback, £6.99 each.

The contents of these two liberally illustrated guides for young ornithologists are every bit as interesting and well thought out as the attractive covers - as one would expect from two books recommended by the RSPB for 8 - 14 year olds.

The guide to bird identification & fieldcraft does not rely upon spot characters. Thus it is not a field guide - plenty of books of this type are available. Rather this book contains chapters on behaviour, calls & songs, habitats, times of year, all of which assist greatly in identification.

The guide to migrants & migration presents, in a fascinating way, the story of bird migration as well as that of other migrants. It is stimulating to read.

Each book contains chapters on practical work that may be readily carried out and they represent good value in that they are packed full of information not readily found elsewhere.

ROBERT GRAY.

### **Mice and Voles**

JOHN FLOWERDEW with illustrations by STEVEN KIRK  
Whittet Books Ltd., London, 1993, 128 pp., black & white  
sketches. Hardback. ISBN 1 873580 08 8, £7.99.

This publication makes a delightful easy read which combines detailed information with an attractive humorous style in describing the six species of mice and voles normally found in Britain (Wood Mouse, Yellow-necked Mouse, Harvest Mouse, House Mouse, Bank Vole & Short-tailed Vole). There are numerous charts, tables and humorous sketches which clarify and supplement the text.

Aspects of the importance of these rodents are also considered, ranging from the chaos caused when poison-resistant mice chewed through computer cables in Birmingham to the effects they have on predators, conservation, field study and keeping small mammals in captivity are all dealt with adequately.

The coverage is surprisingly thorough considering the size of the publication and it makes a good buy at £7.99.

IAN McCALLUM

### **Roses of Great Britain and Ireland**

G.G. GRAHAM & A.L. PRIMAVESI with illustrations by  
MARGARET GOLD  
Botanical Society of the British Isles, London, 1993, 208 pp., line  
drawings & maps. Limpback, ISBN 0 901158 22 4, £11.50.

This welcome handbook presents the first complete revision for over 60 years of the British Dog-roses, a group whose complexity and difficulty of identification has hitherto given considerable trouble. Taxonomic confusion, largely caused by the assigning of varietal names to numerous described forms has given way to an orderly and rational arrangement which generally recognises these "varieties" as results of hybridisation. The unusual process of hybridising in Dog-roses is explained and shown to be the source of most difficulties of identification.

12 native and 8 introduced species are described and illustrated and 83 hybrids are described. Fruiting twigs and details of stems, leaves & hips are illustrated in each case. Distribution of native species and selected hybrids is shown on 32 maps but this is very uneven & incomplete, reflecting the paucity of authoritative records. Distribution by vice-counties is also given for each taxon but this too, is very incomplete.

As a reference work, this handbook is strongly recommended.

ALLAN STIRLING

### **On The Trail of the Whale**

MARK CARWARDINE

Thunder Bay, Guildford, 1994, 158 pp., numerous colour and black & white plates, 10 maps, bibliography. Softback, ISBN 1899 074007, £9.95.

This is a delightfully written and easily read book divided into 10 chapters, or essays, detailing the author's whale watching experiences in areas ranging from South Africa & Sri Lanka to the Isle of Mull. Different species of whale are described as is the thrill of observing a breach. Welfare of whales is the author's primary concern and it is encouraging to learn that whale watching is becoming a more lucrative industry than whaling.

Humorous anecdotes about whale watchers are told and these glimpses of human behaviour are just as fascinating as those of whale behaviour. The book is adequately illustrated and there are useful technical notes on the photography.

MARGARET M. H. LYTH

### **The Islands of Scotland: a Living Marine Heritage**

J.M. BAXTER & M.B. USHER (editors)

HMSO, 1994, 286pp., 8 colour plates, black & white photographs, diagrams, maps & tables. Hardback, ISBN 0 11 494243, £37.95.

This book is a compilation of 15 papers which were presented at a conference in Inverness organised by Scottish Natural Heritage. Like the conference, it is divided into three sections. The first reviews factors that have shaped the marine and coastal environment of the islands; the second deals with the fauna and flora and the third discusses economic development and its consequences. Although covering a range of specialised topics, every attempt has been made to make the book accessible to the general reader: there are useful introductory and concluding chapters which highlight critical issues. Each section starts with an introductory guide to the content of the subsequent papers and each paper starts with a summary box containing a numbered list of the main points. However, it is unavoidable that, whilst some chapters are very readable to the non-specialist, others, by the nature of their subject matter or the approach taken by the author, are somewhat abstruse. In the otherwise highly accessible first section, the

paper by C.D. Todd *et.al.* on the genetic structure of mollusc populations seems out of place. A highlight of this section is J. R. Turner's advocacy of the concept of "sea-scape as a means of emphasising the need for an integrated management policy for coasts." I balked, however at his suggestion in a photograph caption that some undeveloped sea-scapes might actually benefit from the addition of a major offshore installation.

The second section is arranged in a satisfyingly logical order dealing with, in turn, machair, sea-birds, sea-shore ecology, sublittoral ecology, fish & shellfish stocks and marine mammals. All papers review current knowledge and discuss the potential impact of human activities.

The third section is the most thought-provoking. It deals with economic development and focuses on the idea of sustainability. The first chapter is perhaps the most persuasive because it is a voice talking from the islands and not at them. Jim Hunter begins it with the demise of drift-netting off Lewis as seen by a local fisherman: it is a lesson on how the sustainable was replaced by the non-sustainable and the author argues cogently that, to avoid the evils of the past, economic development must be initiated and managed by local communities and not imposed from outside. A good example of the latter is superquarry proposals and in his chapter on development of geological resources A. McKirdy stretches the meaning of sustainability beyond the limit when discussing such developments. He gives the proposal for Rodel, South Harris, as an example and includes informative maps of the site and its possible fate, but one has to ask, in what sense could rock extraction on such a scale and with such consequences to the landscape ever be described as sustainable?

This is a handsome, well-produced book and I have only two complaints. It is disappointing that the islands of the Firth of Clyde are hardly mentioned, either individually or as a group and it is very expensive. It may be worth £38 to the professional but its arresting covers & colour plates suggest that the target readership is meant to include the interested non-specialist. My advice to such is to wait for the paperback!

I.C. WILKIE

### **The Evolution of Insect Flight**

ANDREI K. BRODSKY

Oxford University Press, Oxford, 1994, 229pp., black & white drawings, photographs & illustrations. Hardback, ISBN 0 19 854681 5, £55.00.

This book has the initial appearance of being highly technical and as though it might be difficult to read or understand. It is certainly detailed and comprehensive but it does not presume prior knowledge. For example, when referring to insects, English names are used as well as Latin. For those interested in the mechanics of flying, the first third of the text is devoted to aerodynamics with some detailed anatomy. Then there are fascinating treatments of behaviour and evolution followed by a run through the various groups of insects according to their individual solutions to the problem of flying. Here are diverse topics such as wing-coupling apparatus, gliding and hind-wing flying. There are a number of curiosities such as what is happening in very small insects. In

them the wing membrane can lack veins or be heavily fringed and resemble a feather. When they stop flapping their wings they come to a stop and drift through the air as a result of the air friction overcoming their inertia. When you are that small the size of air molecules is important. This is one of the subjects highlighted by Brodsky as requiring more research.

It is evident that the veins and folds in the membranes can all be explained in mechanical terms. As these characters are of primary use in identification at all levels, this demonstrates how much variation is possible within just this one organ and how much selective pressure there must be to account for it. Also, there is no simple relationship between wing size, shape or beat frequency and body size. This variation is as great as in the insects themselves and there is much fertile ground for investigation for which this work is a milestone.

E.GEOFFREY HANCOCK

### **The Ochil Hills: an Introduction**

L. CORBETT, E.K. ROY & R.C. SNADDON  
Forth Naturalist & Historian \ Clackmannanshire Field Studies  
Society, 1994, 56pp., black & white photos., line drawings, maps.  
Softback, ISBN 0 9506962 3 4 (FN&H), 0 9036500 7 X (CFSS),  
£3.50.

This booklet gives valuable information concerning many aspects of the area. Starting with geology and minerals it goes on to tell of the weather, followed by all forms of wildlife found in the hills. Former inhabitants and the monuments & castles they have left are dealt with. There is a 2 page bibliography and an appendix describing 3 walks. Poems interspersed with the text are added bonuses.

RUTH H. DOBSON

**The Forth Naturalist & Historian**, vol. 17, 1994.  
ISBN 1 898008 02 7, £5.00.

This issue contains articles on local natural history, history & archaeology, including the regular features on the Weather (1993) and the Forth Area Bird Report (1993). Natural History is represented by Alpine Foxtail & Mountain Hare in the Ochil Hills, Woodlands for the Community, Minerals at the Alva Silver Mines & Clackmannan River Corridors Survey. Historical items concern R.L. Stevenson, Music at Bridge of Allan, Blairlogie, The Trial of David Buchanan in 1746, The Ancient Bridge at Stirling & David Bruce - Medical Scientist, Soldier & Naturalist. Another item concerns the River Forth. Archaeological Notes & Book Reviews conclude the volume.

RUTH H. DOBSON

### **Hamlyn Birdwatching Guides. Where to Watch Birds in Eastern Europe**

GERARD GORMAN  
Hamlyn Ltd., 1994, 214pp., colour ills. CLIVE BYERS, black & white ills. MARK ANDREWS. Softback ISBN 0 600 57976 X,  
£16.99.

This useful book follows the pattern set in the growing series of European Birdwatching Guides. Entitled for convenience "Eastern Europe" it includes some countries which might prefer to be thought of as Central European. It covers 140 of the best birdwatching sites in Poland, the Czech Republic, Slovakia, Hungary, Romania & Bulgaria. The writer lives in Budapest and, as a Bird Tour guide, writes from first hand experience.

In discussing each country he starts with some brief but useful information on travel to and within the region, currency, accommodation, existing Bird and Conservation organisations and how to contact them. This is followed by a general account of the habitats typical of each country and their seasonal importance. Key sites are then described with a calendar of species occurrence and information on access. The most important sites have a sketch map included. These appear well conceived and clear, indicating not only the geography of the site but occasionally pinpointing particularly interesting locations within it e.g. a Bee-eater colony or a Great Snipe lek.

The text is enhanced by crisp black & white pen drawings of birds and a small central section of attractive colour plates, one for each country, depicting typical indigenous bird specialities.

The author also points that due to the relative lack of ornithologists in the area, visitors, apart from having a rewarding holiday, may be able to make useful contributions to unanswered questions on status, distribution & abundance of some species.

With a growing number of holiday deals available for Eastern Europe this book must certainly whet the appetite of the keen bird watcher.

THOMAS P. DANIELS

### **Publications of Glasgow Natural History Society**

Bound copies of the following may be obtained from the Librarian at the address given on the inside of the back cover and at the prices shown:

*The Flora of the Clyde Area* (Original printing). J.R. LEE, 1933. Price £7.50 to members of GNHS and to the book trade, £10.00 to others (p. & p. 50p extra). This is still the only work of its type and is in diminishing supply.

*The Flora of Ailsa Craig*. B. ZONFRILLO, 1994. Price £2.50 plus p. & p. 25p.

*The Vascular Plants of Northern Ardnamurchan* (with additions). R.H. DOBSON, 1983. Price £1.00 plus p. & p. 25p.

*Additions to the Flora of Kintyre*. A.C. KENNETH, 1985. Price £1.00 plus p. & p. 25p.

*The Natural History of the Muck Islands, N. Ebuades:*

1. *Introduction and Vegetation with a List of Vascular Plants*. R.H. DOBSON & R.M. DOBSON, 1985. Price £1.00 plus p. & p. 25p.

3. *Seabirds and Wildfowl*. R.H. DOBSON & R.M. DOBSON, 1986. Price £1.00 plus p. & p. 25p.

5. *Landbirds*. R.H. DOBSON, 1988. Price £1.00 plus p. & p. 25p.

## Proceedings 1993

The chairman, place\*, number present, lecturer's name, title of lecture and note of any exhibits are given for most meetings.

\*BOB: Boyd Orr Building, Glasgow University  
 GMK: Art Gallery & Museum, Kelvingrove, Glasgow  
 UGBD University of Glasgow, Botany Department

- 12 JANUARY.** Prof. N. R. Grist, UGBD, 25, The 24th Paisley International Colour Slide Exhibition. Commentary by T. Norman Tait; shown by Winifred Brown.
- 9 FEBRUARY.** E.G. Hancock, UGBD, 40, Dr. J. Moran, Wildlife Photographs from Borneo.
- 23 FEBRUARY.** E.G. Hancock, 63rd A.G.M.  
 Activities during 1992 were reported on, elections held and appointments made (see p. 547).  
 At the end of 1992 there were 248 ordinary members, 29 family members, 2 junior, 3 school and 9 honorary members making a total of 291. 4 evening meetings and the Exhibition Meeting were held in GMK and 2 evening meetings and a joint meeting with BSBI and BSS in UGBD.  
 22 excursions were arranged over the summer months.  
 The Annual Dinner was held in Kelvin Park Lorne Hotel.  
 There were 3 Council meetings and the executive met informally as required.  
 E.G. Hancock gave his presidential address on the Scottish Entomologist, John Russel Malloch.
- 9 MARCH.** Prof. N.R.Grist, UGBD, 41, Paul Watson, Effect of Food Availability on Seabird Populations.
- 13 APRIL.** Prof. N.R. Grist, UGBD, 35, Graham Burns, Lake Baikal and Surrounding Area.
- 11 MAY** Prof. N:R. Grist, UGBD, 43, Brian S. Skillen, Underground Glasgow.
- 1 OCTOBER.** Prof. N.R. Grist, GMK, Exhibition Meeting and Cheese and Wine. Special exhibit on Waulkmill Glen
- 12 OCTOBER.** Prof. N.R. Grist, BOB, John Robertson, Whales and Dolphins.
- 9 NOVEMBER.** Prof. N.R. Grist, BOB, Jackie Muscott, Bings and Things, the Colonisation of Waste Places in the Lothians.
- 14 DECEMBER.** Annual Dinner, Kelvin Park Lorne Hotel, Edna Stuart and Kate Aird, African Safari.  
 25 excursions were arranged during the summer months.

## Officers and Council SESSION LXIII 1993

- President:* Prof. Norman R. Grist, B.Sc., M.B., Ch.B.,  
F.R.C.P., F.R.C.Path.
- Vice-Presidents:* James H. Dickson, B.Sc., M.A., Ph.D., F.L.S.  
F.R.S.E.  
Ronald M. Dobson, M.A., Ph.D.  
E. Geoffrey Hancock, B.Sc., F.M.A.
- Councillors:* Mary M. Child, B.Sc.  
Iain Gordon  
Mrs Alison Moran  
Jonathan Moran, B.Sc., Ph.D.  
Brian Skillen, M.Lit., B.A., Dip.Lib., A.L.A.  
William Parkes, B.Sc., Ph.D.  
Keith Watson, B.Sc., M.Sc.  
Carol Aitken, B.Sc., M.Sc.  
Andrew Wilson.
- General Secretary:* Mrs Jean Millar, M.A., M.I.Biol.
- Treasurer:* Robert Gray, B.Sc., M.I.Biol.
- Librarian:* Mrs Ruth H. Dobson, B.Sc., M.Sc.
- Editor:* Ronald M. Dobson
- Section Conveners:* Keith Watson (*Botany*)  
Richard Sutcliffe B.Sc., A.M.A. (*Geology*)  
T. Norman Tait, A.B.I.P.P., F.R.P.S.  
(*Photography*)  
E. Geoffrey Hancock (*Zoology*)  
Andrew Wilson (*Computer*)
- Assistant Secretaries:* Hazel Rodway (*Social & Fund-raising*)  
Richard Sutcliffe (*Membership*)  
John Lyth (*Publicity*)
- Auditors:* E.T. Watt.  
Martin Brown
- Newsletter Editor:* Carol Aitken
- Editorial Board:* The Editor  
Allan McG. Stirling  
James H. Dickson  
Iain C. Wilkie, B.Sc., Ph.D.
- BLB Administrators:* Peter Macpherson, F.R.C.P., F.R.C.R.,  
D.T.D.C., F.L.S. (*Scientific*)  
Bruce Lindsay (*Financial*)

## Index to Volume 22

Contents are indexed by author, subject and, where appropriate, area and Watsonian vice-county. Organisms mentioned in Papers and Short Notes are indexed by their scientific and/or common names only if these appear in the titles. Figures in brackets are vice-county numbers.

- Aculeata: (104) 255  
 Adams, C.E. & Mitchell, J.  
 Introduction of another non-native Fish  
 Species to Loch Lomond: Crucian  
 Carp: *Carassius carassius* (L.) 165  
*Adistemia watsoni*: in Scotland 195  
 Agrochemicals: lower Clyde Valley 443  
 Ailsa Craig (75): 59; 83; 197; 307; 524  
 Airborne introductions: 198  
 Amphibians: Central Region 221  
 Ancient Diets: 65  
 Anglerfish: off Rockall Trough 505  
*Anser anser*: (104) 83  
*Aphelocheirus aestivalis*: (75) 85  
 Apterygota: (104) 31  
 Argyll (98): *Blechnum cordatum* & *Nym-  
 phoides peltata* 191; Plant records 281;  
 Plant notes 424; Plant records 1994  
 521; Fishing success rate of Otters 528  
*Arion lusitanicus*: (99) 287  
 Arran (100): 84  
*Artemisia stellariana*: (75) 523  
*Áustropotamobius pallipes*: (108) 107  
 Ayrshire (75): Yellow Star-of-Bethle-  
 hem 93; *Limosella aquatica* 192; Win-  
 ter Heliotrope 193; Shelduck & Black  
 Guillemot 197; *Polypodium* ferns 278;  
 Caddisflies 285; *Artemisia stelleriana*  
 523  
 Baldwin, S.I. Spiders from Wallacebank  
 Wood, Stirlingshire, 5  
 Bartsia, Yellow: (76,77) 526  
 Bates, M. & Dickson, J.H. Scottish  
 Orchids as Postage Stamp Designs 345  
 Bees, leaf-cutter: (76) 429  
 Beetles: 81; (83) 86; (102) 87  
 Betony: (77) 524  
 Bird's-nest Orchid: (76,77) 219  
 Black Guillemot: (75) 197  
*Blackstonia perfoliata*: (99) 92  
 Bland, K.P. Records of Lepidoptera on  
 North Uist, Outer Hebrides 247; Some  
 leaf-mining Diptera from North Uist,  
 Outer Hebrides 385; see Swinney  
*Blechnum cordatum*: (86) 191  
 Blue Fleabane: (77) 467  
*Bombus lapidarius*: (77,83) 430  
 Book Reviews: 10, 30, 40, 64, 96, 106,  
 110, 124, 139, 190, 200, 344, 364, 374,  
 378, 387, 396, 408, 418, 435, 436, 437,  
 438, 439, 453, 454, 466, 471, 478, 491,  
 500, 512, 535  
 Bothwell Castle: 527  
 Bovine tuberculosis & wildlife: 379  
*Brachycercus harrisella*: (77) 85  
 Bream, Ray's: 431  
 Bryophytes: (104) 141  
 Bumblebee, red-tailed: (77,83) 430  
 Burns, J.H. David Ure (1749-1798)  
 "Breadth of Mind & Accuracy of Obser-  
 vation" 259  
 Caddisflies: (75) 285  
 Canna (104): 82  
 Capercaillie: (86,99) 533  
*Carex buchanani*: (77) 194.  
*Carassius carassius*: (86,99) 165.  
 Cardowan: 279  
 Carp, Crucian: (86,99) 165  
 Cat Flea: (104) 532  
*Centaurea nigra*: (75) 524  
*Cervus elaphus*: (86,99) 527  
 Chaetognatha: (73) 479  
 Christie, I.C. *Ledum* on Flanders Moss,  
 41; Insect Records from the West of  
 Scotland in 1969 77; Obituary 163  
 Clarke, J.: see Jardine, D.C.  
 Clarke, P.M.: see Jardine, D.C.  
 Clouded Yellow: 284; 389  
 Clubmoss: (77) 88

- Clyde: "Beds" 115; River 85; Valley (76,77) 219; 443
- Coleoptera: (83) 86; (102) 87; 195
- Colonsay: (102) 196; 215
- Common Crossbill: (86) 84
- Common Knapweed: (75) 520
- Common Skate: tagging 455
- Computer: software review 434
- Convolvulus Hawkmoth: (76,77) 283
- Conway, Dr. E.: Obituary 214
- Corbet, G.B. Some Records of Myriapods & Slugs new to the Glasgow Area 531
- Cormorant, ringed: (77) 433
- Cornish Sucker Fish: (75) 83
- Cornstone workings: 485
- Cotoneasters: in the Glasgow Section of V.C. 77 111
- Counsell, D., see Foster, G.N.
- Craib, N., Hunter, R. & Laird, A. Willow Gentian (*Gentiana asclepiadea* L.) in Perthshire, (87) 422
- Crayfish: (108) 107
- Crossbill, Common: (86) 84
- Crucian Carp: (86,99) 165
- Crustacea: Isopoda in Clyde Area 133
- Cryptosaras couesi*: 505
- Ctenocephalides felis felis*: 532
- Daniels, T.P. Red-eared Terrapin at Loch Ardsinning, Milngavie (V.C. 86) 430; Slow-worm active in December (86) 431
- Deep-sea Anglerfish: 505
- Deer, Red: (99) 527
- Dickson, C. Memoirs of a Midden Mavis- The Study of Ancient Diets and Environments from Plant Remains 65
- Dickson, C.A. & Parkes, W. Ten years of population counts of Orchids at Dumbrook Loch Meadows, Stirlingshire and problems of management 349
- Dickson, J.H. A large stand of Giant Knotweed (*Fallopia sachalinensis*) at Skipness, Kintyre 421
- Dickson, J.H. *Erigeron acer* L. (Blue Fleabane) & Rabbits in Central Glasgow 467
- Dickson, J.H. see Bates, M; see Watson, K.J.
- Dickson, J.H. & Watson, K. *Fallopia x bohémica* (Chrtek & Chrtkova) J. Bailey in the Glasgow area 423
- Digitalis monstrosa*: (100) 52
- Diptera, leaf-mining: (110) 385
- Dobson, R.H. Additions to the list of Vascular Plants for the Muck Islands (V.C.104) 89; Increase in numbers of breeding Greylag Geese, *Anser anser* (L.) in the Muck Islands 83
- Dobson, R.H. & Hodgetts, N.G., Additions to the List of Mosses for the Isle of Muck (V.C.104) 277; Additions to the list of Liverworts for the Isle of Muck 419
- Dobson, R.M. The Natural History of the Muck Islands, North Ebudes 7. Insecta: Apterygota & Exopterygota 31; 9. Insecta: Neuroptera, Trichoptera, Siphonaptera & Hymenoptera - Symphyta & Aculeata 255; 10. Insecta: Diptera 513
- Dolichopodid flies: (72,96,100,110) 86
- Dolphin, Striped: 243
- Doon, River (75): 85
- Doughty, C.R., The Water Bug *Aphelocheirus aestivalis* in the River Doon 85; Re-discovery of the Mayfly *Brachycercus harrisella* in the River Clyde 85; Some Observations on the Effects of Mineral Solids Deposition on Littoral Invertebrates in Loch Lomond 205; The mayfly *Heptagenia fusco-grisea* (Retzius) in Ayrshire, (75) 428; Sea Lamprey, *Petromyzon marinus* L. in the River Clyde (77) 432
- Duke of Argyll's Tea-Plant: (75,77) 91
- Dumbrook Loch (86): 349
- Dunbarton. (99) Yellow Wort 92; *Pulicaria dysenterica* 194; *Arion lusitanicus* 287; Cornstone workings 485
- Dunbeath Estate (109): 47
- Easterbee, N.: see Kitchener, A.C.
- Endrick Mouth: 288
- Erigeron acer*: (77) 467

- Errata: Vol.21 part 5, 76; Vol. 22, v  
 Exopterygota: (104) 31  
*Fallopia sachalinensis*: (101) 421  
*Fallopia x bohémica*: (76,86) 423  
*Felis silvestris*: (88,89,98) 11  
 Ferns: (75) 59; *Polypodium* (75) 278  
 Fish, Cornish Sucker: (75) 83; Non-native species, Loch Lomond 165  
 Five Kingdoms Database: 81  
 Flanders Moss (87): 41  
 Flea, Cat: (104) 532  
 Fleabane, Blue: (77) 467  
 Flies, Dolichopodid: (72,96,100,110) 86  
 Flora: (75) 307  
 Foster, G.N., Spirit, M.G. & Counsell, D.  
 A Survey of Water Beetles in the Western Highlands & on Mull, 21  
 Fox, Red: 375  
 Foxglove, *Digitalis monstrosa*: 523  
 Fringed Waterlily: (99) 420  
 Geese, Greylag: (104) 83  
 Gentian, Willow: (87) 422  
*Gentiana asclepiadea*: (87) 422  
 Giant Knotweed: (101) 421  
 Gilthead: (74) 433  
 Glasgow & Area (76,77,86,89): 88; 94; 111; 125; 191; 194; 196; 397; 423; 429; 430; 526; 531  
 Grassland, base-rich: (77) 425  
 Greylag Geese: (104) 83  
 Griffith, R.S.Ll. The Five Kingdoms Database- A Practical Guide to the Biological Nomenclature of the World of Organisms 81; Ray's Bream at Ardrossan North Beach 431; *Scrophularia umbrosa* in Irvine 192; *Limosella aquatica* in the Kilmarnock Area 192; Winter Heliotrope in Ayrshire V.C. 75 193  
 Grist, N.R. Stag's-Horn Clubmoss at Ruchill, Glasgow - Postscript 88  
 Guernsey stowaways: 90  
 Guillemot, Black: (75) 197  
 Hairstreak, Purple: (77) 196; (86) 285  
 Hancock, E.G., Pill Millipede on Arran 84; Scottish Records of some Dolichopodid flies 86; Alexander Patience and his work on Woodlice (Crustacea: Isopoda) in the Clyde Area with a List of Recorded Species 133; Insect Records from the West of Scotland in 1990 159; Some Records of Terrestrial Invertebrates from Rum National Nature Reserve 1990 169; *Adistemia watsoni* in Scotland 195; Insect Records for the W. of Scotland in 1991 & some Records of Coleoptera for 1990 251; *Minthea rugicollis*, an unusual imported Powder-post Beetle 282; *Convolvulus* Hawkmoth in 1992 283; Caddisflies from a Light-trap in Newmilns Ayrshire 285; Insect Records from the West of Scotland in 1992, 381; *Keroplatus testaceus* Dalman (Diptera: Mycetophilidae), another Scottish record 428; Leaf-cutter bees, *Megachile willughbiella* Kirby, at Waulkmill Glen, Darnley, Glasgow 429; *Bombus lapidarius* (Linn.) (Hymenoptera: Apidae), the Red-tailed Bumblebee 430; Insect records from the West of Scotland in 1993 501  
 Hancox, M. Dental loss, Disease & Abnormalities in Scottish Red Foxes 375; Bovine Tuberculosis and Scottish Wildlife 379; Fishing success rate of Otters in Argyll 528  
 Hawkmoth, *Convolvulus*: (76,77) 283  
 Hearshaw, R. Cornish Sucker Fish at Ailsa Craig, Ayrshire 83  
 Heliotrope, Winter: (75) 193  
 Herbarium Specimens: 361  
 Herman, J. see Reid, R.J.  
 Hoary Mugwort: (75) 523  
 Hodgetts, N.G. The Natural History of the Muck Islands, North Ebudes 8. Bryophytes of Muck 141; see Dobson, R.H.  
 Horsfield, D. Re-discovery of the beetle *Laemostenus complanatus* at Leith 86  
 Hunter, R. see Craib, N.  
 Hybrids, plant, natural: 125  
 Hymenoptera: (104) 255

- Inchlonaig: (99) 365  
 Insect Records, W. of Scotland: 1991  
 251; 1992 381; 1993 501  
 Inversnaid: (86) 290  
 Invertebrates: Freshwater (109) 47; Ter-  
 restrial (104) 169  
 Irvine (75): 192  
 Islay (102): 87, 198  
 Isopoda: Clyde Area 133  
 Jardine, D.C., Clarke, J. & Clarke, P. M.  
 Additions to the Coleopteran Fauna of  
 Colonsay & Oronsay, Argyllshire S.  
 Ebudes (V.C.102) 215  
 Jefferies, D.J. Some Observations on  
 Scottish Wildcats *Felis silvestris* based  
 on the results of Autopsies 11  
 Kelvin, River (77): 289  
*Keroplatus testaceus*: (87) 428  
 Kilmarnock Area (75): 192  
 Kilpatrick Hills (99): 527  
 Kingfisher: (77) 289; 527  
 Kitchener, A.C., Stroud, D.A., Stroud,  
 J.M., Easterbee, N. & Nelson, W. Air-  
 borne Introductions? First records of  
 the Rabbit on Rum and the Mole on  
 Islay 198; see Reid, R.J.  
 Knapweed, Common: (75) 524  
 Knotweed, Giant: (101) 421  
*Laetostenus complanatus*: (83) 86  
 Laird, A. see Craib, N.  
 Lamprey, Sea: (77) 432  
 Lanarkshire (77): Bird's-nest Orchid 219;  
 Cotoneaster Records 239; Magellan  
 Ragwort 279; *Veronica anagallis-aquat-*  
*ica* 278; Long-stalked Orache  
 280; *Convolvulus Hawkmoth* 283;  
 Kingfishers 289; "Nose" Update 495;  
 Betony 524  
 Lassièrè, O.L. The Distribution of  
 Amphibians in Central Region, Scot-  
 land 221.  
 Late-Devensian Marine Fauna: (76) 115  
 Leaf-cutter Bees: (76) 429  
 Leaf-mining Diptera: (110) 385  
*Ledum*: (87) 41  
 Leith (83): 86  
 Lepidoptera: (110) 247.  
*Libertia*: (99) 91  
*Limosella aquatica* (75): 192  
 Lindsay, E.L.S., see Macpherson, P.  
 Linthouse (77): 280  
 Little, W. Common Skate & Tope, 1st  
 results of Glasgow Museum's tagging  
 Study 455  
 Liverworts: (104) 419  
 Lloyd-Binns, B.: Obituary 155  
 Loch Fyne: 529  
 Loch Lomond: 165; 205  
 Loch Lomondside: 533  
 Loggerhead Turtle: (75) 82; (102) 196  
 Long-stalked Orache: (77) 280  
 Lorrain, William Buckham: 1  
 Luing (98): 88  
 Lyth, J.R.S. A Peculiar Foxglove - *Digi-*  
*talis monstrosa* 523  
 Lyth, M.M.H. *Veronica anagallis-aquat-*  
*ica* an addition to the Flora of Glasgow  
 278; Kingfisher near Bothwell Castle  
 527  
 Macpherson, A.C. see Macpherson, P.  
 Macpherson, P. Persistence for 20 years  
 of Guernsey stowaways in a Glasgow  
 Garden 90; Difficulties with the identi-  
 fication of Twiggy Spurges 90; Smooth  
 Rupturewort in the Glasgow Garden  
 Festival Site 191; Magellan Ragwort at  
 Cardowan 279; Long-stalked Orache in  
 Linthouse 280; Improving the Quality  
 of poorly-pressed Herbarium Specimens  
 361; Base-rich Grassland in  
 Industrial Lanarkshire 425; Lanark-  
 shire's Nose Update 495; Betony in  
 Lanarkshire 524; see McMullen, J.A.  
 Macpherson, P. & Lindsay, E.L.S. Coto-  
 neasters in the Glasgow Section of  
 V.C.77, 111; Cotoneaster update 239.  
 Macpherson, P. & Macpherson, A.C.  
*Carex buechananii* in Glasgow 194  
 Macpherson, P. & Stirling, A. McG. The  
 Duke of Argyll's Tea-plants in the West  
 of Scotland 91  
 McCallum, I. Despoiling of Willows by  
 Beetles near Kippen 423

- McGee, M.J. Recovery of a ringed Cormorant 433
- McKnight, G. see Thacker 443
- McMullen, J.A. & Macpherson, P., Yellow Bartsia in the Glasgow Area 526
- Marten, Pine: (86) 290
- Mayfly: (77) 85; (75) 428
- Megachile willughbiella*: 429
- Millipede, Pill: (100) 84
- Mineral solids deposition: (99) 205
- Minthea rugicollis*: 282
- Mitchell, J. Common Crossbills feeding in gardens 84; Further Notes on the Reverend John Stuart's Contribution to the Discovery of Britain's Mountain Flowers 103; Additional Localities for the Purple Hairstreak Butterfly 285; Shelduck at the Endrick Mouth, Loch Lomond 288; Fringed Water-lily in Dunbartonshire 420; Old Cornstone workings in Dunb. & W. Stirl. with notes on flora 485; Return of Red Deer to Kilpatrick Hills 527; See Adams, C.E.
- Mole: (102) 198
- Moran, S. *Stenotus binotatus* in Scotland 282
- Mountain Flowers of Britain: 103
- Muck Islands (104): 31, 83, 89, 141, 255, 419, 513
- Mugwort, Hairy: (75) 523
- Myriapods: (77) 531
- Nelson, W. see Kitchener, A.C.
- Neuroptera: (104) 255
- Nogales, M. see Zonfrillo, B.
- North Ebudes (104): Bryophytes 141; Insects 31; 255; 513; 532; Liverworts 419; Mosses 277
- North Uist (110): 385
- Nymphoides peltata*: (98) 191; (99) 420
- Obituaries: B. Lloyd-Binns 155; I. C. Christie 163; E. Conway 214
- Officers & Council: 102, 204, 442, 306, 547
- Orache, Long-stalked: (77) 280
- Orchids: Bird's Nest (76,77) 219; (86) 349
- Oronsay: see Colonsay
- Otters, fishing success: 528
- Outer Hebrides (110): Lepidoptera 247; Diptera 385
- Parkes, W. see Dickson, C.A.
- Patience, Alexander: 133
- Petromyzon marinus*: (77) 432
- Phyllodecta vulgatissima*: (86) 423
- Pilkington, N., Proctor, J. & Reid, K. I. The Inchlonaig Yews, their Tree Epiphytes and their Tree Partners 36
- Pill Millipede: (100) 84
- Pill Woodlice: (74,75) 528
- Pine Martens: (86) 290
- Pitcherplant: (98) 419
- Plant Remains: 65
- Polypodium* Ferns: (75) 278
- Proceedings: 100, 202, 304, 440, 546
- Proctor, J. see Pilkington
- Pulicaria dysenterica*: (99) 194
- Purple Hairstreak: (77) 196; (86) 285
- Rabbits: (104) 198; (77) 467
- Ray's Bream: 431
- Red Deer: (99) 527
- Red Fox: 375
- Red-eared Terrapin: (86) 430
- Red-tailed Bumble Bee: (77,83) 430
- Redgate, N. The Cat Flea *Ctenocephalides felis felis* (Bouche) in Skye, a new record for V.C.104 532
- Renfrewshire (76): Late-Devensian Marine Fauna 115
- Reid, K.I. see Pilkington, N.
- Reid, R.J., Kitchener, A., Ross, H.M. & Herman, J. First Records of the Striped Dolphin *Stenella coeruleoalba* in Scottish Waters 243
- River Clyde (77): 85
- River Doon (75): 85
- Ross, H.M. see Reid, R.J.
- Rough Firth (73): 471; 479
- Rum (104): 169, 198
- Rutherford, A. A Species of *Libertia* new to Britain as a naturalised introduction 91; The Slug *Arion lusitanicus* Mabile in a Helensburgh Garden 287
- Rutherford, A. & Stirling, A. McG., Fur-

- their observations on Yellow Wort (*Blackstonia perfoliata*) in Dunbartonshire 92
- Ryrie, J.L., see Spirit, M.G.
- Sarracenia purpurea*: (98) 419
- Scrophularia umbrosa*: (75) 192
- Scyphomedusae: (73) 471
- Sea Lamprey: (77) 432
- Shelduck: (75) 197
- Short Notes: 82, 191, 277, 419, 521
- Sinclair, M. Two Beetles (Coleoptera: Staphylinidae) from Islay (V.C. 102) 87
- Siphonaptera: (104) 255
- Skate, Common: tagging 455
- Skillen, B.S. Kingfishers on the River Kelvin 289; Underground Glasgow - a Study in Environmental and Urban impact 397
- Skinner, T.G. The Seasonal Occurrence of Some Prominent Zooplankton spp. in Rough Firth. 1 Scyphomedusae 471; 2 Chaetognatha 479
- Skye (104): 532
- Slow-worm: (86) 431
- Slugs: (77) 531
- Smooth Rupturewort: (77) 191
- Software review: 434
- South Ebudes (102): Loggerhead Turtle 196; Coleoptera 215
- Spiders: (86) 5
- Spirit, M.G., see Foster, G.N.
- Spirit, M.G. & Ryrie, J.L. The Freshwater Invertebrates of the Dunbeath Estate, Caithness 47
- Spurges, Twiggy: (77) 90
- Star-of-Bethlehem, Yellow: (75) 93
- Stenotus binotatus*: (96) 282
- Stirling (86): Spiders 5; Amphibians 221; Purple Hairstreak 285; Shelduck 288; Pine Martens 290
- Stirling, A. McG. Yellow Star-of-Bethlehem in Ayrshire 93; *Pulicaria dysenterica* in Dunbartonshire 194; Obituary of E. Conway 214; Short Notes 82, 191, 277, 419, 521; Hoary Mugwort (*Artemisia stelleriana*) in Ayrshire 523; Pill Woodlice records from S.W. Scotland 528
- Stirling, A. McG. See Macpherson, P.; see Rutherford, A.; see Thompson, B.H.
- Striped Dolphin: 243
- Stroud, D.A. see Kitchener, A.C.
- Stroud, D.M. see Kitchener, A.C.
- Stuart, Rev. John: 103
- Sutcliffe, R. Purple Hairstreak in Glasgow 196; A Juvenile Loggerhead Turtle from Colonsay 196; Clouded Yellow Invasion, 1992 284; The Clouded Yellow Invasion of Scotland; 1992 389; Gilthead 433; Swordfish from Loch Fyne 529; see Swinney
- Sutherland (108): Crayfish 107
- Swinney, G.N., Sutcliffe, R. & Bland, K.P. A Specimen of the Deep-sea Anglerfish *Cryptopsaras couesi* Gill (Teleostei, Lophiiformes, Ceratiidae) Caught on the Eastern Flank of the Rockall Trough, with Comments on the Distribution of the Species in the N.E. Atlantic 505
- Swinney, G.N. & Yoxon, G.M. A juvenile Loggerhead Turtle from Canna 82
- Swordfish: Loch Fyne 529
- Symphyta: (104) 255
- Tait, T.N. Capercaillie on Loch Lomondside 533
- Tea-plant, Duke of Argyll's: (75,77) 91
- Terrapin, Red-eared: (86) 430
- Thacker, J.R.M. & McKnight, G.A. Survey of Farms & their Agrochemical Inputs in the Lower Clyde Valley 443
- Thomas, W.J. A Note on the Crayfish of Loch Croispol 107
- Thompson, B.H. *Blechnum cordatum* and *Nymphoides peltata* in Argyll 19; Loch Iliter, Isle of Luing 88; Recent Plant Records from Argyll 281; Plant notes from Argyll, V.C. 98 424; do. in 1994 521
- Thompson, B.H. & Stirling, A. McG. Pitcherplant (*Sarracenia purpurea*) in Argyll, V.C.98, 419

- Todd, J.G. A Late-Devensian Marine Fauna from the "Clyde Beds", Linwood and Johnstone, Renfrewshire 115
- Tope, tagging study: 455
- Treasurer, J.W. Distribution and Species and Length Composition of Wrasse (Labridae) in Inshore Waters of West Scotland 409
- Trichoptera: (104) 255
- Trubridge, M.I. Pine Martens at Inversnaid, Loch Lomond-side 290
- Tuberculosis, Bovine & Wildlife: 379
- Turtle, Loggerhead: (75) 82; (102) 196
- Twiggy Spurges: (77) 90
- Uist, N. (110): Lepidoptera 247
- Ure, David (1749-1798): 259; photo of plaque 261
- Vascular Plants: (104) 89
- Veronica anagallis-aquatica*: (77) 278
- Walker, A. The last Willow in "Willow Water Meadow" Street, Glasgow 94
- Walker, A.G. Some Recent Records of Bird's-nest Orchid in the Clyde Valley 219
- Water-lily, Fringed: (99) 420
- Water-violet: (77) 421
- Watson, K.J. Water-violet in Strathclyde Country Park (77) 421; see Dickson, J.H.
- Watson, K.J. & Dickson, J.H. Some naturally occurring Flowering Plant Hybrids in the Glasgow Area 125
- West of Scotland: Insect Records 1990-1992 381; 1993 501
- West Stirlingshire: (86) 485
- Wildcats: 11
- Willow: (77) 94; despoiling by beetles (86) 423
- Willow Gentian: (87) 422
- Winter Heliotrope: (75) 193
- Woodlice: Clyde Area 133; Pill (74,75) 528
- Woodward, F.R. William Buckham Lorrain, amateur Malacologist and 1st Vice-President of the Natural History Society of Glasgow 1
- Wrasse (Labridae): Distribution, Species & Length in inshore Waters, West of Scotland 409
- Yellow Bartsia: (76,77) 526
- Yellow Star-of-Bethlehem: (75) 93
- Yellow wort: (99) 92
- Yews: (99) 365
- Yoxon, G.M. see Swinney, G.N.
- Zonfrillo, B. *Polypodium* Ferns on Ailsa Craig 278; The Ferns of Ailsa Craig and their Distribution 59; The Flora of Ailsa Craig (75) 307; Common Knapweed (*Centaurea nigra*) new to Ailsa Craig 524
- Zonfrillo, B. & Nogales, M. First Breeding records of Shelduck and Black Guillemot on Ailsa Craig, Ayrshire (V.C. 74) 197
- Zooplankton, Seasonal Occurrence: Scyphomedusae 471; Chaetognatha 479
- (The editor is grateful to E.W. Curtis, R.H. Dobson, N.R. Grist, A. McG. Stirling and I.C. Wilkie for help with the preparation and checking of the index.)
- Dates of publication of *The Glasgow Naturalist* Volume 22:
- Part 1: February 1991
- Part 2: February 1992
- Part 3: February 1993
- Part 4: March 1994
- Part 5: February 1995

# The Glasgow Naturalist

The Journal of the  
Glasgow Natural History Society

## Volume XXII

Edited by R. M. Dobson

ISSN 0373-241X  
GLASGOW, SCOTLAND





## Contents of Volume 22

### Page

- 1 William Buckham Lorrain, amateur Malacologist and first Vice-President of the Natural History Society of Glasgow, F.R. WOODWARD.
- 5 Spiders from Wallacebank Wood Stirlingshire, S.I. BALDWIN.
- 10 Book Reviews: *A Key to Case-bearing Caddis Larvae of Britain and Ireland*, I.D. & B. WALLACE & G.N. PHILIPSON; *Atlas of the Living World*, D. ATTENBOROUGH, P. WHITEFIELD, P. MOORE & B. COX.
- 11 Some Observations on Scottish Wildcats *Felis silvestris* based on the Results of Autopsies, D.J. JEFFERIES.
- 20 Publication Received: *Flowers of the Mediterranean*, O. POLUNIN & A. HUXLEY.
- 21 A Survey of Water Beetles in the Western Highlands and on Mull, G. N. FOSTER, M.G. SPIRIT & D. COUNSELL.
- 29 Advertisement: *The Flora of the Clyde Area*, J.R. LEE.
- 30 Book Reviews: *A Guide to Spiders of Britain & Northern Europe*, D. JONES; *Creating a Wildlife Garden*, B. & L. GIBBONS.
- 31 The Natural History of the Muck Islands, North EbuDES 7. Insecta: Apterygota and Exopterygota, R.M. DOBSON.
- 40 Book Review: *The Hebrides*, J.M. & I.L. BOYD.
- 41 *Ledum* on Flanders Moss, I.C. CHRISTIE.
- 47 The Freshwater Invertebrates of the Dunbeath Estate, Caithness, M. G. SPIRIT & J.L. RYRIE.
- 59 The Ferns of Ailsa Craig and their Distribution, B. ZONFRILLO.
- 64 Book Review: *Eagles*, J.A. LOVE.
- 65 Memoirs of a Midden Mavis - The Study of Ancient Diets and Environments from Plant Remains, C. DICKSON.
- 76 Erratum: Vol. 21 part 5, 1990.
- 77 Insect Records from the West of Scotland in 1989, I.C. CHRISTIE (Comp.).
- 81 The Five Kingdoms Database - A Practical Guide to the Biological Nomenclature of the World of Organisms, R.S. LI. Griffith; Acknowledgments.
- 82 Short Notes, A. McG. STIRLING (Comp.)
- 96 Book Reviews: *The Natural History of Moles*, M.L. GORMAN & R.D. STONE; *A Guide to Bats of Britain & Europe*, W. SOHOBER & E. GRIMMBERGER; *The Identification of Flowering Plant Families*, P.H. DAVIS & J. CULLEN; *The Manx Shearwater*, M. BROOKE; *Where to watch Birds in Scotland*, M. MADDERS & J. WELSTEAD; *Islands in the Sound, Wildlife in the Hebrides*, A. JOHNSON; *Atlas of the British Flora*, F.H. PERRING & S.M. WALTERS.
- 100 Proceedings 1989.
- 102 Officers & Council Session LIX 1989.
- 103 Further notes on the Reverend John Stuart's Contribution to the Discovery of Britain's Mountain Flowers, J. MITCHELL.
- 106 Book Reviews: *Flowers of the Mediterranean (3rd ed.)* O. PALUNIN & A. HUXLEY; *Crucifers of Great Britain and Ireland*, T.C.S. RICH.
- 107 A Note on the Crayfish of Loch Croispol, W.J. THOMAS.
- 110 Book Reviews: *Bird Watching for the Under Tens*, B. ODDIE; *Birds and Forestry*. M. AVERY & R. LESLIE.
- 111 Cotoneasters in the Glasgow Section of V.C.77, P. MACPHERSON & E.L.S. LINDSAY.
- 115 A Late-Devensian Marine Fauna from the "Clyde Beds", Linwood and Johnstone, Renfrewshire, J.G. TODD.
- 124 Book Review: *An Artist on Migration*, B. PEARSON.
- 125 Some Naturally occurring Flowering Plant Hybrids in the Glasgow Area, K.J. WATSON & J.H. DICKSON.
- 132 Book Notice: *Wild Plants of Glasgow*, J.H. DICKSON.
- 133 Alexander Patience and his Work on Woodlice (Crustacea: Isopoda) in the Clyde Area with a List of Recorded Species, E.G. HANCOCK.
- 139 Book Reviews: *Flora of the Outer Hebrides*, R.J. PANKHURST & J.M. MULLIN; *Bird Migration*, T. ALERSTAN;
- 140 Audiotope Review: *Beginning Birdsong*, K. JACKSON.
- 141 The Natural History of the Muck Islands, North EbuDES 8. Bryophytes of Muck, N.G. HODGETTS.

- 155 Obituary: Blodwen Lloyd-Binns MSc., PhD., DSc., FLs.  
 159 Insect Records from the West of Scotland in 1990, E.G. HANCOCK (Comp.).  
 162 Obituary: Iain Colin Christie BSc., (1930-1991).  
 165 Introduction of another non-native Fish species to Loch Lomond: Crucian Carp (*Carassius carassius* (L.)), C.E. ADAMS & J. MITCHELL.  
 169 Some Records of Terrestrial Invertebrates from Rum National Nature Reserve 1990, E.G. HANCOCK (Comp.).  
 190 Book Reviews: *The Status of Seabirds in Britain & Ireland*, C. LLOYD, M. TASKER & K. PARTRIDGE; *Collins Guide to Animal Tracks and Signs (New ed.)*, P. BANG & P. DAHLSTROM.  
 191 Short Notes, A. McG. STIRLING (Comp.)  
 200 Book Reviews: *Pocket Guide to Birds of Prey of the World*, M. WALTERS; *Recent Surveys and Research on Butterflies in Britain & Ireland: a Species Index & Bibliography*, P.T. HARDING & S.V. GREEN.  
 201 Editorial - The Numbering of the Sessions of the Glasgow Natural History Society; Advert. *The Flora of the Clyde Area*, J.R. LEE.  
 202 Proceedings 1990.  
 204 Officers & Council, SESSION LX 1990.  
 205 Some Observations on the Effects of Mineral Solids Deposition on Littoral Invertebrates in Loch Lomond. C.R. DOUGHTY.  
 213 Colour Plates in The Glasgow Naturalist.  
 214 Obituary: ELSIE CONWAY, B.Sc., Ph.D.  
 215 Additions to the Coleopteran Fauna of Colonsay & Oronsay, Argyllshire (South Ebudes, V.C. 102), D.C. JARDINE, J. CLARKE & P. M. CLARKE.  
 218 Book Review: *Freshwater Fishes of the British Isles*, P.S. MAITLAND & R.N. CAMPBELL.  
 219 Some Recent Records of Bird's-nest Orchid in the Clyde Valley, A.G. WALKER.  
 221 The Distribution of Amphibians in Central Region, Scotland, O.L. LASSIÈRE.  
 239 Cotoneaster Update, P. MACPHERSON & E.L.S. LINDSAY.  
 243 First Records of the Striped Dolphin, *Stenella coeruleoalba* in Scottish Waters, R.J. REID, A. KITCHENER, H.M. ROSS & J. HERMAN.  
 246 Book Reviews: *The Soil*, B. DAVIS, N. WALKER, D. BALL & A. FITTER; *Flitting the Flakes*, M. PEARSON (Ed.).  
 247 Records of Lepidoptera on North Uist, Outer Hebrides, K.P. BLAND.  
 251 Insect Records from the West of Scotland in 1991 & Some Records for Coleoptera for 1990, E.G. HANCOCK (Comp.).  
 254 Book Review: *The Trials of Life*, D. ATTENBOROUGH.  
 255 The Natural History of the Muck Islands, North Ebudes 9. Insecta: Neuroptera, Trichoptera, Siphonaptera & Hymenoptera - Symphyta & Aculeata, R.M. DOBSON.  
 259 David Ure (1749-1798) - "Breadth of Mind and Accuracy of Observation", J.H. BURNS.  
 275 Book Reviews: *Collins Photoguide to Fossils*, H. MAYR; *Geological Excursions around Glasgow & Girvan*, J.D. LAWSON & D.S. WEEDON.  
 277 Short Notes, A.McG. STIRLING (Comp.).  
 293 Book Reviews: *A List of Vascular Plants of the British Isles*, D.H. KENT; *Checklist of the Plants of Perthshire*, R.A.H. SMITH, N.F. STEWART, N.W. TAYLOR & R.E. THOMAS; *New Flora of the British Isles*, C.A. STACE; *A Field Guide to the Rare Birds of Britain & Europe*, I. LEWINGTON, P. ALSTROM & P. COLSTON; *Endangered Birds*, J. FERGUSON-LEES & E. FAULL; *Newman's Birds of Southern Africa 1991 Update*, K. NEWMAN; *In Search of Arctic Birds*, R. VAUGHAN; *The Cambridge Encyclopedia of Ornithology*, M. BROOKE & T. BIRKHEAD (Eds.); *The Birds of Fair Isle*, J.N. DYMOND; Leopard, G. HINDE; *The Illustrated Encyclopaedia of Shells*, K.R. WYE; *Spiders: an Illustrated Guide*, R. PRESTON-MAFHAM; *The Hemiptera or True Bugs*, W.R. DOLLING; *A Field Guide to the Wildlife of the Falkland Islands and South Georgia*, I.J. STRANGE; *The Forth Naturalist & Historian Vol. 15: Watching Wildlife - a Field Guide to the Wildlife Habitats of Britain*, G. YOUNG & E. FRANKS; *The Great Wood of Caledon*, H. MILES & B. JACKSON; *The Good Zoo Guide*, J. IRONMONGER; *A Natural History of the Lakes, Tarns & Streams of the English Lake District*, G. FRYER, ill. by S. MURPHY.  
 304 Proceedings 1991.  
 306 Officers & Council, SESSION LXI, 1991.  
 307 The Flora of Ailsa Craig, B. ZONFRILLO.  
 344 Book Reviews: *The Flowers of Iona*, 2nd. ed., J.S. MILLAR.  
 345 Scottish Orchids as Postage Stamp Designs, M. BATES & J.H. DICKSON.  
 349 Ten Years of Population Counts of Orchids at Dumbrook Loch Meadows, Stirlingshire & Problems of Management, C.A. DICKSON & W. PARKES.

- 361 Improving the Quality of Poorly-pressed Herbarium Specimens, P. MACPHERSON.
- 364 Book Review: *Wild Orchids of Scotland*, B. ALLAN, P. WOODS & S. CLARKE.
- 365 The Inchlonaig Yews: their Tree Epiphytes & their Tree Partners, N. PILKINGTON, J. PROCTOR & K.J. REID.
- 374 Book Review: *Eric Hosking's Classic Birds - 60 Years of Bird Photography*, J. FLEGG & D. HOSKING.
- 375 Dental Loss, Disease & Abnormalities in Scottish Red Foxes, M. HANCOX.
- 378 Book Review: *Collins Field Guide: Birds of Britain & Europe, New ed.*, R.T. PETERSON, G. MOUNT-FORD & P.A.D. HOLLLOM.
- 379 Bovine Tuberculosis & Scottish Wildlife, M. HANCOX.
- 381 Insect Records from the West of Scotland in 1992, E.G. HANCOCK (Comp.).
- 385 Some Leaf-mining Diptera from N. Uist, Outer Hebrides, K.P. BLAND.
- 387 Book Review: *Bird Life of Coasts & Estuaries*, P.N. FERNS.
- 388 Book Reviews: *The Ecology of Butterflies in Britain*, R.L.H. DENNIS (Ed.); *Collins Field Guide: Insects of Britain & Northern Europe, 3rd. ed.*, M. CHINERY.
- 389 The Clouded Yellow Invasion of Scotland, 1992, R. SUTCLIFFE.
- 396 Book Review: *Insects in Flight*, J. BRACKENBURY.
- 397 Underground Glasgow: a Study in Environmental & Urban Impact, B. SKILLEN.
- 408 Book Reviews: *The Great Tit*, A GOSLER; *Seabirds*, R. HUME & B. PEARSON.
- 409 Distribution & Species & Length Composition of Wrasse (Labridae) in Inshore Waters of West Scotland, J. W. TREASURER.
- 418 Book Reviews: *Insects of the Northern Hemisphere*, G.C. MCGAVIN; Bird Migration, R. BURTON.
- 419 Short Notes: A. McG. STIRLING (Comp.).
- 434 Soft-ware Review: *The Hypercard Guide to the Parkhouse Community Nature Reserve*, R.S. LI. GRIF-FITH.
- 435 Book Reviews: *Seashells of Great Britain & Europe*, R.T. ABBOT; *Trees of Great Britain & Europe*, A. MITCHELL; *Wild Flowers of Great Britain & Europe*, P. FOREY; *Rocks & Minerals of the World*, M. O'DONOGHUE; *British Freshwater Crustacea Malacostraca*, T. GLADHILL, D.W. SUTCLIFFE & W.D. WILLIAMS; *The Encyclopedia of Land Invertebrate Behaviour*, R. & K. PRESTON-MAFHAM; *The Really Wild Guide to Britain*, E. ROWAN & D. WALLACE; *Field Guide to Mammals of Britain & Europe*, D. MACDONALD & P. BARRETT; *Echo of the Elephants: the Story of an Elephant Family*, C. MOSS & M. COLBECK; *Kingfisher*, P. FIORATTI (translated S. SULLIVAN).
- 439 Advert. *The Flora of the Clyde Area*, J.R. Lee (1933).
- 440 Proceedings 1992
- 442 Officers and Council, SESSION LXII, 1992.
- 443 A Survey of Farms and their Agrochemical Inputs in the Lower Clyde Valley. J.R.M. Thacker & G. McKnight.
- 453 Book Reviews: *Collins Photoguide to Lakes, Rivers, Streams and Ponds of Britain & NW Europe*, R. FITTER & R. MANUEL; *Collins Field Guide: Land Snails of Britain & NW Europe*, M.P. KERNEY & R.A.D. CAMERON, ill. by G. RILEY; *Collins Field Guide: Caterpillars of Britain & Europe*, D.J. CARTER & B. HARGREAVES; *The Barn Owl*, C. SHAWYER.
- 455 Common Skate and Tope: First Results of Glasgow Museum's Tagging Study, W. LITTLE.
- 466 Book Reviews: *The Complete Guide to Ireland's Birds*, E. DEMPSEY, art work M. O'CLERY; *Seashores & Shallow Seas of Britain & Europe*, A. CAMPBELL, ill. J. NICHOLLS;
- 467 *Erigeron acer* L. (Blue Fleabane) and Rabbits in Central Glasgow, J.H. DICKSON.
- 470 Book Reviews: *Mediterranean Wild Flowers*, M. BLANEY & C. GREY-WILSON; *The Swallow*, A.K. TURNER.
- 471 The Seasonal Occurrence of Some Prominent Zooplankton Species in Rough Firth. I. Scyphomedusae, T. SKINNER.
- 478 Book Reviews: *Central Scotland - Land, Wildlife, People*, Ed. L. CORBETT, D.M. BRYANT, D.S. McLUSKY, B.J. ELLIOT, & N.L. TRANTER; *Ladybirds*, M.E.N. MAJERUS.
- 479 The Seasonal Occurrence of Some Prominent Zooplankton Species in Rough Firth. II. Chaetognatha, T.G. SKINNER.
- 485 Old Cornstone Workings in Dunbartonshire and West Stirlingshire, with Notes on their Associated Flora, J. MITCHELL.
- 491 Book Reviews: *Urban Nature Magazine*; *Wildfowl*, M. OGILVIE, ill. B. PEARSON; *Hedgehogs*, N. REEVE.
- 495 Lanarkshire's Nose Update, P. MACPHERSON.
- 500 Book Review: *The Fieldfare*, D. NORMAN.
- 501 Insect Records from the West of Scotland in 1993, E.G. HANCOCK (Comp.).

- 505 A Specimen of the Deep-sea Anglerfish *Cryptopsaras conesi* Gill (Teleostei, Lophiiformes, Ceratiidae) Caught on the Eastern Flank of the Rockall Trough, with Comments on the Distribution of the Species in the NE Atlantic, G.N. SWINNEY, R. SUTCLIFFE & K.P. BLAND.
- 512 Book Reviews: *Scottish Birds*, V. THOM; Torridon, L. MACNALLY.
- 513 The Natural History of the Muck Islands, N. Ebudes 10. Insecta: Diptera, R.M. DOBSON.
- 520 Book Reviews: *The Scottish Pearl in its World Context*, F. WOODWARD; *Where to Watch Birds in Britain & Europe*, J. GOODERS.
- 521 Short Notes, A. McG. STIRLING (Comp.).
- 537 Book Reviews: *Birds in Wales*, R. LOVENGROVE, G.WILLIAMS & I. WILLIAMS; *Butterflies & Climate Change*, R.L.H. DENNIS; *British Birds, Vol. 86*; *Mammals of Great Britain & Europe*, J. BURTON; *Insects of Great Britain & Europe*, G. C. McGAVIN; *The Loch. A Year in the Life of a Scottish Loch*, R. DENNIS, photos P. MOORE; *Waders*, N. HAMMOND & B. PEARSON; *Bird Identification & Fieldcraft*, I. NETHERCOAT & M. LANGMAN; *Migrants & Migration*, P. HOLDEN & M. LANGMAN; *Mice & Voles*, J.FLOWERDEW, ill. S. KIRK; *Roses of Great Britain & Ireland*, G.G. GRAHAM & A.L. PRIMAVESI ill. M. GOLD; *On The Trail of the Whale*, M. CARWARDINE; *The Islands of Scotland: a Living Marine Heritage*, J.M. BAXTER & M.B. USHER (eds.); *The Evolution of Insect Flight*, A.K. BRODSKY; *The Ochil Hills: an Introduction*, L. CORBETT, E.K. ROY & R.C. SNADDON; *The Forth Naturalist & Historian, vol. 17, 1994*; *Where to Watch Birds in Eastern Europe*, G. GORMAN.
- 545 Publications of Glasgow Natural History Society.
- 546 Proceedings 1993.
- 547 Officers and Council, SESSION LXIII, 1993.
- 548 Index to Volume 22.

### Errata Volume 22

- p. 197, line 2: for V.C.74 read V.C.75
- p. 256, line 37: for *rectangulus* read *rectangulatus*  
 line 42: for *sorecis sorecis* read *soricis soricis*
- p. 257, line 4: for *talpa talpa* read *talpae talpae*

## The Glasgow Naturalist

This publication is included in the abstracting and indexing coverage of the Biosciences Information Service of *Biological Abstracts* and in that of *CABS* (Current Awareness in Biological Sciences).

The following back numbers are available for purchase in their separate parts: Vols. II-VIII (1890-1918); Vols. XIII-XXII (1937-1994)

Of the earlier journals the only parts available are:

*The Annals of the Andersonian Naturalist's Society* Vol. IV, pt. 3.

*Proceedings and Transactions of the Natural History Society of Glasgow*

Vol. I, pt. 3; Vol. II, pts. 1 & 2; Vol. VI, pts. 1 & 2; Vol. VII, pt. 3; Vol. VIII, pts. 1 & 2.

Enquiries regarding prices of and orders for any of the above, or for reprints or photocopies, should be addressed to *The Librarian*:-

Mrs R. H. Dobson, 7 Netherburn Avenue, Glasgow, G44 3UF

### Advice to Contributors

Contributions, except *Short Notes*, should be sent to *The Editor*:- *Glasgow Naturalist*, c/o Natural History Department, Museum & Art Gallery, Kelvingrove, Glasgow G3 8AG. (Tel. 0141 305 2660). *Short Notes* should be sent to Mr A. McG. Stirling, 17 Austen Road, Glasgow, G13 1SJ

Articles, preferably typed doubled-spaced, should conform to the format of the journal as regards layout, use of capitals, punctuation etc. Script should be of uniform size and format (no bold lettering) and passages to be italicised should be underlined. Titles of journals should be abbreviated according to accepted conventions e.g. as in *World List of Scientific Periodicals*. Samples of format can be supplied on request.

5 in. or 3 1/2 in. computer disks may be sent in addition to typescripts. These should be produced as Wordperfect, Ascii or Text Only files devoid of all printing instructions .

Drawings, graphs etc. should be designed to utilise page space (166 x 109mm) economically and line thickness, shading, lettering etc. should allow for any necessary reductions. Monochrome and colour photographs (preferably transparencies) may be acceptable. Maps should be "boxed" and include scale lines and indication of North.

The journal is usually issued in mid-February each year and, unless prior arrangements have been made, the deadlines for receipt of papers and for *Short Notes* are, respectively, 30 September and 31 October of the previous year.

Ten free reprints are issued with each paper. Further copies may be purchased if required.

Printed by Aldard Print & Typesetting Services, The Old School, The Green,  
Ruddington, Notts. NG11 6HH

# Contents

## Page

- 443 A Survey of Farms and their Agrochemical Inputs in the Lower Clyde Valley. J.R.M. THACKER & G. McKNIGHT.
- 453 Book Reviews: *Collins Photoguide to Lakes, Rivers, Streams and Ponds of Britain & NW Europe*, R. FITTER & R. MANUEL; *Collins Field Guide: Land Snails of Britain & NW Europe*, M.P. KERNEY & R.A.D CAMERON, ill. by G. RILEY; *Collins Field Guide: Caterpillars of Britain & Europe*, D.J. CARTER & B. HARGREAVES; *The Barn Owl*, C. SHAWYER.
- 455 Common Skate and Tope: First Results of Glasgow Museum's Tagging Study, W. LITTLE.
- 466 Book Reviews: *The Complete Guide to Ireland's Birds*, E. DEMPSEY, art work M. O'CLERY; *Seashores & Shallow Seas of Britain & Europe*, A. CAMPBELL, ill. J. NICHOLLS.
- 467 *Erigeron acer* L. (Blue Fleabane) and Rabbits in Central Glasgow, J.H. DICKSON.
- 470 Book Reviews: *Mediterranean Wild Flowers* M. BLANEY & C. GREY-WILSON; *The Swallow*, A.K. TURNER.
- 471 The Seasonal Occurrence of Some Prominent Zooplankton Species in Rough Firth. I. Scyphomedusae, T. SKINNER.
- 478 Book Reviews: *Central Scotland - Land, Wildlife, People*, Ed. L. CORBETT, D.M. BRYANT, D.S. McLUSKY, B.J. ELLIOT, & N.L. TRANTER; *Ladybirds*, M.E.N. MAJERUS.
- 479 The Seasonal Occurrence of Some Prominent Zooplankton Species in Rough Firth. II. Chaetognatha, T.G. SKINNER.
- 485 Old Corstone Workings in Dunbartonshire and West Stirlingshire, with Notes on their Associated Flora, J. MITCHELL.
- 491 Book Reviews: *Urban Nature Magazine: Wildfowl* M. OGILVIE, ill. B. PEARSON; *Hedgehogs*, N. REEVE.
- 495 Lanarkshire's Nose Update, P. MACPHERSON.
- 500 Book Review: *The Fieldfare*, D. NORMAN.
- 501 Insect Records from the West of Scotland in 1993, E.G. HANCOCK (Comp.).
- 505 A Specimen of the Deep-sea Anglerfish *Cryptopsaras couesi* Gill (Teleostei, Lophiiformes, Ceratiidae) Caught on the Eastern Flank of the Rockall Trough, with Comments on the Distribution of the Species in the NE Atlantic, G.N. SWINNEY, R. SUTCLIFFE & K.P. BLAND.
- 512 Book Reviews: *Scottish Birds*, V. THOM; Torridon, L. MACNALLY.
- 513 The Natural History of the Muck Islands, N. Ebudes 10. Insecta: Diptera, R.M. DOBSON.
- 520 Book Reviews: *The Scottish Pearl in its World Context*, F. WOODWARD; *Where to Watch Birds in Britain & Europe*, J. GOODERS.
- 521 Short Notes, A. McG. STIRLING (Comp.).
- 537 Book Reviews: *Birds in Wales*, R. LOVENGROVE, G.WILLIAMS & I. WILLIAMS; Butterflies & Climate Change, R.L.H. DENNIS; British Birds, Vol. 86; Mammals of Great Britain & Europe, J. BURTON; Insects of Great Britain & Europe, G. C. McGAVIN; The Loch. A Year in the Life of a Scottish Loch, R. DENNIS, photos P. MOORE; Waders, N. HAMMOND & B. PEARSON; Bird Identification & Fieldcraft, I. NETHERCOAT & M. LANGMAN; Migrants & Migration, P. HOLDEN & M. LANGMAN; Mice & Voles, J.FLOWERDEW, ill. S. KIRK; Roses of Great Britain & Ireland, G.G. GRAHAM & A.L. PRIMAVESI, ill. M. GOLD; On The Trail of the Whale, M. CARWARDINE; The Islands of Scotland: a Living Marine Heritage, J.M. BAXTER & M.B. USHER (eds.); The Evolution of Insect Flight, A.K. BRODSKY; The Ochil Hills: an Introduction, L. CORBETT, E.K. ROY & R.C. SNADDON; The Forth Naturalist & Historian, vol. 17, 1994; Where to Watch Birds in Eastern Europe, G. GORMAN.
- 545 Publications of Glasgow Natural History Society.
- 546 Proceedings 1993.
- 547 Officers and Council, SESSION LXIII, 1993.
- 548 Index to Volume 22.
- i Title Page and contents, Volume 22.
- v Errata Volume 22





**HECKMAN**

**B I N D E R Y , I N C .**

Bound-To-Pleace®

**OCT 02**

N. MANCHESTER, INDIANA 46962

SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01205 4300