Porcupine Newsletter

Volume 2 Number 5 ISSN 0309-3085

JULY 1982

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CONTENTS

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NEWSLETTER. The next PN, normally due in November, will be held until December in order to report the Reading meeting (below).

BACK NUMBERS OF PN. A complete set of back numbers is available. Volume 1 contains 10 parts and Volume 2 has 5 parts to date. Charges, including postage, are 70p a part for Volume 1 and £1 a part for Volume 2.

Any Member who was entitled to, but did not receive, PN Volume 1, parts 9 and 10, should write to the Secretary, Dr. Shelagh Smith, at the Royal Scottish Museum, Chambers Street, Edinburgh, EH1 1JF for free copies. Enquiries for other back numbers should be similarly addressed.

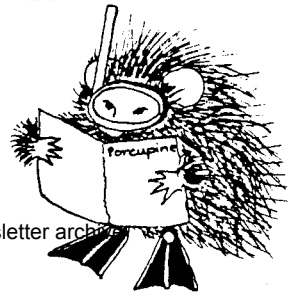
FUTURE MEETINGS. 1. A joint meeting with the Underwater Conservation Society will be held at Reading University on Saturday 11 and Sunday 12 December 1982. Details are on a separate sheet enclosed with this Newsletter. Contact address: Dr. Geo. Warner, Zoology Department, The University, Whiteknights, Reading RG6 2AJ.

2. The next AGM will be held at the Marine Science Laboratories, Menai Bridge, Wales on 26 and 27 February 1983. The theme will be "Biogeographic boundaries in British seas - the role of marine recording". A shore excursion to the W. coast of Anglesey is offered. Further details will appear in the December PN.

THE LETTER COLUMN is open for contributions. Opinions, facts, speculations, all are welcome.

OWNERS of specimens of Thalassiohystrix scuba Smith & Heppell are asked to contact the Editor (see Notes and News).

Frank Evans, Editor,
Dove Marine Laboratory, Cullercoats, North Shields NE30 4PZ,
England.



REPORTS OF THE MEETING IN GLASGOW (continued from Vol. 2, No. 4)

STRATEGIES IN MARINE RECORDING

Rob Earll
UCS Projects Co-ordinator, Candle Cottage, Kempley, Dymock, Glos.

One of the main objectives in ecology is to describe and explain the distribution of species. The biological reasons for this are various but range from the traditional study of biogeography in order to understand the evolution of species to detailed autecological studies at a local level designed to investigate the nature of those biological and environmental factors which influence where species are found. Following the example set initially by the terrestrial botanists, and then developed by the Biological Records Centre, what have become known collectively as 'recording schemes' began to be started for single marine taxa, e.g., the molluscs, algae and echinoderms, in the late 1960's and early 1970's instigated by BRC. Few of these projects have come to fruition, and in general one could say that as yet few have realised their original objectives. In fact, it is likely that an increasing number of projects will be published. However, it has become quite clear that the current strategy ('the BRC model') for producing results has some serious drawbacks. This paper considered elements in the strategy of marine recording, in the light of the experience with the BRC model but also in relation to alternative strategies which have been developed recently. It is possible to characterise various of the elements of marine recording schemes (Fig. 1), and review how one can go about organising such projects; the following provides a brief review of this subject:

The question and planning:

As with any scientific project clear definition of the aims of the project are required, and this should ideally be set out at the planning phase. The option in marine recording of 'do it yourself', i.e., without involving a large number of recorders in the type of BRC scheme we have become accustomed to, is a viable one. Shelagh Smith and David Mckay - with their regional mollusc atlas's, and Professor Dodge with the dinoflagellate atlas (BRC) provide good examples of this approach. What is outlined below refers to projects which involve a large number of recorders, on a nationwide scale, and probably will require a number of years to complete. Such projects are in fact major excercises in terms of the time they require and are likely to require a reasonable amount of 'professional time' to achieve a result within an acceptable period of time. The organisation of feedback and the manipulation of information received can be achieved using a micro-computer (see David Erwin's paper). Both 'professional time' and micro-computers cost money and funding the project adequately from the outset should be carefully planned.

The project co-ordinator:

This is the key position which largely determines what the project achieves. Since most national projects are likely to run for at least three years - the commitment of the Co-ordinator is crucial; joint co-ordination can work extremely well.

Recorders and publicity:

The advantage of using volunteer recorders is that a comparatively large area can be covered (at least in theory) in a comparatively short period of time and at a level of coverage achieved which would be very difficult or expensive using any other method. Publicity for the project is quite essential to attract potential recorders at the outset; once the project is underway this publicity can be combined with feedback relating to the results which have already been acquired.

The potential number of recorders available to collect records from quite specific parts of the marine environment varies enormously. For example there are perhaps several hundred thousand potential recorders who could be engaged in recording in the intertidal environment, a maximum of 50,000 divers who could collect records from the shallow sublittoral zone, and perhaps less than a thousand workers who have access to offshore boat facilities. Whilst recognising the view that the marine environment is more than just any one compartment, these compartments or rather the different characteristics of potential recorders can be utilised to practical effect - the UCS Species Recording Scheme provides a good case in point.

Scientific publication in any particular subject usually takes place in a step by step fashion. To wait for a complete data set (if there is such a thing) with data from intertidal, sublittoral and offshore before publishing seems to be contrary to other practices in scientific publication (i.e., step by step). To wait for offshore records - which one can recognise as taking much longer to accumulate whilst one has adequate coverage of say the intertidal or sublittoral seems unnecessarily cautious - especially given the restricted distribution of many species in these environments.

Time span: Most of the recording projects currently underway have been running for roughly ten years or more. This is probably too long, without publication, to maintain the interests of both the participants and the co-ordinator ('co-ordinator fatigue' is a known phenomenon!). There is a strange logic which has crept into the current recording schemes, and that is, because volunteer recorders are involved somehow in what would be intolerable on a 'professional level' becomes the accepted norm. Marine recording is a worthwhile topic and should command more professional time in order to achieve publication, within an acceptable period of time.

Materials:

Before recorders can be expected to make accurate records they must either be experienced or be furnished with the materials which

will enable them to gain that experience. An adequate identification guide to the species to be identified before the scheme begins is essential.

Feedback:

Whilst it is very easy to talk about this it is probably the most time consuming and difficult part of co-ordinating marine recording projects. Letters will suffice in the short term, but ideally interim reports on a yearly basis should be produced. Using micro-computers considerably speeds up this process. There are also a number of simple methods which can be utilised to display geographic information in table form which can considerably simplify feedback exercises, to direct people to areas where further records are required.

Publication:

If the results have been computerised as the project has proceeded, the analysis of final results can be considerably simplified. Ideally publication costs might be included with the initial planning of the project. In any event it is far easier to raise the finances required to fund publication once the results have been written up.

Further points:

Using divers in the Species Recording Scheme we have found that for commonly recorded species, by the time one has 400 records of the species, the amount of new information acquired after a further 500th, 600th and 700th record decreases substantially. This is normal and what one might expect as with all sampling intensity - information curves using a particular method. Once the information curve starts to level off publication is probably warranted, for unless a new strategy is employed different information is unlikely to affect particular distributions.

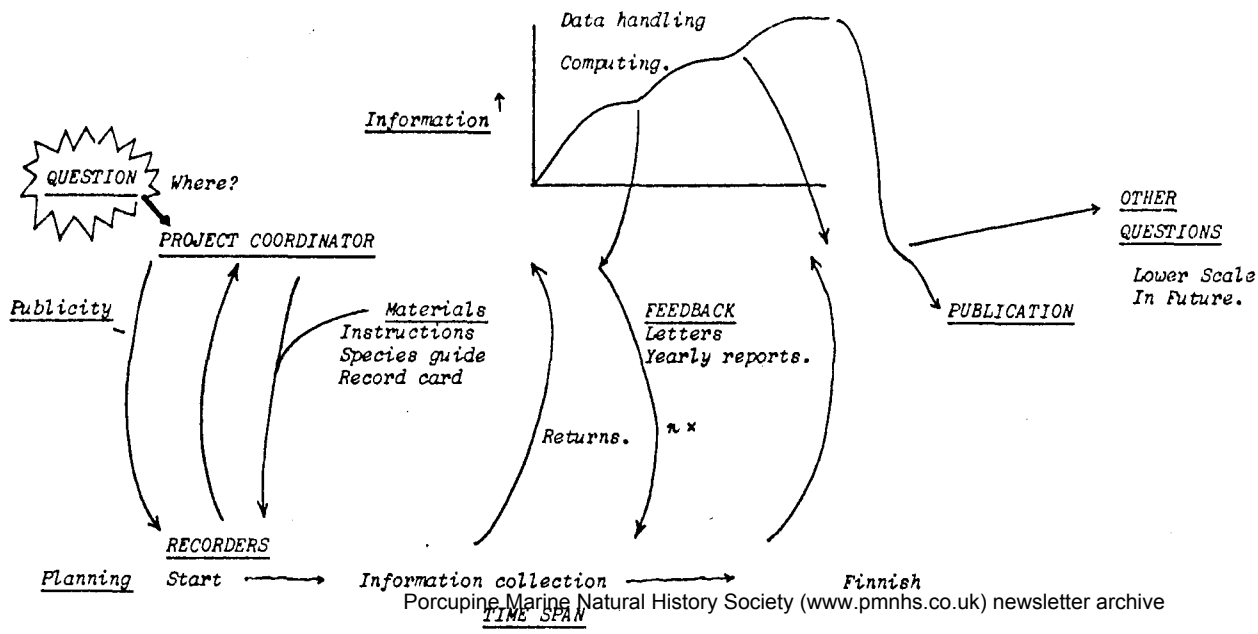
Record cards:

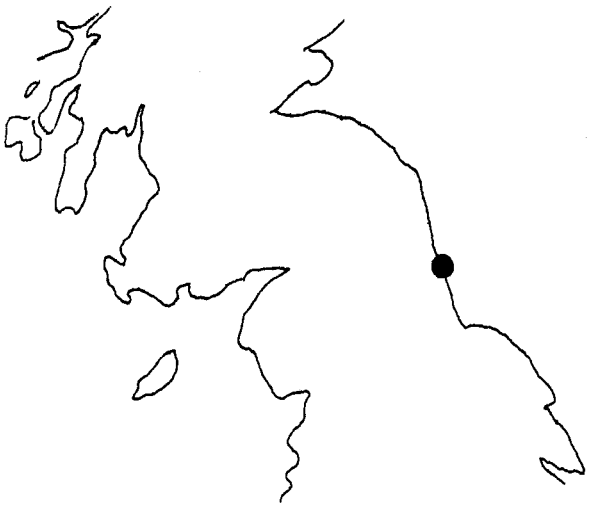
In a variety of UCS projects record card design has been altered to cope with multi-taxa, single taxa, single species recording projects, and habitat recording. Successful and published results have been obtained from all types of card. It is clear however that there are several design criteria which have to be considered. For example, the more complex the card the greater the commitment required for its completion. If this means that there are very few returns, this also has a marked effect on how long the overall project will take to be completed. There is however another penalty with regard to complexity or I should say the number of species or bits of information requested and that is the degree of rendundancy of the material on the card. How many species are ticked off on the average card from a site or station - I suspect very few in comparison with the total number of species on the card. The third point about cards with large numbers on them is, that ideally one should have adequate identification guides for all the species. In some cases with species on current cards only one or two national experts possess such information, and the documentation

concerning the identification of those species is often unavailable or wildly out of date. During the presentation of this paper some people felt that I was against the use of recording cards; that is not the case. I feel that they are an essential element of such schemes in that they provide a durable record of the information which has been collected during the study in a structured manner which can often considerably enhance both recording and analysis. My point was that many of our current record cards are badly designed and prevent, rather than facilitate, recording.

The future:

As Norman Holme said during the morning session, we probably have come to the end of an era. There are alternatives to the BRC model and co-ordinators seem likely to utilise these to an increasing degree in order to complete recording projects. The planning of projects and the greater involvement of professional commitment and organisation might help to facilitate the publication of results rather more quickly than has been the case to date. More attention must be paid to what is likely to attract potential recorders, and the documentation which will enable them to complete record cards and identify species. Multi-taxa projects geared to levels of identification skill and particular parts of the marine environment - depending on the target recorders, would probably achieve what is possible using volunteer recorders far more quickly than current BRC schemes. Even with single taxa projects environmentally linked, and priority based (species selected on the basis of their likely occurrence) schemes would prove to be more satisfactory if only from the view that publication could be achieved far more quickly. Marine recording of species distributions is a subject which occupies a considerable amount of professional and volunteer biologists time. It is a fundamental part of understanding of the marine environment; recording schemes using volunteers in the marine environment can work as a method of collecting fundamental information of considerable interest. Hopefully this meeting began to illustrate some of the techniques which can be applied to the problem in order to get this method to work more effectively to everyone's benefit.





Around the Marine Laboratories.

Number 4.

Dove Marine Laboratory

Nineteenth century Tyneside, situated at the heart of the industrial revolution, generated amongst its multifarious products many eminent marine naturalists, most of whom found that the new steam train from Newcastle to Cullercoats, ten miles distant, gave easy access to the shore and to a small fishing harbour where specimens from deeper water could be obtained from the boats. Around the turn of the century Professor Alexander Meek of Armstrong College, Newcastle, took to storing his wellies at Cullercoats in a saltwater bathing establishment on the beach, a left-over from Victorian health-seeking.

In 1908 the salt-water baths were pulled down and Meek built a marine laboratory fronted by a public aquarium on the site. Meek's 1908 laboratory still stands, little changed externally, apart from a 1950s extension at one end. Newcastle University, direct successor of Armstrong College, retains ownership.

The public aquarium is closed now but the research in progress at the Dove Marine Laboratory is linearly descended from that of the local nineteenth century naturalists. At the core of the Dove's functioning are a workers' aquarium, a trawler and a fine library. Academics on the staff number four; including postgraduates a total of about twenty people are employed. Undergraduates, about sixteen in each year, are prepared for a first degree in marine biology.

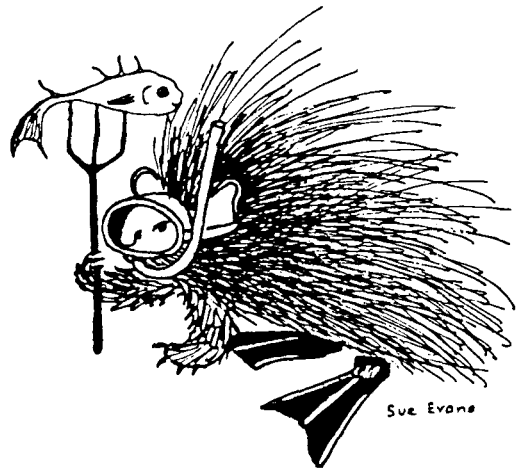
Research interests are centred on benthic ecology, on reproductive strategy in marine invertebrates, on heavy metal pollution and on inshore plankton ecology; there is also a well-trodden pathway leading from Cullercoats to certain tropical coral reefs.

The dual use of the Northumberland shore as holiday beach and sewer pipe termination and of the sublittoral as both a fishing ground and an immense dumping ground gives immediate relevance to the laboratory's work despite earnest protestations as to the purity of the research undertaken.

For the interested visitor, both professional and informed amateur, there is a continuing welcome at the Dove. Enquiring naturalists are plied with information, guidance and copious tea. Some bench space may be available and the local shores are well documented floristically and faunistically.

Dove Marine Laboratory, Cullercoats, North Shields, Tyne and Wear NE30 4PZ.

Notes & News



GENDER OF THALASSIOHYSTRIX SCUBA Smith & Heppell. It was hoped in this issue to reveal the sex of the holotype of this species but its discovery has so far proved too difficult. While it is usually possible, by the judicious inversion of a small mammal, for instance a cat, to read the fine print beneath the tail it is certainly not so in the present case without serious risk to the investigator. Furthermore, direct verbal interrogation of the normally voluble subject has consistently been met by a prudish pursing of the lips. Any help in procuring a second specimen of Thalassiohystrix for breeding and the consequent resolution of this problem would be appreciated.

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IRISH DIVING - SERIOUSLY. The Marine Section of the Ulster Museum under Member David Erwin has recently been awarded a government contract to survey the sublittoral life of Northern Ireland. Two diving biologists, David Connor and Christine Howson are to assist Erwin and Member Bernard Picton with the survey. The team plans to sample representative sites chosen using a computer clustering programme. This will give the collected results some predictive capacity. A further aim is to enhance the museum's already extensive voucher collection, especially among poorly known groups such as sponges.

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MAFF MAP. Plans are advancing to augment the popular "Atlas of the Seas around the British Isles" published by the Ministry of Agriculture, Fisheries and Food. The Editors wonder if Porcupine could contribute. Are we sitting on mappable information that might go into a later edition? What do you think? Write and tell us.

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OYSTER TINGLING - A LETHAL GAME. Southampton University Department of Oceanography (SUDO) (?!) are running a study on the oyster tingle, Ocenebra erinacea, a boring gastropod (we resist the jest). The tingles are thought to kill large numbers of young Solent oysters and the oyster farmers want them out. Can SUDO outwit the tingle? Watch this space.

INVERTEBRATE PORCUPINE. Collections of nudibranchs from SW Ireland have recently revealed the presence of a number of species not previously known around the British Isles, and several undescribed species. A recent paper in the Irish Naturalist's Journal by Picton and Brown (1981) describes three of these new discoveries; Facelina dubia, previously known from the French Atlantic coast and the Med; Dicata odhneri, previously known only from Naples, and Doto lemchei, recently described from NW Spain; and a new species, Doto hystrix, named for the porcupine-like ceratal tubercles and rhinophore sheaths, together with the fact that its discovery resulted from marine recording by diving biologists, the sort of research that Porcupine aims to promote.

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TOM THE ASCOGLOSSA. It gives us much pleasure to publish in this issue a piece by Dr. Thos. Gascoigne. Tom is one of our earliest and most faithful members. In the last thirty years or so he has made an absolute corner in the ascoglossans of Porcupine seas. (What are they? Reader, turn the pages.) Sadly, we report that he has recently become partially sighted and has now joined the white stick brigade. But we can testify personally that he refuses to be downcast at this. Witness the vigour of his current article. Although he is now deprived of the use of his microscope we look forward to an unabated flow of publications from his pen. Good wishes, Tom, from Porcupine.

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LOBSTERS GALORE. We have news that the very large (300 m^3) plastic bags installed in Loch Ewe, Scotland, for the experimental rearing of cod and herring are also to be used for the rearing of lobster larvae. Will the mystery surrounding the development in the wild of this familiar crustacean be removed? Time it was!

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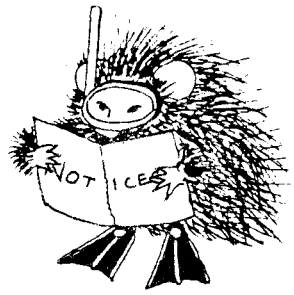

NOTICES

NOTICE 1. WORKSHOP ON THE IDENTIFICATION OF ECHINODERMS

From Member J. Hunter, Highland River Purification Board, Strathpeffer Road, Dingwall, Ross and Cromarty (Dingwall 62021).

The workshop will take place at Stirling University from Tuesday, 7 September to Friday, 10 September 1982. It will be led by Members Eve Southward (MBA, Plymouth) and Paul Tyler (Oceanographic Department, Swansea University College). Details from Dr. Hunter at the above address.

NOTICE 2.

NATURAL HISTORY COLLECTIONS RESEARCH - CAN YOU HELP?

From Helen E. Stace, Project Officer, The Council for Museums and Galleries in Scotland, County House, 20 Torphichen Street, Edinburgh EH3 8JB.

A Collections Research Unit has been set up to produce a register of botanical, zoological and geological collections in Scotland. This will be useful to researchers and enthusiasts alike, enabling them to locate material of relevance to their studies. We are already collecting information from museums, universities and colleges, but also hope to include details of collections in private hands. A 'collection' can be anything from a few rocks to a herd of elephants, and if there are records or notes with the collection, all the better. We are interested in collections of any age, some of which now lie dormant in attics, their true scientific value being unrecognised by their owners. If you own or know of any such collections and you think their existence should be recorded, please contact us at the address below. We usually ask the owner to record the collections since he/she will usually know many details about the collections which are not written down, but we can visit the collections if necessary (note - arrangements can be made to keep the location of valuable collections confidential).

Save Scotland's Natural History Heritage.

Write to: The Council for Museums and Galleries in Scotland (NSCRU) at the above address.

Editor's Note: There are several Collection Research Units in England, including the North-West, the North-East, Yorkshire and Humberside, the Midlands, the South-West and the South-East. There is also a unit in Wales. For further information contact Member Bill Pettitt at the Manchester Museum. He computerises much national Collection Research information and was instrumental in setting up FENSCORE, the Federation for National Science Collections Research.

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REDISCOVERY IN BRITAIN OF THE HYDROID LAOMEDEA ANGULATA.
A REQUEST FOR RECORDS.

Paul F.S. Cornelius
Department of Zoology, British Museum (Natural History), London.

INTRODUCTION

Laomedea angulata Hincks, 1861, is a distinctive shallow water hydroid which seems to be substrate specific for eel grasses. It has been recorded on Zostera spp. and Posidonia, but apparently not on Ruppia. Few hydroids are so substrate specific as L. angulata, and I know of no confirmed records on any other substrate. Recent rediscovery of L. angulata on the south coast of England prompts me

to appeal for records and also for negative reports to find out whether or not L. angulata died out in the 1930's.

Did Laomedea angulata die out?

In the 19th century L. angulata was recorded reliably from the Isle of Man southwards. But until 1981 the most recent British mainland records were from Plymouth Sound in 1906 (Plymouth Marine Fauna) and Studland Bay, Dorset in 1890 or earlier (BMNH regd. material 1899.7.22.1; mentioned, Cornelius, 1982). Zostera suffered the world-wide 'wasting disease' in the British Isles in the 1930s (Tutin, 1938) and it might be that L. angulata died out too. The Zostera populations were decimated and it could be that in many places the small patches thqt survived no longer supported L. angulata. C.M. Yonge (1949, ch. 16), when considering the fate of the Zostera bed communities, said 'Many marine animals..... which used to live or feed upon the Zostera.....died out.....There is evidence now (1949) of some return of the eel grass and in time the former beds will doubtless be re-established.'. I am hoping that from fragmentary records which 'Porcupine' readers might have that some evidence of a re-colonization by L. angulata might be found. There was a record of L. angulata from the Scillies in 1967 (Robins, 1969) but no other confirmed British records until 1981. One in Pembrokeshire in 1960 (Crothers, 1966), off Skomer, seems unlikely since the reported depth, 20 m, was unusually great. But Zostera does occur near Skomer (Keith Hiscock, pers. comm.) and the record could be valid. The next deepest record is that from Studland around 1890, at 6 - 8 m (but perhaps at high tide).

REDISCOVERY

On 15th August 1981, while paddling in the sea on my birthday, I found L. angulata to be common on the Zostera marina bed at Studland Bay, Dorset. This was just three weeks after submitting a long paper in which I stated that the species had not been recorded on the British mainland for 75 years! Clearly an application of a well known Law. About one Zostera blade in four bore a colony of the hydroid.

A month later, on 15th September (my mother's birthday), I found L. angulata once more - again by accident. This was on the small area of Zostera marina just north of Misery Point, R. Yealm, near Plymouth. In some patches about three blades in four bore the hydroid, but just a few yards away it would be absent.

I had previously searched without success the Zostera spp. beds of Scolt Head, Norfolk; Seasalter, N. Kent; and Exmouth and Dawlish Warren, S. Devon. It seems likely that these beds are too silty to support L. angulata - the Studland and Yealm localities are free of silt. But it might also be relevant that these two beds are at ELWS, whereas those where I have not found L. angulata are exposed on every tide. L. angulata has been recorded on the mid-shore around Roscoff (Faure, 1965; Teissier, 1965) but so far as I know all British records are from ELWS and below.

PHORETIC TRANSPORT

There is a potential interest in L. angulata beyond mere locality logging. Detached Zostera floats, even for a time while it is dying, and it could be that if L. angulata died out in the British Isles in the 1930s that its subsequent return resulted from dispersal on floating Zostera (cf. Cornelius, 1981). L. angulata is well known in the Netherlands (Vervoort, 1946) and the floating power of Zostera is documented (Wolff, 1979). Indeed, the Plymouth Marine Fauna lists fertile L. angulata on floating Zostera 3 miles SSW of the Mewstone, which is situated next to the Yealm estuary. On the day I found L. angulata at Studland there were hundreds of Zostera leaves floating in the sea, probably detached by pleasure boat propellers, and about half had living L. angulata attached. Even on dead, black leaves, which still floated, the hydroid colony was alive. So the possibility of dispersal is great. Wolff catalogued a number of observations of eel grass remains found at depth many miles from land. It is clear that the potential for transport is adequate to bring about re-colonization of L. angulata in southern England from Continental populations.

L. angulata has yet to be reliably reported away from western Europe and the Mediterranean. (Gili i Sardà, 1982, cites literature records from the USA, Brazil, the Black Sea and South Africa. But the South African report later proved to be of L. calceolifera (following Millard, 1975) and the remaining literature citations seem erroneous.) It is likely that, as reviewed by Wolff (1979), detached eel grass eventually decays and sinks. It follows that its value as a phoretic substrate is regulated by the time it takes to rot. Maybe the survival time of detached eel grass would not allow a trans-oceanic journey (cf. Cornelius, 1981). This, together with the restriction of L. angulata to eel grass, might have prevented that hydroid from becoming so widespread as some other campanularians, several of which are nearly cosmopolitan. Lastly, L. angulata has not been reliably recorded so far south in the Atlantic Ocean that it might be carried westwards in the east-west tropical counter-current.

IDENTIFICATION

Many hydroids grow on eel grass. Obelia dichotoma is often reported and is quite similar - even sometimes having tendrils. The distinguishing features which follow* are arranged in order from most to least useful. See also Fig. 1 and Cornelius (1982) for a key to related species.

REQUEST FOR INFORMATION

I should be grateful to hear from anyone who has either found L. angulata or looked for it and failed to find it, in Britain and Eire, this century. If response is adequate I shall analyse the records, acknowledging their sources.

ACKNOWLEDGEMENTS

I am grateful to my colleague Gordon Paterson for showing me the Wolff, 1979, reference and to the Trustees of the British Museum (Natural History) for permission to reproduce Figure 1.

*see overleaf

Character	Laomedea angulata	Obelia dichotoma
Internode	Virtually straight	Gently curving
Gonotheca	On basal stolon; aperture occupying entire terminal width	Axillary; aperture narrower than end of gonotheca; usually at end of short 'vicar's collar'
Dispersive stage	Planula larva	Medusa, often visible inside gonotheca
Shape of colony	Several erect stems each up to 10 polyps in extent, arising from a long stolon; no branching	Erect shoots often more than 10 polyps in extent; branching common
Tendrils	Recurved and slightly dilated at tip; common from mid-summer onwards	Not recurved and not dilated at tip; uncommon

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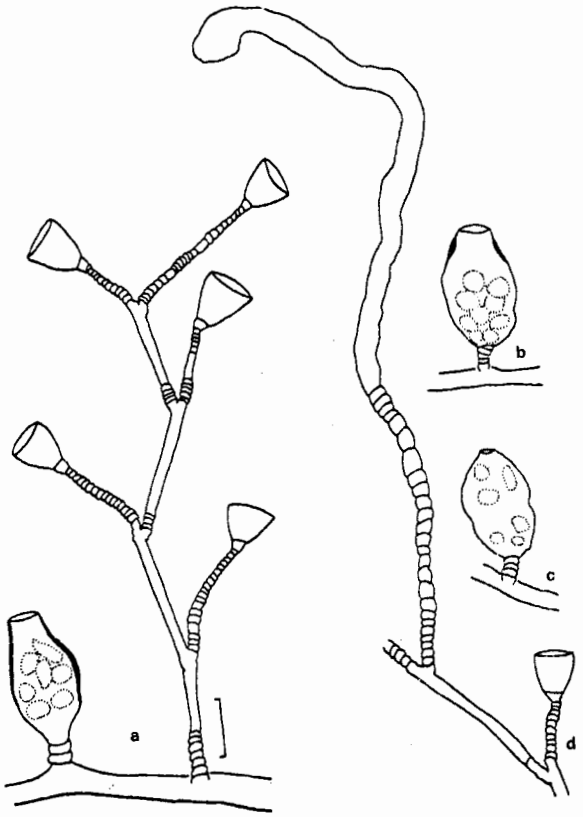


Fig. 1. Laomedea angulata. (a) part of colony with female gonotheca on stolon. Note the straight internodes and that the colony is fertile although small. (b-c) male gonothecae. (d) a terminal stolon. Note that the end is slightly dilated, and recurved. Scale (a-d) 500 µm.

THE ATTRACTION OF ASCOGLOSSANS

Thos. Gascoigne
16A York Grove, Peckham, London SE15 2NY.

Nearly all sea slugs belong to two orders, Nudibranchia and Ascoglossa (= Sacoglossa) of the subclass Opisthobranchia, class Gastropoda. Nudibranchs are more well known, many are large and brightly coloured; they are carnivores feeding on sponges and coelenterates, and the order comprises about 2,000 species. Ascoglossans form a minor order of about 200 species, most of them are small and are green or light fawn to dark brown in colour. They are herbivores and feed on the sap of filamentous algae.

I have studied ascoglossans for 30 years and am sometimes asked, what is the attraction of the group? I find their small size is an attraction. In a slender ascoglossan of length 6 mm is packed a gut, an elaborate reproductive system, a central nervous system with sense organs and numerous nerves, a heart with blood vessels and blood spaces; in fact all major systems are represented, except most lack a skeletal system. It reminds one of Ben Jonson's famous line,

'In small proportions we just beauties see'.

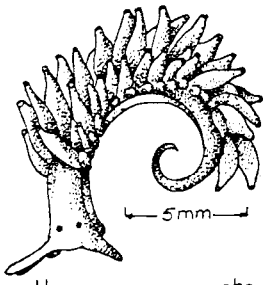
The small number of species is an advantage. It enables one to comprehend theorder as a whole, to realise it is composed of 4 main lines, and to speculate on their evolution. Fossil evidence is rare, though there are indications that ascoglossans existed in the Juraassic period. I hold it likely that explosive evolution occurred in the Ascoglossa during the Eocene.

If you are fond of functional anatomy and like fiddling about with fine dissection, the order has plenty to offer - much are, as yet, undiscovered. For those who like watching living animals observations on their methods of feeding and reproduction are required. The food preferences of only 50 species are known; the shape of the egg mass and the number of eggs it contains are known for about 10 species, and for a lesser number the mating behaviour has been described.

For collectors and recorders it is worthwhile becoming acquainted with the 10 British species. It is a question of recognising the algal species on which they feed and of getting your eyes accustomed to spotting such small creatures. I have often found pleasure in collecting them and adding to the lists of busy recorders. If you travel to Mediterranean shores, ascoglossans are easy to identify; they have only one pair of tentacles and are found feeding on filamentous algae. For the species names there are several good faunistic works (Provot-Fol, 1954; Riedl, 1963; Nordsiecher, 1972. Some Mediterranean species are large (1.5 cm long). A few, including Hermaea variopicta are beautifully coloured. Of these, Trinchese, a famous Italian zoologist, wrote,

> 'The colours of these creatures are like that of an oriental sapphire, the yellow of pure gold, and the white of virgin snow gleaming in the

light of the sun. Some colours have a luminiscent quality. Butterflies and Birds of Paradise are splendidly coloured, but they have not the fascination of a brilliant eolid viewed through a film of sea water.'



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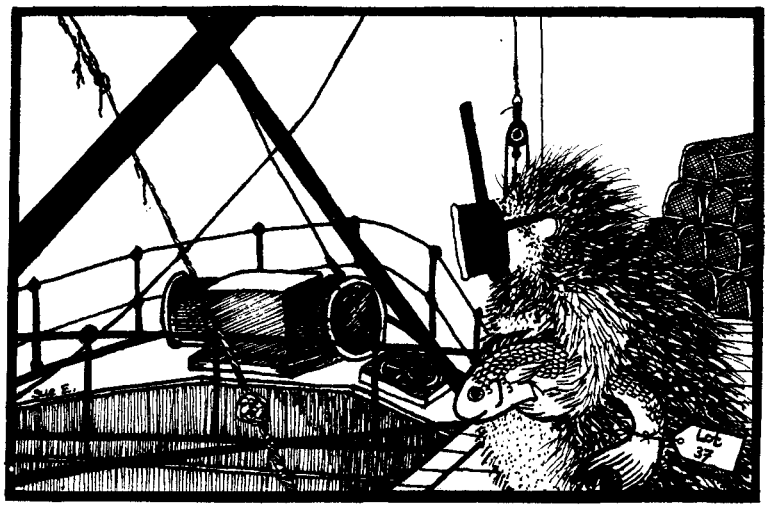
THE COLLECTION OF FISHERIES STATISTICS

Alan Hunter
Ministry of Agriculture, Fisheries and Food,
Fisheries Office, North Shields.

The MAFF station at North Shields is one of several situated at fishing ports around the country, responsible for the gathering of information regarding the quantity of commercially important fish species landed at the respective ports. Apart from collecting the weights of landed species, staff at the port offices also interview fishing skippers to obtain information on where their fish were



caught and the amount of effort (in terms of hauls) to catch it.

The aim of collecting this information is one of conservation and management of the fish stocks. For these purposes it is necessary to determine the potential yield of a given fish population,

so that proper legal limits may be imposed on the number of fish caught. The maximum sustainable yields of the fish stocks are estimated largely from the raw data collected at the port offices. From these estimates, the total allowable catch for a given fishery is recommended by fisheries scientists at Lowestoft. International quota allocations are subsequently agreed. These quotas serve as a powerful conservation measure, especially where many countries fish in one area. Other methods include the allotment of restricted fishing zones and the enforcement of mesh size limits.

For accurate stock assessment it is essential to know the numbers of fish of every age in a population. Each morning at North Shields samples of fish landed at the fish market are individually measured. From some fish, saccular otoliths are removed by which the fish can subsequently be aged. This information enables age/length keys to be drawn up from which to discover the proportion of fish at each age.

At North Shields a team of six collectors of fisheries statistics are at work; they account for nearly 7000 cod, haddock and whiting measured monthly. Similarly 366 otoliths are monthly extracted from these three species. Throughout the country forty separate stocks of plaice, sole, lemons, cod, haddock, coalfish and whiting are monitored and over 35,000 pairs of otoliths are read during the year at the Lowestoft Laboratory.

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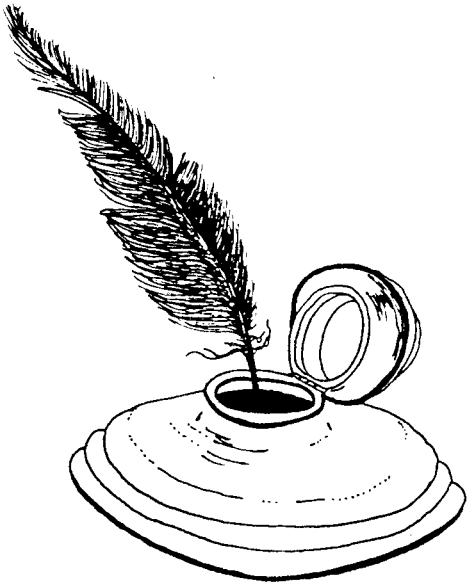

LETTER TO THE EDITOR

Dear Editor,

Meroplanktonic larvae which metamorphose and settle on the bottom have two obvious choices: they can either metamorphose and then settle or they can settle and then metamorphose. As is usual in the animal world when there are two ways of doing something, some species will do one thing, some the other. Examples of animals which metamorphose and then settle are starfish and bivalves. Examples the other way are barnacles and phoronids.

It is among these latter groups that a most interesting phenomenon may be observed. The premetamorphic settling stage can have features strongly recalling the adult. For instance, the barnacle cypris larva has six pairs of thoracic legs, while the actinotroch larva of Phoronis has a ring of larval tentacles resembling the adult lophore.

Yet both these larval structures are lost at metamorphosis, the thoracic legs by absorption (Balanus) and the larval tentacles by rejection and ingestion (Phoronis). Why? And why the resemblance between larval and adult structures anyway? Is it because some species can create and recreate their most characteristic organ with ease, like playing a familiar tune over again?

"Pelagos"