

Porcupine Newsletter

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NEWSLETTER. As you see, we are not at present short of copy. To ensure the continuation of this happy state would you please send in your comments for "Notes and News", your Notices or your more formal papers. Additionally we are willing to publish signed letters containing matters of opinion. Here's a topic to start on. Do you think PN so severely, even dauntingly, scholarly that you fear to contribute? Or is our triviality and low levity just too tiresome? Write and tell us.

MEMBERSHIP. Please recruit another member. Our numbers, although standing at a reasonable level, are becoming static. A simple ploy is to show your copy of PN to a friend, the while murmuring that our annual subscription is only £2.

FUTURE MEETINGS. 1. The next meeting and AGM will be held in Glasgow on 6-7 March 1982 (the AGM agenda is on p. 54). Details will be posted to Members in due course. The theme of the meeting will be "Biological Recording in the Marine Environment". A similar theme at the inaugural meeting of PORCUPINE in 1977, "A Forum on Marine Recording", proved to be one of the most popular and successful we have offered. It was the Biological Records Centre at Monks Wood in the early 1970s which provided the impetus and framework for a number of the marine recording schemes which are now in existence as well as the inspiration for others which are now available for use in regional and national marine recording projects.

2. It is hoped to arrange a PORCUPINE field meeting at Sherkin Is. near Cork, SW Ireland, at some time around early August 1982. Why not combine this meeting with your summer holiday? Families and friends welcome. Details during the Glasgow meeting and in the Spring 1982 PN.

3. The Conchological Society, we understand, is planning a meeting in Skye in May.

Frank Evans, Hon. Editor.

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

REPORTS OF THE JOINT MEETING WITH THE COELENTERATE GROUP,
PORTSMOUTH, SEPTEMBER 1981

ACTINIA REPRODUCTION AND THE SPECIES PROBLEM

M.A. Carter and J.P. Thorpe
Portsmouth Polytechnic and University of Liverpool

Until recently the species Actinia equina has included two taxa mesembryanthemum and fragacea. A major morphological distinction between the two is that the mesembryanthemum column is usually a uniform shade of red or brown or green whereas all fragacea have a red column which is green spotted.

We know rather little about the reproductive methods of Actinia species. This is not so much due to lack of information as to the existence of conflicting evidence. The results of experiments, with which we have attempted to shed light on the problems, are summarised below:

- i) Gametogenesis has been followed in individual males and females of both taxa in the laboratory. All have shown annual cycles with normal gamete development. Animals on the shore appear to show similar cycles.
- ii) Laboratory animals do not change sex at the completion of a gametogenic cycle but initiate a second cycle as before.
- iii) Gametes mature and are lost from the gonads in the early summer.
- iv) Laboratory females of the mesembryanthemum taxon acquire early developmental stages within their tentacles and enteron simultaneously with the loss of gametes from their gonads.
- v) Fragacea individuals do not brood in the laboratory and we do not yet know the fate of the gametes lost from their gonads.
- vi) Some male-female mesembryanthemum pairs maintained in pasteurised sea water in the laboratory for two years have produced large numbers of young which were eventually released into the water.
- vii) Single individuals have been similarly maintained and individuals without gonads as well as males and females have released some juveniles. Genetic analysis of the large anemones and their young should confirm whether or not this taxon can reproduce sexually as well as asexually.

We have accumulated evidence that there are ecological and genetic differences between the two taxa as well as reproductive ones.

- i) There are differences in the proportion of reproductive individuals in sympatric populations as well as other differences in reproduction strategy.
- ii) There are differences in the distribution on the shore as judged by transect data.

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iii) There are differences in geographical distribution.

iv) Gene frequencies in sympatric populations of the two taxa are quite different as judged by enzyme electrophoretic data.

Since there is reasonable, although not complete, evidence of sexual reproduction in both taxa and because of the differences between them we have felt justified in suggesting that they are separate species Actinia equina and Actinia fragacea.

The species situation may not, however, be as simple as that. There are ecological differences between red and brown Actinia equina and the green forms on shores in the Isle of Man and in Brittany. Greens are more restricted to the lower shore and in particular to more cryptic environments. Electrophoretic analysis of a large sympatric sample from the Isle of Man shows that there are significant differences between greens and the others at several enzyme loci. It is therefore possible that greens are reproductively isolated from the other forms of Actinia equina and may be a separate species.

POPULATION DYNAMICS OF ACTINIA EQUINA (L)

Tim Rees, Nottingham University

Reproductive success in the anemone Actinia equina (L.) has been studied in two populations at monthly intervals. The sites are - 1 on the West Coast of Britain (Rhossili, S. Wales) and 2 on the East Coast (Burniston, Yorkshire).

By studying the adult class adjacent to permanent quadrats, the percentages of the populations 'brooding' and the numbers of young 'brooded' have been determined. These data represent the production of young by the population.

Observations of anemones within the quadrats at each site has allowed the determination of the number of young settling each month and the probability of their survival, primarily to the next month, but ultimately to the adult reproductive class. These data, together with a population size/structure analysis, permit a comparison between production and the survival of young into parenthood (recruitment).

Production of young at Burniston was 3 times that at Rhossili. However, settlement was 4 times higher at Rhossili. Both populations had similar juvenile mortalities calculated as a percent of production, but calculated as a percent of the population, the juvenile mortality at Rhossili was twice that at Burniston. This was twice the adult mortality which was similar for both populations. The recruitment at Rhossili was four times greater than at Burniston and this maintained a field density at Rhossili twice that at Burniston.

From adult mortality data it is possible to estimate the minimum life span for any anemone which has reached adulthood. This is 16 years.

OOGENESIS IN ACTINIA FRAGACEA

Alan Larkman, Portsmouth Polytechnic

Large individuals of the intertidal sea anemone Actinia fragacea were collected from a rocky shore at Wembury, near Plymouth, at approximately monthly intervals over a two year period, and their gonads were examined by light and electron microscopy. In A. fragacea the sexes appear to be separate, and the gonads show an annual cycle of activity. Female germ cells appear among the bases of the endodermal epithelial cells in spring and early summer. They are small, rounded cells, 6 - 10 μm in diameter, with relatively large nuclei and dense cytoplasm, containing few organelles. Some nuclei contain synaptonemal complexes, indicating that these cells are in meiotic prophase and hence are already oocytes. The oocytes grow for a variable period in the endoderm before entering the mesogloea. Many oocytes are constricted into a 'dumbbell' shape as they pass from endoderm to mesogloea. Once within the mesogloea, vitellogenesis begins. Two major types of granule are synthesized within the oocyte. Fibrillar granules are produced early in vitellogenesis, and are Golgi-derived, while compound yolk granules are produced throughout, and appear to be formed by the fusion of dense vesicles with lipid droplets. Each oocyte grows surrounded by a layer of mesogloea except at one point, where a structure known as the trophonema develops. In this region, endodermal cells extend through a pore in the mesogloea and contact the oocyte surface directly. The trophonema is thought to be involved in the transfer of nutrients to the growing oocyte.

BODY SIZE AND REPRODUCTIVE MODE AS ADAPTIVE TRAITS IN THREE SPECIES OF METRIDIUM (COELENTERATA, ACTINIARIA.)

Ann Bucklin, Department of Zoology, University of California, Berkeley and Department of Zoology, University of Reading.

Although the sea anemone genus Metridium has been considered to consist of a single, highly variable species, recent studies using starch-gel electrophoretic techniques (Bucklin and Hedgecock, in preparation) and classical taxonomic methods (Bucklin and Hand, in preparation) have demonstrated that Metridium consists of three distinct species of less variable morphology. The results of laboratory studies of growth and asexual reproduction and observations of natural populations demonstrated that the three species differ significantly in several aspects of their reproductive biology. One species, formerly the "solitary" morph of M. senile and currently being described as a new species (Bucklin and Hand, in preparation), may grow very large and reproduces only sexually. Metridium senile, formerly the "clonal" morph of M. senile, does not grow as large as the solitary species despite copious feeding; it reproduces both sexually and asexually by pedal laceration. A third species, M. exilis, develops gonads at very small size and remains tiny despite increased feeding by increased rates of asexual reproduction by binary fission. These differences in reproductive strategy provide evidence of a relationship between individual size and reproductive mode and of the relative benefits of sexual and asexual reproduction. Since the species also differ in characteristic habitat, these findings suggest that individual size and reproductive mode are highly adaptive traits in each of the three species of Metridium.

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LOCOMOTION AND THE ECOLOGY OF MEDUSAE

Mandy Smith, Department of Zoology, Manchester University

Medusae swim to increase the volume of water which they can obtain food from, and the swimming movements circulate water around the tentacles. Data obtained by filming *Cyanea* and *Aurelia* during locomotion have been analysed using a model of locomotion based on the vortex turbulence which the animals shed into their wake, and power requirements estimated from this analysis show that the cost of transport is very low - of the order of 0.1 to 0.5 J/kg/m. This may explain why the animals can achieve such high growth rates. The model suggests that the most efficient medusae should be the coronates, but lack of information makes this hard to verify.

LIFE CYCLE, DISPERSAL AND DISTRIBUTION AMONG THE HYDROIDA

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

The Hydroida are an order of the coelenterate class Hydrozoa and comprise the hydroids and their medusae. The medusae are often called hydromedusae to distinguish them from the very much larger scyphomedusae or true jellyfish, which are not considered here. I shall use medusae to mean hydromedusae alone. This contribution to the joint Porcupine/Coelenterate group meeting was a summary of first impressions of what seems to be a genuine biological phenomenon, namely, that many Hydroida species are very widely distributed around the world. Zoogeographical discussions often consider wide distributions among genera, but in the hydroids and their medusae it is many of the species which are widespread. Most of the genera are near-cosmopolitan (within Shelf depths) and endemism, although known, is unusual. When identified such endemism as there is usually relates to areas much wider than usually implied by the term.

Unfortunately the species-level taxonomy is not refined enough for comparisons to be made easily between almost any area of the world and another. The NE Atlantic Hydroida fauna is best known. To demonstrate that sub-global distribution is common in the group I determined the occurrence of the c. 195 NE Atlantic species in other areas of the world. The NW Atlantic shares 104 of these species⁺, SE Atlantic (poorly worked) 35, west coast of N & S Americas 65, N & E Pacific 58, Japan and China⁺ 61, Indo-West Pacific 65, Australia 33, New Zealand 28⁺, S & W Africa 77⁺, Antarctic 25, Arctic 61. (+ indicates a relatively well worked area). It is noteworthy, for example, that one third of the NE Atlantic species occur in Japan and China, and that a third of a European identification guide would be applicable there at the species level!

There can be few other invertebrate groups in which near-globality is so common at the species level.

An easy route from the N Atlantic to the N Pacific is around the rim of the Arctic Ocean, where the hops are short, employing the Bering Straits. Many temperate species might have used this route

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and the figures just given might be distorted by this element. But warm-temperate to tropical species cannot use this cold route. It is therefore re-assuring to learn that there are at least 91 Hydroida species found pan-tropically (or circum-globally), throughout warmer parts of the Atlantic and Indo-Pacific Oceans. This is a high percentage of the 1000 or so known species of Hydroida. Paucity of data in tropical regions no doubt leads to the figure of 91 being too low - many species are known from one or other of the oceans by just one or a few records, and further collecting will almost certainly add more species to the list.

Hence many of the apparent widespread distributions in the cooler parts of the Northern Hemisphere may be 'genuine', rather than simply due to dispersal along the easy circum-north-polar route. Whether or not this is so, the tropical distributions are noteworthy and it can be asked: how do these species disperse? Not all hydroids have a medusa stage - most have suppressed it during evolution - and it is interesting to learn that of the 91 circumglobal species 62 (or two thirds) lack a medusa stage. How do these species disperse so widely?

Hydroid dispersal is usually considered to be by means of egg and sperm, by planula larva and in some species by medusa. The gametes perhaps disperse for a few Km only. The tiny, usually lecithotrophic planulae probably travel just for some tens of Km though some with zooxanthellae are believed to travel much further. But the medusae are the stage best adapted to dispersal and although there are no direct observations it seems reasonable to assume that they might disperse for some hundreds of Km under favourable conditions. However, their life spans are limiting: probably several weeks only. Evidence for their brief longevity is the seasonality of the temperate water hydromedusae, and the virtual lack of records of coastal species from mid-ocean. The now classic calculations by R.S. Scheltema in the early 1970's suggested that a couple of months is just enough for an invertebrate larva (trochophore, veliger, etc.) to cross the Atlantic Ocean at its narrowest point with the prevailing currents. That is, from the Caribbean to the Azores in the Gulf Drift, or backwards from the Cape Verdes to the Caribbean in the southerly counter-current. It follows that a hydromedusa, but probably not most planulae, could occasionally cross the Atlantic. But medusae are of one sex or the other. So for a species to colonize a distant place two medusae would have to arrive simultaneously to release gametes which would have to fuse, grow into planulae and settle successfully and then mature into new hydroid colonies. Further, it is not known if all the medusae liberated from one of the 'new' colonies would be of one sex, or of both. Certainly most species having retained medusae are monoecious (one sex). No one has reared all the medusae from a single colony to maturity to determine their sex. But if they are of one sex only then two colonies would have to be established for the species to successfully colonize, and the odds seem that much longer. Dispersal across the vast stretches of the Indo-Pacific Ocean by medusae alone seems improbable. The medusae would age and die on the way, and even if they didn't the chance of successful colonization seems slim.

Since most hydroid species have suppressed and vestigial medusae which are not released, the medusa stage cannot be responsible for most of the long distance dispersal observed. I am currently looking at the apparent paradox, that it is the only sessile stage in the life cycle - the hydroid - which is responsible for very long distance transport. And also perhaps for shorter distance dispersal in species lacking a free medusa, which otherwise employ the planula alone.

The evidence is circumstantial, but weighty. There are sufficient records of hydroid colonies attached to flotsam, both living and dead, and to swimming animals, to indicate that long distance transport might be frequently achieved by such means. Scores of hydroid genera have been recorded on such 'phoretic substrates'. There are many records of a variety of genera on eel grasses (Zostera, Posidonia) and gulf weeds (Sargassum, Turbinaria), which are circum-global and which float considerable distances. Brown algae, especially the fucoids on which many hydroids grow, are likely to act in this way; and kelp has been recorded transporting invertebrates including hydroids between South Africa and St. Helena. Phoretic animal substrates on which hydroids have been reported include pelagic cirripedes, fish (even a basking shark), parasitic crustacea themselves on fish, free-living crustacea, sea snakes and a turtle. I do not know of any records on whales and their ectoparasites as yet. Pteropods commonly support hydroid growths. Some hydroid species, such as the circum-global Clytia linearis (= C. gravieri), are often found on them as well as on more conventional substrates while a few hydroids form quasi-obligate associations.

Some transport of hydroids by ships has been demonstrated. For example the North Atlantic Gonothyrea loveni is known from the South Atlantic only from Cape Town docks. But the role of ship transport seems a side issue, with so many natural means of phoresis available.

Few hydroids are substrate specific. Some are, and it may be that these are among the less widespread; I have still to do this analysis. But species in most families will grow on a wide variety of substrates. It is usual for a species to grow on 'all algae'; or on algae and many animal substrates; or on non-living substrates in addition. There is insufficient evidence for precise analysis but it is absolutely clear from the few available surveys that hydroids as a group are substrate generalists. Some might say 'generalist strategists' but so far as I am aware hydroids are not that clever. Maybe in the past forms which settled on nearly anything (today the majority) more often settled on phoretic substrates than more conservative forms, and by chance became the more widespread. It does not take long, when paddling in the sea after rough weather, to find a lump of sea-weed floating past with a live hydroid colony on it. Similar examples, such as floating buoys, readily spring to mind; and it may be relevant that much of the hydroid-covered algae one sees on the shore during summer collecting trips becomes torn off and dispersed in the autumn. As an aside, a good way to collect subtidal species is to scan floating algae accumulated just inside a bay-head spit at an estuary mouth following rough weather.

Over a long time scale a sufficient number of hydroid colonies on phoretic substrates might arrive on a given coastline to influence the local population by recruitment to it. A nice illustration that such natural transport is a feature of oceanic life was given by Charles Darwin (1845) in 'The voyage of the Beagle'. He cited observations that islanders on the group of coral atolls called the Ratak (Radack) Archipelago, in the Marshall Islands, treasured the few hard metamorphic rocks which formed part of their island heritage, amongst the softer coral 'country rock' by which they were surrounded. The hard rocks were used as tools. The rocks were in short supply and were automatically owned by the king. There were customs about how they were distributed among his subjects. Darwin tells us that the rocks

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had arrived on the atolls embedded in the roots of drifting trees - another of his 'small processes operating over great lengths of time'!

My hypothesis is that, similarly, a slow trickle of recruitment to a remote hydroid fauna might influence the local species composition. It follows that the genotype of a species already there might be influenced. A continuous trans-oceanic exchange might reduce the genetic isolation of apparently remote populations though it is outside my immediate brief to assess these arguments. The reverse concept is that the species involved would become and remain very widespread - an observed end-point, though admittedly not universal within the group. It would seem to follow that the rate of speciation would be reduced, and that, as observed, rather few hydroid species would ultimately survive. Limited isolation would give reduced opportunity for world-wide species diversity. This, too, is an observed end-point: there are only about a thousand species altogether.

Still speculating wildly, but in an interesting area, we might consider why most hydroids no longer release their medusae. (Imagine, for a moment, that an Obelia medusa remained somehow glued to the parent colony and released its gametes from there, and you have the usual, derived condition.) Some selective advantage must have operated on most of the genera, and in some cases on just a few species within currently recognised genera, for the apparently useful medusa stage to have been lost. A parallel might be if butterflies and moths were to become eliminated from most lepidopteran life cycles. It would be surprising if there were just a single cause. But if transport can be achieved by the hydroid stage alone, then the value of a medusa will be diminished maybe so much that it might be selected against. Perhaps medusae are energy-expensive to make. Their value would be further diminished if the planulae became more efficient at travelling long distances, similar in length to those 'traditionally' covered by medusae.

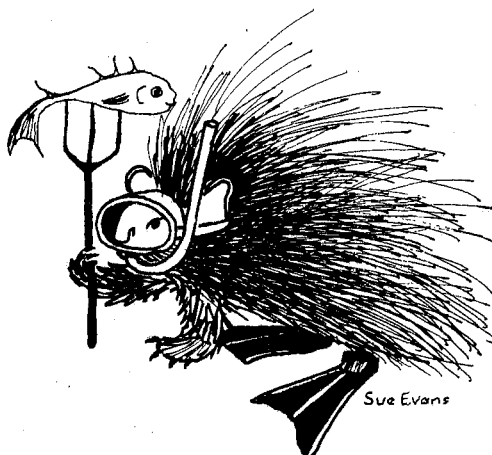
Clearly, much of this is speculative and I was fortunate in receiving a constructive discussion after this paper, when I might have been criticized on the many links in these arguments. I am grateful to those who offered suggestions, some of which have been incorporated.

RHOSSILI FIELD TRIP. The joint September field meeting with the Conchological Society at Rhossili, S. Wales was unfortunately attended by a very strong gale of onshore wind and rain. Because of the wind the tide did not fall to its predicted level and the collections (all molluscan) were small. Eight people bravely toiled through the weekend.

"Like quills upon the fretful porpentine" - "Hamlet".

Our Porcupine does not fret, though it scratches at a few sea-lice, sometimes - Ed.

Notes & News



We print elsewhere a note on the sampling of lobster larvae in the plankton. The discovery of a method for catching these larvae in any quantity represented an important advance, for until recently we were simply not sure where the creatures passed their days; in all his years of plankton sampling your Editor has taken no more than four or five lobster larvae until last year. Now we can catch them fairly easily, following Member John Nichols's long-distance towing method. Having got thus far it is sad to report that the Lowestoft lab. has sold ("Nucella") or withdrawn from service ("Tellina") their only boats capable of continuing this significant inshore work.

**

The little hatchet fish, Argyroteleus, whose silver side glistens so delightfully in the illustration in Murray and Hjort's "Depths of the Ocean" (1912) is currently turning up with remarkable frequency in the Bay of Biscay. Although a deep-sea fish it is being repeatedly reported at the surface by sailors, always at places near the continental slope. If any Members are planning a world cruise watch out for it as you cross the Bay.

**

Miss Susan Gubbay of the Biology Department of York University is running a recording project for British barnacles in conjunction with the Underwater Conservation Society. She has issued a good illustrated description and key for nine species of British sessile barnacle and will supply recording cards on request. Her results for 1980/1, as with so many recording schemes, give a clearer picture of the distribution of recorders than of the animals recorded (do no York Sub-Aqua Club or U.C.S. divers dive between the Thames and the Humber?) but this will presumably be rectified in time. Miss Gubbay writes that she is herself also investigating the shell strength of various species of barnacle and, linked to this, the rate at which the different species are predated. Sounds good Ph.D. stuff!

**

Still on barnacles, in August your Editor, having resolutely locked the door of the Newsletter office, set off in intrepid holiday pursuit of the modest Elminius, kilted variety. A perilous week was spent under canvas among the wild Scottish tribes of the Fife coast

who, in total disregard of the Geneva Convention, practice the fiendish rite of pouring whisky down the throats of their captives; and there we observed the thin vanguard of the invading army of elmins creeping from their long-established camp on the Firth of Forth in an outflanking movement above the zonal level of the enemy, Balanus balanoides, all the way to the Tay. There, to our astonishment, a few Heroes have actually swum the Tay Firth and established a foothold (? headhold) at Broughty Ferry on the north shore.

Records of Elminius modestus, August 1981: Aberdour (common), Kircauldy (common), Leven (infrequent), Earlsferry (not found), Elie (abundant), St. Andrews (infrequent), Tayport (infrequent), Broughty Ferry (rare), Arbroath (not found), Ferryden, Montrose (not found).

**

Secretary Shelagh Smith writes: Two oceanic vertebrates have recently been stranded in the Firth of Forth. The wind for some time has been predominantly northerly, and would have encouraged progress, particularly of the fish, down the North Sea, but the factors causing their arrival in Scottish waters cannot be surmised.

On 6th October 1981 a Sowerby's Whale Mesoplodon bidens was found dead at Society Point, Hopetoun Estate 55°59.5'N 03°27.5'W. This was an immature male, about 4 m long. The skull and flippers have been retained by the Royal Scottish Museum (A.S. Clarke, pers. comm.)

On 15th October 1981 I found a Sunfish Mola mola very freshly dead on the rocks at high water at Gullane 56°02.5'N 02°51.3'W. The fish was, fortunately, a small one, weight 17.27 kg, length 68.5 cm, maximum span across the fins 87.0 cm, and was brought home whole. Some organs have been made available for research, the skeleton and some soft parts are retained in the Royal Scottish Museum. Waste not want not, it tastes good too!

**

B.M. watchers will be gripped by the news that as the dinosaur wrangle subsides, and in the wake of some critical comment, another major rearrangement is to be made in the Natural History Museum in South Kensington. For the first time ever an exhibition of British natural history is to be mounted. It will be a straightforward faunal display, no cladistics, and there are to be strong sections on fish and marine invertebrates. Should be well worth a visit once it's set up.

**

A newsletter devoted to copepods and started in October 1980 has now reached its third issue. It is called "Monoculus", the generic name given by the remarkable Bishop Gunnerus of Norway to the animal we now call Calanus. Porcupine copepodologists not familiar with this informative publication should contact H. Kurt Schminke, Fachbereich Biologie, Universitat Oldenburg, Postfach 2503, D-2900 Oldenburg, W. Germany. The journal is lively and the editor's linguistic command is remarkable, even to the length of apologising in Norman French for insulting a colleague by typographical error: "Honi soit qui mal y pense," he wrote in alleviation. Schminke had put 'lightly' instead of 'highly' in praising the colleague's work.

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Competition Corner: A free bundle of quills to the Member who supplies P.N. with the most cutting sentence containing this misprint.

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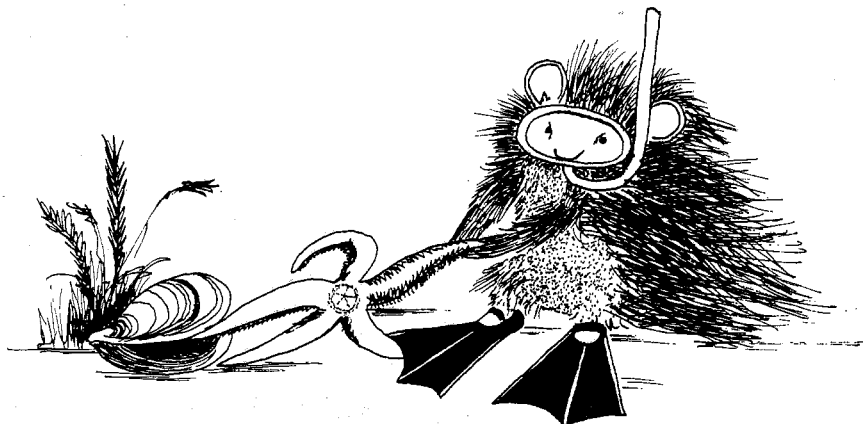
Last spring some enterprising people travelled to the PORCUPINE meeting in Plymouth free by train (almost). Jimmy Saville and British Rail wish to inform PORCUPINE members, among others, that when you buy an adult British Rail Awayday, Weekend or Monthly Return for most journeys, you can take another adult or child with you ABSOLUTELY FREE. You can use the Pass for as many journeys as you like for a whole month and as soon as you've got one Pass you can start saving for the next.

For each Monthly Train Pass, just collect nine proofs of purchase from the following (one per brand): Bisto (top flap), Crest (bottom panel), Daz or Daz Automatic (top), Fairy Liquid (cap hinge), Head and Shoulders (weight marking), McDougalls or Be-Ro flour (top panel), McVitie's Digestives (wrapper), Maxwell House (label), Mothers Pride (end panel), Penguin Multipack (cellophane wrapper), PG Tips (address end panel), Stork SB (lid excluding rim).

Send these together with a stamped self-addressed envelope to: Free Train Travel Offer, Dept. No. 700, Sunderland SR9 9XZ.

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The imminent departure of our Treasurer for a few weeks' holiday in India, where he proposes to sort out the molluscs of the sub-continent, reminds us of a story of that grand old oceanographer, Col. Seymour Sewell of the Indian Medical Service and his remedy for sea-sickness, practised some seventy years ago aboard the Indian research ship "Investigator". It consisted of a diet of ship's biscuits and iced champagne! Palmy days, were they not? In fact, we know of an even better remedy: sit under a tree. Happy holiday, David Heppell!



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ANNUAL GENERAL MEETING - PRELIMINARY NOTICE

The Annual General Meeting of PORCUPINE will be held at Kelvingrove Museum, Glasgow, on Sunday, 7th March 1982.

The Agenda will include:

1. Hon. Secretary's Report.
2. Hon. Treasurer's Report.
3. Hon. Editor's Report.
4. Record Convener's Report.
5. Election of Office Bearers and Council Members.

In connection with the election of Office Bearers and Council Members, attention is drawn to the relevant Rules of Procedure.

- (2) The maximum and minimum numbers of members on the Committee shall be left open.
- (4) The Office Bearers retire annually and are normally available for immediate re-election.
- (5) Council Members shall at present serve for three years, at least two retiring each year, who are not normally available for immediate re-election.
- (6) Voting shall take place at the AGM and shall be restricted to members present.
- (7) Names of persons seeking election to the Committee (as chosen by the Committee) will appear in a notice prior to the AGM together with an intimation that proposals from ordinary members of additional candidates are welcome. Candidates must give their assent in person or in writing before voting takes place.

The Office Bearers available for re-election are as follows:

Hon. Secretary	Shelagh Smith
Hon. Treasurer	David Heppell
Hon. Editor	Frank Evans
Records Convener	Bob Earll

The present Council Members are:

Roger Bamber	Adrian Norris
Roger Brehaut	Eve Southward
John Gordon	Geoff Swinney
Celia Pain	John B. Wilson
David W. McKay	Fred Woodward

Adrian Norris wishes to retire.

Attention is drawn to members that proposals of candidates are welcome.

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6. Proposed linkage with the Underwater Conservation Society.
7. Future meetings.
8. Any other business. If members have a point which they wish to be discussed, particularly if they will be unable to come to the AGM, please will they contact Shelagh Smith.

PROPOSED LINKAGE WITH THE UNDERWATER CONSERVATION SOCIETY

At meetings of committee members of PORCUPINE, held in Edinburgh and at Portsmouth, a proposal that there should be closer links between PORCUPINE and the Underwater Conservation Society was discussed. There was broad agreement in favour of closer co-operation and that the proposal does not extend beyond the aims and objectives of PORCUPINE, therefore no formal constitutional changes are necessary at the moment.

The general consensus was that more co-operation would be a good thing. This would involve pooling of resources to avoid duplication of effort and to widen interests.

There were reservations, in particular it was feared by most people that PORCUPINE might be submerged by UCS and/or that too close a merger would not appeal to members of either society. The value of a linkage to PORCUPINE itself was discussed. One of the problems of PORCUPINE is that it is rather static and cannot expand without more money and effort, such as from an increased membership, yet without expansion there is nothing to attract a larger membership. The present small size of the membership means a lack of manpower for various commitments.

The conclusions were that:

1. Co-operation between the two societies should be on the following lines:-
 - a) Joint publicity regarding meetings etc., (see Publications).
 - b) Indoor meetings would retain the flavour of PORCUPINE or UCS. Membership of either society would ensure full eligibility to attend meetings of the other, for example, field expeditions (UCS expeditions are members only).
 - c) Publications might be of two kinds, one a newsletter of the type now circulated by UCS, ultimately to contain PORCUPINE business, notices of meetings, etc., and would come out about 4 times a year. A second publication would grow out of the PORCUPINE NEWSLETTER, and would be a longer journal, appearing about twice a year.

- d) Formation of a joint 'expert system for specimen identification and referral for observations.
2. A subcommittee will be set up to look into the aspects of this co-operation, especially regarding publications and finance, the authority for which will be put to all PORCUPINE members at a general meeting. The first meeting of this subcommittee, comprising several committee members of PORCUPINE and UCS, will take place in March in Glasgow during the next PORCUPINE meeting.

Members of PORCUPINE are invited to send their comments on this proposal to Shelagh Smith, for consideration at the subcommittee meeting.

NOTICE 1. NATIONAL DISTRIBUTION OF ACTINIA EQUINA SURVEY

From Member M.A. Carter, Portsmouth Polytechnic.

A national survey is being started to establish the geographical and intertidal distributions of the various forms of the beadlet sea anemone Actinia equina.

Because of the length of the British coastline, we hope that school or other collectors may be able to assist in our survey. No previous knowledge of this, the most common British intertidal sea anemone, is required. A full description is given below together with references which have coloured illustrations of the various forms of the anemone. Many other guides to the sea shore also contain such illustrations.

We ask that collectors will, when on field trips or day excursions to the sea shore, fill in a questionnaire (one for each beach). The forms can be returned to us for correlation. Returned forms will allow us to determine the overall distributional details of the species very rapidly while taking you very little time. More survey forms are available on request.

T.D. Rees
Nottingham University

M.A. Carter
Portsmouth Polytechnic

- References:
1. T.A. Stephenson, British Sea Anemones Vol. 1, Plate 5 (I-IV) and Vol. 2 pp. 112-123.
 2. Hamlyn Guide to the Sea Shores & Shallow Seas of Britain and Europe, Page 90.
 3. Collins Pocket Guide to the Sea Shore, Pages 56-57, Plate 5.

Actinia equina L.

There are two varieties: a) var mesembryanthemum of which there are three colour forms. green Ref. above 1(iii), 2,3(a); brown Ref. above 3(e); red Ref. above 1(iv),2, b) var fragacea, larger than above, red, covered with large green spots. NOT to be confused with the occasional red or brown forms of mesembryanthemum which have a few small green stripes or spots on the column. Ref. 1(ii), 2,3(f).

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NATIONAL DISTRIBUTION OF Actinia equina SURVEY

Date of survey : _____ KEY

Name of shore : _____ Ex Common = > 100 per sq metre

Grid reference of shore : _____ Common = 10-100 per sq metre

Tidal height (if known) : _____ Present = 1-10 per sq metre

Exposure (Ballentine) : _____ Absent = 0 per sq metre

High-shore = EHWS-MHWN

Mid-shore = MHWN-MLWN

Low-shore = MLWN-ELSW

1. var mesembryanthemum - colour morph GREEN

	Ex Common	Common	Present	Absent
High-shore				
Mid-shore				
Low-shore				

2. var mesembryanthemum - colour morph BROWN

	Ex Common	Common	Present	Absent
High-shore				
Mid-shore				
Low-shore				

3. var mesembryanthemum - colour morph RED

	Ex Common	Common	Present	Absent
High-shore				
Mid-shore				
Low-shore				

4. var fragacea

	Ex Common	Common	Present	Absent
High-shore				
Mid-shore				
Low-shore				

PLEASE
TICK
APPROPRIATE
BOX

NAME
OF
COLLECTOR

any further comments on the distributions :

Please return to either Dr. M. A. Carter or T. D. Rees
Biology Department Zoology Department
Portsmouth Polytechnic Nottingham University
King Henry I Street University Park
Portsmouth Nottingham

General description of species:

Base adhesive and sucker like; smooth column up to 7 cm high and 6 cm across when fully expanded (var. mesembryanthemum is normally smaller than var. fragacea); about 200 densely packed retractile tentacles which can reach 2 cm in length and are arranged in 5 - 6 circlets - they are quickly retracted when the animal is disturbed; 24 relatively conspicuous blue spots (acorragi) are present on the periphery of the oral disc outside the tentacles; occasionally there is a blue line around the base. When the tide is out the anemone may appear as a blob of jelly (tentacles are retracted). HABITAT, common on rocks and in crevices from middle shore down to ELWS (extreme low water spring tide).

NOTICE 2. AIDGAP PROJECT: CRABS AND CRAB-LIKE ANIMALS

From Stephen Tilling, Project Co-ordinator; Field Studies Council, The Leonard Wills Field Centre, Nettlecombe Court, Williton, Taunton, Somerset.

Whereas the best loved groups of animals and plants (such as the birds and wild flowers) are well-served by numerous identification aids, less popular groups often suffer from a lack of adequate non-specialist identification literature. The AIDGAP (Aids to Identification in Difficult Groups of Animals and Plants) project, which is administered by the Field Studies Council, was initiated to help solve problems in identification which were due to such deficiencies in the available literature. It is not the intention of the project to become embroiled in problems of fundamental taxonomy; rather to produce easily-used, authoritative and attractive guides to groups which are already well-studied and documented at the specialist level. In order to achieve these aims all AIDGAP guides are subjected to a period of field 'testing' during which preliminary test versions are distributed to potential users (ranging from academics through to interested amateur naturalists). This 'testing' period can last for up to one year and the final versions of the identification aids are revised in the light of feed back from these sources before final publication.

Recently, the AIDGAP project has produced the test version of 'A key to the crabs and crab-like animals of British inshore waters', by J.H. Crothers. This key is to be tested until the early summer of next year and a limited number of these test copies are available for distribution to members of PORCUPINE who feel that they may be able to 'test' the key comprehensively in the interim. Interested persons should contact the AIDGAP office at the Leonard Wills Field Centre, Nettlecombe Court, Williton, Taunton, Somerset TA4 4HT. The project co-ordinator would also be interested in hearing from anyone wishing to suggest possible groups which could be the subject of future guides, or wishing to contribute identification aids to the project. All suggestions and comments would be gratefully received.

Other AIDGAP guides which have been published include:-

'A field key to British brown seaweeds' by S. Hiscock, price £1.00 including postage and packing.

'An illustrated guide to the Diatoms of British coastal plankton' by J.B. Sykes. This key is due to be published in this year's edition of 'Field Studies', the journal of the Field Studies Council, and will be available as a separate offprint thereafter.

NOTICE 3.COLLECTIONS RESEARCH: CAN YOU HELP?

From Member Charles Pettitt, Computer Cataloguing Unit, Manchester Museum, Oxford Road, Manchester.

A large number of museum curators with responsibility for natural sciences collections have been collaborating as a team to record the existence (or known fate if lost) of all collections of natural science specimens in the British Isles. Recently the Federation for Natural Sciences Collection Research (FENSCORE) was formed, with representatives from many major provincial museums and from all the relevant national museums. The information being gleaned about collections is fed through FENSCORE into the national database being compiled by the Manchester Museum Computer Cataloguing Unit on the Manchester University computer.

The primary purpose of the database is to provide researchers with a means of rapidly locating collections containing material of relevance to their studies. For example, details can readily be retrieved of the collections known to:

- 1) Contain material of a given group.
- 2) Be associated with a particular person or expedition.
- 3) Be gathered from a particular area of the world.

Until recently the curators involved have been concentrating on collections held in provincial museums and kindred institutions, but now wish to expand the scope of the Register to include details of collections outside museums, such as those in private hands or in the teaching departments of educational establishments.

If you own, or are in charge of, botanical, geological and/or zoological collections, and you think its existence should be recorded in the Register, then please get in touch with Mr. Pettitt at the address given below; note that arrangements can be made to keep the precise location of valuable collections confidential.

You will be sent the necessary forms and instructions, together with the name and address of the nearest involved curator, to whom the completed forms should be returned, and who will be able to answer any queries you may have.

The work of compiling the Register is unfunded, so it would be appreciated if you could include a stamped, addressed envelope (at least 9" x 3½") with your letter.

NOTICE 4.MARINE CONSERVATION AREA AT WEMBURY

From Member N. Holme, The Marine Biological Laboratory, Plymouth.

Agreement has been reached for the designation of a voluntary Marine Conservation Area at Wembury, on the south Devon coast. The Area, which extends along some 6 km of coast between Plymouth Sound and the mouth of the Yealm, includes the whole intertidal zone, shallow waters offshore to a depth of about 10 metres, and habitats above high water mark at Renney Rocks and the Mewstone.

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While local fishermen opposed the idea of a voluntary marine reserve because they feared that their activities might be restricted should a reserve later become a statutory MNR, they agreed to the designation of a Conservation Area "where groups and individuals would be encouraged to conform to codes of conduct appropriate to their activity."

The Conservation Area includes rocky intertidal reefs at Wembury which are frequently visited by educational classes, and mainly rocky sublittoral areas of considerable interest to divers.

The Conservation Area is supported by a number of local and national organisations, including Fort Bovisand Underwater Centre, Devon Trust for Nature Conservation, the Underwater Conservation Society, and the National Trust.

The shore at Wembury was visited by members of Porcupine following the meeting in Plymouth last February.

NOTICE 5.ASCIDIAN MINI-PRINT SET

From Member Bob Ewell, Candle Cottage, Kempley,
Nr. Dymock, Gloucestershire.

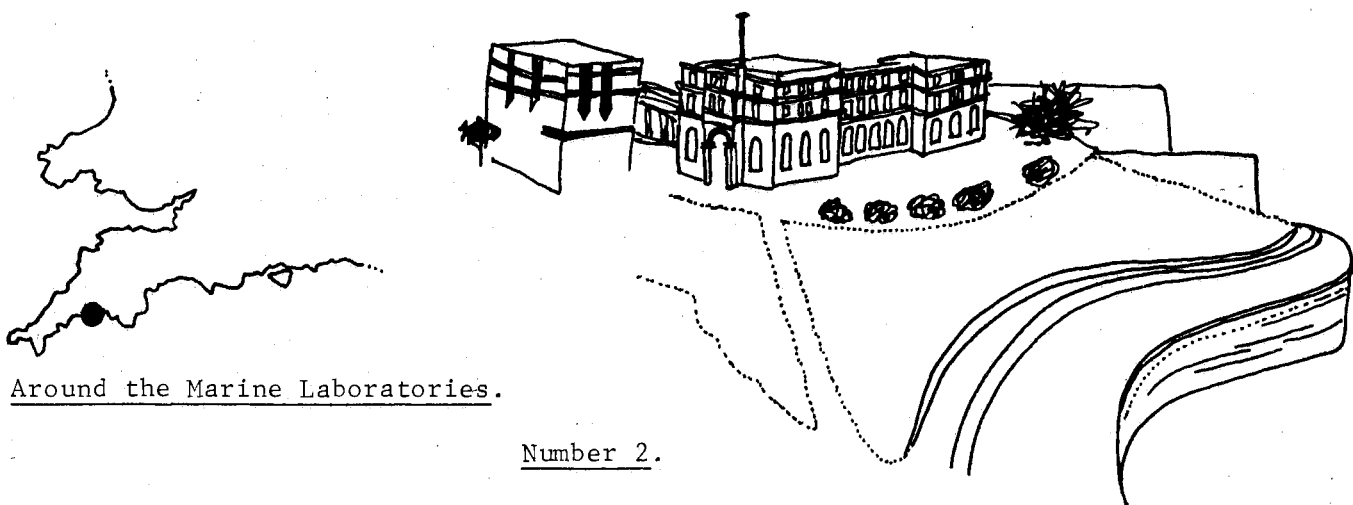
As reported in the last UCS newsletter Bernard Picton and Bob Earll are collecting photographs and information at present so that a mini-print guide to living ascidians can be completed. This is proving to be problematical from several respects. There are still a large number of species for which no photographs have been found; the complete list of these species is included on the Observation scheme - Photographic Project checklist. Anyone taking photographs of these species should have specimens of the material photographed so that identity can be verified should the need arise. A second problem concerns a large number of photographs for which no appropriate species name can be found - the Didemnids and Polyclinids seem particularly problematical in this respect. Lastly there seem to have been some changes to the nomenclature, with regard to the Didemnids especially, which means that some long standing names are no longer appropriate. Given these problems it seems likely that a two stage guide will be produced, the first illustrating the commoner species and describing some of the problems areas and then a second guide hopefully completing the set once sufficient information has been acquired. Anyone who feels that they can contribute to the guide should contact the above.

NOTICE 6.CHITON PHOTOGRAPHS - REQUEST FOR ASSISTANCE

Many people will be familiar with the UCS nudibranch mini-print set. This set will shortly be supplemented with a set which adds new British nudibranch species to the set as well as a number of non-nudibranch Opisthobranchs. In addition to this, it is hoped to include pictures of all the British chitons in with the set.

Do you have good quality close up photographs of any of the British chitons which would be used in the guide? If so, would you please contact the Secretary, Dr. S.M. Smith, Royal Scottish Museum, Chambers Street, Edinburgh.
Porcupine Marine Natural History Society (www.pmnhs.co.uk) newsletter archive

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Around the Marine Laboratories.

Number 2.

The Plymouth Laboratory of the Marine Biological Association

Although not one of Europe's oldest marine laboratories (the first was established at Concarneau as long ago as 1859), the Plymouth Laboratory will reach its centenary in 1988. The prominent limestone building on Plymouth Hoe overlooks the Sound from which sea water is pumped into underground reservoirs to serve research requirements, and the public aquarium, which occupies much of the ground floor of the original building.

Founded to further knowledge of the sea and to provide a scientific background to the fisheries, the latter responsibility was devolved on to MAFF after the first world war, when the fisheries laboratory at Lowestoft took on work in the North Sea which had been initiated by staff from the Plymouth Laboratory.

Because the scientific work of the Laboratory depends more on the activity of individual workers than on teams it is difficult to summarise briefly the work of the MBA over the past ninety years. Between the two wars research was directed towards an understanding of the basis of production in the sea - with emphasis on the distribution of plankton, both seasonally and in relation to year to year changes, with associated studies on the chemistry, hydrography and light penetration in the waters of the western English Channel. Since the 1940's there has been rather less emphasis on fisheries aspects, with further diversification into biochemistry, physiology, and chemistry. In recent years studies on oil and heavy metal pollution have been carried out.

The Plymouth Laboratory has always provided facilities for visiting workers, one important aspect of whose work has been on the physiology of nervous conduction and properties of cell membranes, based on the axon of the squid. Another aspect of the Laboratory's facilities is the very comprehensive library, together with a specialised pollution library and information services. Much of the Laboratory's research has been published in the JMBA, issued four times a year, to which members of the Association may subscribe.

The Laboratory has a small fleet of boats to provide specimens and for research at sea. This summer the Laboratory will be happy to welcome a new research vessel, the Frederick Russell, to replace the Sarsia, now 28 years old, the name of the new vessel commemorating one of the most distinguished workers at the Laboratory.

The S.W. Approaches of the English Channel mark an important geographical boundary to the distribution of many littoral and offshore species, so that the study of distribution of marine plants and animals remains one of the foremost activities of the Laboratory.

The Laboratory, Citadel Hill, Plymouth PL1 2PB.

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FAUNA LISTS FROM "PORCUPINE" SEAS: A PN COMPILATION

(Will Members please send corrections and additions to PN Editor for collation by F. Woodward/D. Heppell and subsequent publication.)

1. Plymouth Marine Fauna, 3rd Ed., 1957. The Marine Biological Association, Plymouth. A dated but still authoritative work.
2. Fauna and Flora of St. Andrews Bay, 1974. Scottish Academic Press, Edinburgh. Much of the fauna list derives from the records of Prof. W.C. MacIntosh during 1875-1923. The flora includes lichens and fungi and algae, both fixed and planktonic forms.
3. Marine Fauna of the Isle of Man, 2nd Ed., 1963. Liverpool University Press. Same comment as for Plymouth Marine Fauna.
4. The Fauna of the Clyde Sea Area. Scottish Marine Biological Association, Dunstaffnage, Oban. An attempted replacement for several earlier assemblages. Published in parts and appears to have foundered after five parts. Those published are very useful, some having keys.

Polychaeta (key)	1960
Ascidiacea (key)	1960
Mollusca	1962
Fishes	1965
Euphausiacea & Decapods (key)	1967

5. Inventaire de la Faune Marine de Roscoff. Editions de la Station Biologique de Roscoff. A complex issue of parts and revisions, apparently in two main series.

First series

Cnidaires et Cténaires	1950
Spongiaires	1950
Annélides	1951
Bryozoaires et Echinodermes	1951
Mollusques	1951
Némertes et Tuniciers	1955
Poissons	1956

New series

Amphipodes	1964
Cnidaires et Cténaires	1965
Décapodes et Stomatopodes	1965
Spongiaires	?
Annélides	1968
—————	
Flora: Algues, Champignons	
Lichens	1954 & 1964

6. The Marine Fauna of the Cullercoats District. Rep. Dove Mar. Lab. 3rd ser., nos. 13-21. Parts 1-5 are printed, parts 6 onwards are photocopied. A fauna list saved by the invention of the photocopier.

1 Porifera	1963	4 Insecta: Pterygota	
2 Diplopoda: Chilopoda		Crustacea: Branchiopoda	
Insecta: Apterygota		Crustacea: Ostracoda	1967
Crustacea: Euphausiacea		5 Crustacea: Copepoda	1971
Cetacea	1964	6 Coelenterata and	
3 Entoprocta		Ctenophora	1978
Priapulida, Echiurida		7 Cirripedia	1980
Sipunculida		8 Mollusca: Bivalvia	1980
Chaetognatha			
Echinodermata	1966		
3a Ectoprocta	1975		

In preparation: Polychaeta, Gastropoda, Amphipoda and Isopoda, Pycnogonida, Pisces.

VERTICAL AND DIURNAL DISTRIBUTION OF LOBSTER LARVAE
(HOMARUS GAMMARUS L.) - ITS EFFECT ON QUANTITATIVE SAMPLING

J.H. Nichols, D.B. Bennett and S.P. Milligan,
Ministry of Agriculture, Fisheries and Food, Directorate of
Fisheries Research, Fisheries Laboratory, Lowestoft, Suffolk.

INTRODUCTION

In the report of the ICES working group on Homarus stocks in 1975 it is stated that stocks of both European and North American lobster are in a state of decline. Information was lacking on the ecology of lobsters, between the egg and smallest pre-recruit stages. This area was identified as one which required further research.

Studies began in 1976 off the north east coast of England (Nichols and Lawton, 1978) and continued in Bridlington Bay (Lat: 53°55'N Long: 0°04'E) in 1979 and 1980. Prior to 1976 little was known about the occurrence of lobster larvae around north European coasts, the earlier records being limited to isolated occurrences most of which date back to over fifty years ago. During 1976 extensive ichthyoplankton surveys off the English north east coast offered an opportunity to sample specifically for lobster larvae. These surveys helped to identify both areas and times of greatest larvae abundance. They also highlighted a sampling problem, stemming from the low density of larvae in the plankton which has to be resolved before quantitative surveys are undertaken.

The low larval density can be attributed to the low fecundity of lobsters, compared with many other marine invertebrates and fish. The lobster produces only 7,000 to 14,000 eggs, and if the resultant larvae are distributed throughout the water column, sampling them would be very difficult. However, work in recent years on the American lobster (H. americanus) has shown that the larvae of that species spend most of the time very close to the surface, in the neuston layer. Sampling for that species could be confined to the near surface, and workers concluded that sub-surface abundances would only lead to underestimates of between 10% and 15%.

BRIDLINGTON BAY STUDIES 1979 AND 1980

The MAFF research vessel NUCELLA (length 14 m) was used towing twin frame nets, 2 m wide by 0.8 m deep, to study the vertical distribution of lobster larvae. These studies were aimed at deciding whether or not quantitative sampling for H. gammarus could be achieved by confining sampling to the near surface water.

Two nets were used to sample simultaneously at the surface and sub-surface down to 15 m, between July and September. From 218 half an hour paired hauls in 1979 a total of 821 larvae in all four planktonic stages was caught (695 Stage I, 83 II, 29 III, 14 IV). A total of 1789 (784 Stage I, 437 II, 442 III, 126 IV) was caught in 177 paired hauls in 1980. Most of these larvae, 597 in 1979 and 1614 in 1980, were caught at the surface, although significant numbers were sometimes taken down to 15 metres below the surface.

Surface catch rates in daylight fluctuated from means of 6.84 \pm 5.8 (1 sd.) in July 1980, to 1.67 \pm 2.29 (1 sd.) in September 1979.

The tendency for low surface catches on bright sunny days and towards the end of each sampling season was not reflected in increased catch rates below the surface.

The dominant feature of the results was the dramatic increase in surface abundance at dusk and dawn, reflected in mean catch rates of 54.67 ± 19.8 (1 sd.) at dusk and 27.5 ± 6.98 (1 sd.) at dawn.

The variation in surface catch rates supports the conclusion that quantitative sampling cannot be confined to the near surface layer. The sub-surface catches, although small, are significant if they are considered to be representative of the water column below 1 metre, and down to at least 15 metres. This theory is supported by the high dusk and dawn surface concentration, which if randomly dispersed downwards, would produce densities of < 2 larvae per 1000 M³. These densities would in turn produce sub-surface catch rates compatible with those found in 1979 and 1980.

The practical problems of sampling a planktonic animal in such low concentrations may be insurmountable, and these studies have therefore been terminated.

REFERENCE

- Nichols, J.H. & Lawton, P., 1978. The occurrence of the larval stages of the lobster Homarus gammarus (Linnaeus, 1758) off the northeast coast of England in 1976, Journal du Conseil, 38, 234-243.

E.C. DAVISON AND SPECIMENS FROM THE "PORCUPINE" VOYAGES IN THE HANCOCK MUSEUM

Carole Bainbridge and Peter Davis,
The Hancock Museum, Newcastle upon Tyne.

A previous note about Porcupine specimens held in the Hancock Museum (Davis 1980) described the Charles Davison collection of Atlantic Dredgings from the Porcupine Expeditions of 1869. Labels on the specimens indicated that they had been collected by an E.C. Davison, identified as the Paymaster on HMS Porcupine. They were donated to the museum in 1903 by "Chas Davison" - presumably the collector's son.

Recently, additional dredged material from the same source has been discovered in the Hancock Museum. The first collection to be located contained 34 small samples of Atlantic Soundings collected in 1862, i.e., some seven or eight years before the famous dredging expeditions, by Lieut. Davison from HMS Porcupine, and given to Albany Hancock (1806-1873).

The second collection contained 22 newspaper packages and 8 pillboxes of material dredged from British coastal waters, especially around the Thames estuary. The original label reads, "sea-bottom Dredgings South coast, Lieut. Davison John Hancock". These specimens were evidently intended for examination by John Hancock (1808-1890)

who although primarily recognised as an ornithologist and taxidermist, had wide natural history interests. The newspaper wrappings proved to be a useful source of information. Apparently, a copy of the Sunderland and Durham County Herald (Friday October 4th, 1861) had been posted to E.C. Davison Esq., on HMS Seaflower, stationed at Margate in Kent. This was date stamped Oc. 10. 61 Margate, and then forwarded to Lowestoft, Suffolk and date stamped London, Oc. 11. 61.

Admiralty records (ADM 53/7338) show that between 1861-1862, the Seaflower, a 4-gun cutter from Portsmouth, was engaged in surveying around British coastal waters. During this period the Navy listing gives Lieut. Edwin C. Davison as paymaster for service on the Seaflower while serving on the Fisgard.

It would appear that Davison was a native of the North East of England; he was receiving newspapers from this area, and he must have been in correspondence with, or at least had a passing acquaintance with the Hancock brothers. It would seem that the link here was the Tyneside Naturalists' Field Club which "E.C. Davison, Sunderland" had joined on 19 March 1863. Admiralty records show that Edwin C. Davison was passed clerk on 1st May 1839 on the Asia. On 23rd April 1849 he became Paymaster for the Fisgard, and remained with this vessel on surveying service until his retirement in 1870.

REFERENCE

Davis, P.S., 1980. Collections of material from the dredging expeditions of H.M.S. "Porcupine" in N.E. England. Porcupine Newsletter, 1, 159-161.

A CALCAREOUS CONCRETION FROM THE PASSAGE OF TIREE

Shelagh Smith

The Royal Scottish Museum, Edinburgh.

On 19th June 1981 a calcareous concretion about 60 cm x 60 cm x 15 cm was taken in a fish trawl by mv "Argo". The locality, approximately 56°28'N 06°40'W, a muddy hole about 120 m deep in the middle of the Passage of Tiree, is fished regularly for a mixed demersal catch, in this instance mostly cod haddock, dogfish and prawns. Additional trash included many cephalopods, chiefly Eledone cirrhosa, large gastropods Neptunea antiqua and Buccinum undatum, and a few bivalves. The crew of "Argo" helped me to rootle amongst the catch, which not only contained these common species but also a piece of waterlogged wood full of the small pholad Xylophaga dorsalis, and the above mentioned concretion. The concretion itself is a geological curiosity, and will be the subject of separate investigation. It at first appeared to be unique, but other similar specimens, also from west Scottish waters, have since been brought to notice. The concretion contains many comminuted fragments of barnacles, crab, mollusc and echinoderm remains, and on one side casts of burrows, possibly of Nephrops. It appears to have been overturned several times, probably through previous disturbance by trawls, but the burrow casts mark the latest underside as shown by the positions of the epifauna found living upon it.

A large portion of the concretion, together with the associated fauna, is preserved in the Royal Scottish Museum.

The epifauna, infauna, and species living in mud filling crevices and adhering to the concretion, was considerable, and in addition to several species of hydroids, ascidians, bryozoa, echinoderms, crabs and polychaetes as yet unidentified, there was the cup-coral Caryophyllia smithii and the scale-worm Lepidonotus squamatus and 18 species of mollusc, as follows:

Epifauna	<u>Lepidopleurus asellus</u> <u>Emarginula fissura</u> (= <u>reticulata</u>) <u>Modiolus modiolus</u> (juveniles) <u>Palliolum striatum</u> (= <u>Chlamys</u>) <u>Pododesmus patelliformis</u> (= <u>Monia</u>) <u>Pododesmus squamula</u> (= <u>Heteranomia</u>) <u>Kellia suborbicularis</u>
Mud fauna	<u>Odostomia conoidea</u> <u>Odostomia turrita</u> <u>Odostomia unidentata</u> <u>Eulimella laevis</u> <u>Retusa umbilicata</u> <u>Nucula nucleus</u> <u>Mysella bidentata</u> <u>Abra alba</u> <u>Abra nitida</u>
Infauna	<u>Hiatella arctica</u> <u>Pholadidea loscombiana</u>

The most interesting of these is Pholadidea loscombiana, which previously has only been recorded alive in the type locality in Devon and off the west of Ireland. Here five small specimens were found boring into the softer parts of the concretion. The species is a very distinctive pholad mollusc, not easily overlooked, although small specimens are difficult to identify from the British literature. I do not think that it is unduly rare, but such a habitat as this, even if not infrequently brought up in fish trawls, would usually be rapidly returned (approximately) whence it came, safe from the attentions of the inquisitive marine biologist.

