

PORCUPINE NEWSLETTER

VOLUME 1. NUMBER 2.

March, 1977.

The launching of "PORCUPINE" at the inaugural meeting, which was held at the Royal Scottish Museum, Edinburgh on the 12th and 13th February, 1977 proved a resounding success, some 74 members and visitors attending.

Membership to date numbers 99, which augers well for the Society and it is envisaged that a preliminary list of members will be issued with the next number of the Newsletter following the June meeting. It would be extremely helpful, in this connection if members could notify the Secretary or Editor of their particular specialisations for inclusion alongside their names and also an indication as to whether they are willing to act as referees for the various critical groups.

At its inception "PORCUPINE" was envisaged as providing a focal point and stimulus for marine biologists in Scotland, Northern England and Ireland, but the overwhelming response and enthusiasm of colleagues throughout the British Isles and abroad has been beyond our wildest expectations. Such a response has necessitated our re-appraisal of the geographical coverage of the Society and it is already apparent that there may well be a need for additional meetings outwith the original geographical limitations in order that members in the south of England, and on the continent may have an opportunity of more active participation.

Anyone, therefore, wishing to offer facilities or willing to formulate or suggest suitable topics for such meetings should contact the Secretary and/or myself outlining their proposals in order that serious consideration can be given to such ventures by the committee, who will do everything in their power to assist wherever possible.

The present Newsletter contains, in essence, the proceedings of the inaugural meeting, which in addition to having provided the foundation of the Society, provided an initial platform for proposals for initiating a unified grid system for recording the fauna and flora of the North East Atlantic. This topic has already caused some considerable discussion and divergence of opinions resulting in the setting up of a Sub-committee of Porcupine, consisting of Eve Southward, Phil Palmer, David McKay, Roger Mitchell and David Hepple, to investigate and assess the various proposals. Anyone wishing to contribute their observations and comments should write to one of the above, or to the Secretary, as soon as possible.

Finally members are reminded that contributions comprising reviews, notices of forthcoming events, news of personal and joint research projects, requests for information etc., should be sent to the Hon. Editor of Porcupine, Mr. F. R. Woodward, South Shields Museum and Art Gallery, Ocean Road, South Shields, Tyne and Wear, or to the Hon. Secretary of Porcupine, Dr. Shelagh M. Smith, Royal Scottish Museum, Chambers Street, Edinburgh, EH1 1JF.

F.R. WOODWARD.
Hon. Editor.

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The major contributions in the Newsletter constitute the proceedings of the inaugural meeting at Edinburgh held on 12th and 13th February, 1977, together with the articles submitted by members present.

The opinions expressed by those taking part in the meeting were personal and did not necessarily represent the policies of the organisations they represented. Porcupine policy recognises that these opinions should be publicised, in the hope that the problems of marine recording, both to do with grids and other matters, should be solved as quickly as possible.

Extract from the minutes of the Business Meeting of Porcupine held in the Royal Scottish Museum on Sunday, 13th February, 1977.

The Constitution and Rules of Procedure were discussed and ratified.

The Steering Committee, as listed in Porcupine Newsletter, Vol. 1, No. 1, with the exception of Mr. Michael Hudson who no longer wishes to serve, was voted in as the Official Committee.

Hon. Treasurer, David Heppell, reported that:

Membership: 94	- Entrance Fees	£ 94.
	Current subscriptions	£188.
	Advance subscriptions	£ 9.
	Donations	£115.
	Charges to non-members	£ 14.
		<u>£420.</u>

The 'PORCUPINE' Expeditions

The following, abstracted from the Inaugural Address, is a brief account of the expedition of the 'Porcupine' from which our Society derives its name.

In 1868, despite considerable evidence to the contrary, most scientists shared the popular notion of a zero of life at about 300 fm - a boundary below which no life could stand the great pressure of the depths. That year at the instigation of Wyville Thomson, W.B. Carpenter wrote to the Admiralty, on behalf of the Royal Society, requesting a vessel fitted with dredging gear in order that "questions as to the state of things in the depths of the ocean might be definitely settled". The vessel should be capable of making way under canvas as well as by steam-power "but as our operations must necessarily be slow, speed would not be required".

The Admiralty took him at his word and assigned for the purpose the inappropriately named 'Lightning', described by Wyville Thomson as "a cranky little vessel ... which has the somewhat doubtful title to respect of being perhaps the very oldest paddle-steamer in Her Majesty's navy". She had been built at Deptford in 1823, only 26 years after the Navy Board had categorically reported on the use of steam as a means of propelling ships that "an invention of this kind could never be applied to any advantageous purpose in His Majesty's navy". She was the first steamship in the Royal Navy to see active service and later served in the Baltic fleet during the Crimean War, at which time her funnel was replaced by one shorter and thicker and her paddle boxes were modernised with flattened tops. By the time of the 1868 expedition she was scarcely seaworthy and was finally broken up in January 1872.

During her six weeks cruise north of Scotland between the Shetlands and the Faroes, only nine stations could be dredged owing to the severity of the weather. Nevertheless the Council of the Royal Society considered the general results of the cruise to be sufficiently new and valuable to justify a strong representation to the Admiralty urging the continuation of the investigations which even under unfavourable conditions had achieved a fair measure of success.

The following March the Admiralty granted this request and released the surveying vessel 'Porcupine', under the captaincy of Commander Calver. The Porcupine Bank, which bears her name, had been discovered seven years earlier while on survey duty off the west of Ireland. The 'Porcupine' had been built in 1844, also at Deptford, as a gun vessel, first class, with a length of 141 ft. and a displacement of 490 tons. Like the 'Lightning' she was two masted, brigantine rigged, her paddle wheels with fixed radial floats; the self-feathering paddle although invented in the eighteenth century had not yet been introduced into the ships of the Royal Navy.

The first cruise, under the scientific charge of Gwyn Jeffreys, occupied two months and explored the Porcupine and Rockall Banks and the Rockall Trough, where dredging was successfully undertaken in the then record depth of 1476 fm. As numerous specimens came to the surface sticking to the outside of the dredge-bag instead of within the dredge itself, the captain suggested attaching three deck swabs to each side of the dredge. This modification produced conspicuous results, although the specimens thus collected were usually damaged, and much time had to be spent clipping them out with nail-scissors. Without these "hempen tangles", however, the mutilated specimens would have remained unknown at the bottom of the sea.

As the first cruise had been so successful, the plans for the second were altered to enable the 'Porcupine', under the scientific direction of Wyville Thomson, to dredge in the deepest soundings within their reach, some 2500 fm indicated on the chart about 250 miles W of Ushant. It was felt that if the existence of life and the physical conditions could be established with accuracy down to that depth, then the general question would have been solved for all depths of the ocean, further investigation of the abysses being a mere matter of detail. Successful hauls were duly made in 2435 fm, on the 22nd and 23rd July, the dredge being out for about eight hours.

The cruise of 1869, under the direction of W.B. Carpenter, returned to the area explored by the 'Lightning' the previous year. A further cruise was undertaken in 'Porcupine' during 1870, this time to the Mediterranean, with Gwyn Jeffreys again in charge as far as Gibraltar. Off the west coast of Spain one haul from 994 fm disclosed 186 species of molluscs, of which 71 were new and a further 24 only known previously as Pliocene fossils.

The cruises of the 'Porcupine' had shown decisively that life did exist in abundance at great depths. As a direct consequence of the report of the Royal Society on the scientific results of these expeditions the Admiralty drew up plans for the 1872-76 circumglobal oceanographic voyage of the 'Challenger', whose modern namesake is, appropriately, investigating anew the benthos of the Atlantic slope and Rockall Trough in the illustrious wake of the 'Porcupine'.

David Heppell.

The 'Porcupine' at Rockall

From a letter to 'The Times', 14 February 1977, by Dr. Peter Sabin, Institute of Geological Sciences, London SW7.

... The first authenticated landing (from an open boat) was from HMS Endymion (Lt. Basil Hall, RN) in 1811, and there was a further landing from HMS Porcupine (Lt. G.H. Inskip, RN) in 1862. Specimens of rock survived from both these landings. The Royal Irish Academy mounted a scientific expedition in 1896 in the steamer 'Granuaile' ... but bad weather prevented a landing. There were no more attempts until ... J.B. Charcot, from the research ship 'Porquoi-Pas?' effected a landing in 1921. (Further landings by boat or helicopter took place in 1948, 1955, 1959, 1968, 1971 and 1972). Although there have been other, less certain, and also probably unrecorded landings, Rockall remains one of the least accessible rocks in the world and landings from an open boat very rare and hazardous.

THE STRANGFORD LOUGH SURVEY

David G. Erwin, Ulster Museum, Botanic Gardens, Belfast BT9 5AB.

Introduction

Strangford Lough, Northern Ireland, is a land protected, entirely marine lough of (32% - 34% salinity), 31 Kms long and 4 Kms to 6 Kms wide, connected to the Irish Sea by a narrow channel known as the 'Strangford Narrows'. Numerous partially submerged drumlins, and banks which barely reach sea level known locally as 'pladdies', are found in the main body of the lough. Depth is extremely variable to a maximum of 60m. Major tidal water movements occur through the 'Narrows' area. Rate of water movement varies from 350cms/sec in the fastest part of the 'Narrows' to virtually nil.

In 1972 the Ulster Museum diving team set out to answer the apparently simple question:- What is found, where in the lough? A survey method was evolved to maximise underwater work and to obtain useful data from a large area in a reasonable time. The initial survey which involved more than 450 underwater hours has now been completed. Results presented here can only be a broad outline of the information obtained.

Methods

The method utilised involved 'flying' behind a towing boat on a 'sledge' or 'flying machine' whilst giving a continuous description of the fauna and substrate. Photographic records and detailed analyses were made of the communities and substrate at more than 250 sites. (Details of method - Erwin 1977).

The fauna recorded was all macrofauna, mostly epifaunal with visible infauna. Sediment samples were dried and weighed, wet sieved through a 0.0625mm sieve to remove the silt/clay fraction, dried again and weighed. The coarser fractions were then dry-sieved through a nest of sieves separating the standard Wentworth size classes. (Wentworth 1922).

Results

Because the lough is almost entirely land protected by surrounding drumlins and because of the short fetch available for the production of waves there is little or no evidence of wave action below a depth of 10m. Substrates are therefore laid out on a gradient of tidal water movement in depths greater than 10m, a pattern only disturbed by biotic factors. Recognisably different communities follow the substrate series with a precision which repeats itself many times. Where a particular substrate type exists in different areas of the lough (indicating a particular water movement regime) the same community of animals will be present. It is not suggested that the substrates are distributed on a stepped system but rather that one merges into the next along the gradient. Neither do the communities simply start or stop at particular points. Most commonly one community merges into another with a mixed area between.

The Substrates and their associated Communities

1. Bed Rock 'Narrows' Community

This occurs in the 'Narrows' areas of fastest water movement where the substrate is 100% bed rock. It is typified by massive encrusting forms exhibiting 100% cover of the rock surface. Typical species are Alcyonium digitatum (L.), Pachymatisma johnstonia (Bowerbank) and the massive form of Cliona celata Grant. The community has been observed on near vertical faces in depths down to 48m below which it appears to continue unchecked.

2. Boulder 'Narrows' Community

Where the water movement is slightly reduced the substrate is composed of boulders of various sizes. Species diversity is greater than on the bed rock, typified by almost 100% cover of Tubularia indivisa L. underlain by various encrusting sponges. Large branching hydroids (e.g. Sertularia argentea L.) and bryozoans are also much in evidence together with many mobile species. Particularly numerous is the caprellid Caprella linearis (L.) and this is the only community in the lough where Macropipus puber (L.) is common.

3. Cobbles Community

In several bays off the 'Narrows' tidal flow, cobbles are found covering 50% to 80% of the bottom. Between them is a coarse sand probably accounted for by a reduction in water movement produced by the cobbles. The most obvious 'indicator species' in these areas is Actinothoe sphyrodeta (Gosse). Some cobbles are limestone and are heavily bored by the piddock Hiatella arctica (L.), and have a complex cryptic fauna typified by the ophiuroid Ophiopholis aculeata (L.). The animals associated with the sand between the cobbles are closely related to community six.

One very strange, fairly extensive cobble and pebble area exists in the 'Bar' area where the 'Narrows' meet the open sea. It is a virtual desert of well rounded cobbles and pebbles totally devoid of life. Occasional bed rock outcrops occur with typical bed rock 'Narrows' community on the flat surfaces and typical Boulder Tubularia community in recessed crevices. The 'Bar' is an area of great turbulence due to the tide and wind interference, and this together with its relative shallowness probably induces great mobility of the cobbles.

4. Very Coarse Sand 'Dune' Community

At either end of the 'Narrows' where the current begins to disperse over a wider area, very coarse sand 'Dunes' are set up running at right angles to the line of the 'Narrows'. They vary from 7-9m apart and 0.5m high to 3-5m apart and 1m high. The community is characterised by the holothurian Neopentadactyla mixta (Ostergren), the crab Atelecyclus rotundatus (Olivi) and the bivalve Glycymeris glycymeris (L.)

5. Coarse Sand Community

This is found in extensive areas of the lower lough and is typified by extremely dense aggregations of brittle stars, the great majority being Ophiothrix fragilis (Abildgarrd), but with Ophiocomina nigra (Abildgarrd) also present. At the fringes of the community, when Ophiothrix fragilis ceases to be present, often on a sharp line, Ophiocomina nigra regularly continues for some distance at approximately the same concentration in numbers as in the dense Ophiothrix bed.

6. Muddy Sand Community

This substrate is fairly extensive in relatively shallow water (down to 20m) on the lower east side of the lough and is found in small areas on the west side where a suitable current regime exists. The animal component is quite variable but is best represented as a commercial Pecten maximus (L.) bed. Other species much in evidence are Marthasterias glacialis (L.), Solaster papposus (L.), Asterias rubens L. (although this is present in other communities), Echinus esculentus on occasional rocks and many species of hydroids with their associated faunas.

The association of the coarse sand between the cobbles of community three approximates to this community. Most of the species are those of community six but in much reduced numbers.

7. Clean Sand Community

Clean sand communities are rare in the lough and tend to be in small pockets where they do exist. They are found in open shallow bays (5-15m), usually just to the side of fast water areas. The substrate is very mobile and apart from gobies and flatfish the scarce macrofauna is all infaunal, and is probably best represented by species of Ensis.

8. Fine Sand/Mud Community

This substrate is found mainly in the area where the lough approaches the Quoile estuary in depths from 10-15m, but where there is even less wave action than normal. The community seems to correlate almost completely with the 'Amphiura filiformis - Amphiura chiajei community' of Thorson (1957), originally described by Petersen (1913, 1918). It appears to be present in two facies dependant on the coarseness of the substrate. In one small area where the substrate is mainly fine sand Amphiura filiformis (O.F. Muller) and Amphiura chiajei Forbes exist in large numbers along with Cyprina islandica (L.) in fairly high numbers. In the majority of the range of the community, where the substrate is finer, the two species of Amphiura continue but Cyprina islandica is not present. However the pennatulid Virgularia mirabilis O.F. Muller is very common and Aporrhais pes-pelecani (L.) and Turritella communis Risso are present in quite high numbers. These latter are not present in the coarser Cyprina facies.

9. Fine Mud Community

This substrate seems to be confined largely to the north of the lough. The most obvious member of the community is Nephrops norvegicus (L.) inhabiting burrows in the very soft mud. Other common species are Goneplax rhomboides (L.) and Aphrodite aculeata L.

10. Mud and Shell Community

Mud with a coarse shell fraction is widespread in the northern half of the lough, both in the main channel and between islands and 'pladdies'. The shell fraction permits settlement onto the mud and colonisation by species which would not normally do so. These may themselves modify the substrate and permit other species to colonise. By far the most widespread occurrence of this is based on Modiolus modiolus (L.) which occurs in extensive beds in a wide range of depths down to 40m and possibly deeper. Modiolus are always found attached to shell and around this epicentre a clump of Modiolus builds, all connected by byssus threads. This 'clump' provides an artificial biotic hard substrate in an area where it would not normally exist and many other species are to be found associated with it. Some of the most obvious are Chlamys varia (L.), Ascidella aspersa (O.F. Muller), various serpulids and sponges and the predator/scavengers Asterias rubens (L.) and Buccinum undatum L. Between the 'clumps' a special fauna also exists best indicated by holothurians Thyone fusus (O.F. Muller) and Thyonidium commune (Forbes) and the bivalve Chlamys opercularis (L.).

A further variation on the colonisation of shell in mud occurs mainly in relatively shallow water, where the shell is colonised by Ascidella aspersa with no Modiolus modiolus. The relationship of this 'Ascidella facies' to the 'Modiolus facies' is open to conjecture.

Discussion

All natural processes of erosion tend to make sediment finer and given enough time for stabilisation of the system, hard or coarse substrates will only exist where they are held in hydrodynamic balance by water movement, except where the substrate is relict or where sediment is being transported from elsewhere. Most natural systems are thus assumed to be in hydrodynamic balance. Generally, the 'gross' water movement in an area provides two types of energy input - wave action and tidal action. In low tidal

current areas hard or coarse substrates will exist only due to wave action. In low wave action areas hard or coarse substrates will exist only due to tidal current. The latter is the case in Strangford Lough, where, apart from the 'Bar' area, the sediments below 10m are laid out in hydrodynamic balance only with tidal current. Thus sediments and associated communities which would normally only be found on extensive offshore areas are found in relatively discrete shallow areas accessible to the diver.

Hence it is suggested that Strangford Lough could be considered a simplified model for many of the substrates and communities present in the open sea. In, for example, exposed western areas of the British Isles a large proportion of the substrate is rock or boulder. These large expanses of similar substrate could permit further differentiation of community. Metaphorically it could be considered as a radio with a 'band spread' facility, which permits the receiving of stations whose broadcast frequencies are close together.

In terms of macro-biogeography it is suggested that parallel communities are present relative to the substrate in question. An example is the community recently described by Fedra et Al (1977), in the Adriatic which is an almost perfect parallel to the Strangford Lough 'Mud and Shell' community. Many of the components are the same genus but a different species.

Conclusions

1. Ten Benthic communities, some exhibiting different facies have been identified in Strangford Lough in depths between 10m and 50m.
2. The communities in Strangford Lough can be closely correlated to substrate/water movement.

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* A further exposition of the contents of this paper is currently in press in the Proceedings of 11th European Symposium on Marine Biology.

MACROBENTHOS SURVEY IN THE ENGLISH CHANNEL

Louis CABIOCH, Franck GENTIL, René GLACON, and Christian RETIERE

The macrobenthos survey of the whole English Channel began in 1972 as a co-operative research involving three French marine laboratories (Roscoff, Dinard and Wimereux) and the marine geology laboratory of the University of Caen, with close relationships with the Oceanological Centre of Brittany (CNEXO). The programme is supported by CNRS (Centre National de la Recherche Scientifique) and CNEXO (Centre National pour l'Exploitation des Océans) and the basic idea was to extend to the whole Channel the work previously carried out in the Roscoff and Dinard areas. The aims were:

- to know more about the distribution of the macrobenthic species and to link them with the main environmental conditions;
- to know more about the structure and distribution of the macrobenthic communities and to show their relationships with the ecological conditions.

1. OPERATIONS:

The cruises have been done in spring and summer, from 1972 to 1976. Samples were taken at 2446 stations.

2. WORK AT SEA:

a) Stations distribution:

The distribution scheme of the stations is a compromise between the need of obtaining a mapping as complete and precise as possible and the inverse necessity of avoiding to undertake a work of unrealistic dimension. The distance between stations is 2 miles in the diversified areas along the coasts of France; about 4.5 miles in the more uniform axial area of the Channel and also along the coasts of England, where the aim was to link with the detailed work of N.A. Holme (1961). In some areas, the sampling scheme has taken into account the presence of peculiar structures, such as the sand banks near the Straits of Dover.

b) Operational techniques at sea:

80% of the work was carried out on board the R.V. "Pluteus II" (Biological Station, Roscoff), 20% on board R.V. "Thalassa" (Fisheries Institute, Nantes).

Choosing a sampler is difficult. First, it must work on any type of sediment, including pebbly bottoms. Second, it has to be little affected by weather conditions and drift. After different trials, the circular dredge "Rallier du Baty" was chosen.

Sieving and sorting are carried out at sea. The choice of a 30 dm³ standard volume of sediment conciliates the necessity of doing a great number of samplings with the fact that the similarities or dissimilarities between samples must remain significant. Sieving tables 1m² surface are used, with successive meshes 20mm, 10mm, 2mm and with the possibility of adding an 1mm canvas sieve under them. In practice, sieving to 1mm is only used to improve knowledge in each community, after their distribution scheme has been drawn on the basis of 2mm sievings.

Provisional "relevés" of the sampled fauna are established on board, by registering the obvious species on pre-printed faunistical lists. The sediment is briefly described, as well as the major features of the community. Usual indications like time, depth etc. are noticed.

3. LABORATORY WORK:

a) Faunistic (and floristic) identifications.

Infauna and mobile epifauna on one hand, sessile epifauna on the other hand, are considered separately. Two steps are managed: first, the verification of the provisional limited relevés, involving about 300 species, recognisable without major problem second, the complete listing of the other species. The advantage is, that it is possible to draw the main ecological features of the whole studied area, without waiting for the complete results. We have shown such examples at the 11th European Marine Biology Symposium (Caillon, Glacon and Retiere, 1976).

b) Sedimentology

The sediments are studied in the University of Caen (C. Larssonneur). The granulometric analyses of the samples are essential for ecological interpretation. On the other hand, they will contribute to the achievement of the sedimentological map of the English Channel, in 1977.

4. DATE ANALYSIS:

a) General principles:

Data analysis requires a codification of the taxonomic names. We use for that purpose the four first letters of the generic name, followed by the three first letters of the specific name.

The analysis is done in co-operation with mathematicians. The complete programme will use inertia methods (correspondance analysis etc.) and dynamic aggregation:

- to build a classification of the natural environments, according to the main ecological parameters.
- to build a natural classification of the faunistical relevés (communities, continuum etc.).
- to compare the two systems, and also to establish the auto-ecological characters of the species.

b) Improvement of the knowledge of the ecological parameters:

New data will be obtained by the use of teledetection (thermographies, turbidity recordings), in co-operation with the laboratory of Geography of the Ecole Normale Supérieure (Paris).

c) Distribution maps:

Without waiting for the complete results issued from computing, the immediate data on the most obvious species are plotted on maps covered with a grid (6 miles square = one hundredth of an area 1 degree latitude high and 1° 30' longitude wide). The indication recorded is the presence of the species in the square.

5. SOME EXAMPLES OF RESULTS:

The distribution maps of the main species in the English Channel can easily be classified into several different typical patterns. One of the most interesting patterns is illustrated by the sessile epifaunal species which distribution is more or less restricted to the western part of the Channel. The successive eastern boundaries, from west to east, of Porella compressa, Diphasia pinaster, Thuiaria articulata, Lafoea dumosa, Caryophyllia smithii, Sertularella gayi, show a striking similarity with the classical T₅₀% lines established by Lumby (1936). It shows how the increase of the annual T₅₀ amplitude, from west to east, is probably responsible of an important decrease of the diversity of the fauna in that direction. The same conclusion has already been pointed out by Crisp and Southward (1958) about littoral fauna and by Holme (1966) on examples of infaunal species.

Other patterns show the indicative character of some species. For example, the typical boreal "Modiolus modiolus community" is still present between the Cotentin peninsula and the Isle of Wight and in the Straits of Dover. The boreo-arctic hermit-crab Pagurus pubescens, previously unrecorded in the Channel, is frequent in the same areas; its southerly limit on the European shelf lies just north-east of Roscoff (Cabiocq, Gentil, Glaçon and Retière, 1975). The variations in the distribution of such species might be very indicative in case of thermal pollution.

The distribution of the Polyzoon Conopeum reticulum, closely restricted to the vicinity of the littoral, mostly in the Bay of Seine and in a narrow area from that point to the Straits of Dover, is probably related to the influence of somewhat brackish waters drifting eastward from the Bay.

CONCLUSION:

Recording the distribution of the bottom-fauna of the English Channel is a part of a wider programme, which involves also autoecological and biocoenological aspects.

Doing such work needs not only co-operation between several zoologists, but also with other scientists (sedimentologists, mathematicians, informaticians, specialists of teledetection etc).

Fauna recording takes its full value if it leads to conclusion, either on the whole ecological structure of a sea; or to the generalised knowledge of the autoecology of the species.

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THE ECHINODERM SURVEY

Started in 1973, after consultations with the Biological Records Centre, Monks Wood, the Echinoderm Survey was designed as a trial of the B.R.C. type of survey, using volunteers, to study distribution of marine animals. In this case we have enlisted amateur marine biologists and SCUBA divers as well as professional zoologists and fishery biologists. It is hoped to gather together and eventually publish in the form of maps, much information acquired incidentally during other studies, which would otherwise be forgotten. Echinoderms were chosen because starfish and sea-urchins are colourful and obvious animals, they are found in most marine habitats and they are very useful to ecologists in their description of animal communities. A good handbook describes the British species (Mortensen, 1927), but has been long out of print. The area of the survey covers the continental shelf around the British Isles, from Brittany in the south to Shetland in the north, and the depth range is from the seashore to 200 m.

The value of a distribution survey lies in the interpretation of the results, not in the mere accumulation of records. The first essential is accurate identification of the species, so we have prepared, for our contributors, a key to the 80 species known to occur in the survey area. A need has been found for a simpler key to the common nearshore species, for newcomers to the survey, and one is being prepared. Other essentials are accurate location of records (either latitude and longitude or National Grid references being acceptable), date of observation and as much habitat data as possible.

The distribution of an intertidal species such as Paracentrotus lividus, the purple sea urchin, is quite easy to work out, since it is a spectacular inhabitant of tide pools, and has been recorded frequently in the past. Its range extends from the Mediterranean to the Atlantic coasts of France and Ireland. In Ireland it can be found all the way round from Co. Cork to Co. Donegal. A few specimens have been found around Skye in western Scotland, and these probably arrived as larvae carried northwards from the Irish population. Paracentrotus has a clear southwestern distribution. Northern species, on the other hand, are found in the Shetlands, Orkneys and northern Scotland, with southern limits somewhere on the west coast of Scotland and the northeast coast of England; for these and the sublittoral species we still need many more records.

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The first few years of the Echinoderm survey have shown that a useful amount of data can be gathered by correspondence with volunteer contributors, as long as help can be given with identifications. For offshore distributions collections made by research ships in the past, present and future are essential and so are abstraction of data from the literature and examination of Museum collections. New coastal records are still urgently needed, especially from the east coast of Britain and many parts of Ireland. We would be glad to hear from members of 'Porcupine' or other people who may have information to contribute, or who would like to start looking for echinoderms. More details of the scheme, key to species and recording cards can be obtained from the author.

Dr. E.C. Southward.

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Marine mollusc recording: a proposal for a unified grid system of recording.

By David W. McKay, Marine Laboratory, Aberdeen, and Shelagh M. Smith, Royal
Scottish Museum

This paper has arisen from discussions the authors have had with people actively involved in marine mollusc recording.

Recording of marine organisms from British Seas has been in progress since Linnean times. Early work consisted of local species lists and investigations undertaken by private individuals. The first government expedition took place in 1868 at the behest of the Royal Society. In 1887 a committee was appointed by the British Association to consider the definition of the British Area. Their report published in 1888 was reproduced by Norman (1890) and this Area stood until 1901 when the committee which the Conchological Society of Great Britain and Ireland appointed to draw up a revised list of British marine mollusca enlarged it to include the Channel Isles (Chaster *et al*, 1902).

Winckworth (1921) tentatively (sic) divided the British seas into Areas based upon his personal experience of the suitability of such divisions. He wrote (p.153) "the main object is to get a system which shall really help to represent the British distribution of marine (molluscan) species, and to stimulate interest in their study." However, interest lapsed and in 1961 a sub-committee of the Council of the Conchological Society was set up "to consider questions relating to the production of a published census of equivalent status to that of the British non-marine mollusca." (Heppell, 1962). This committee set out the methods to be used for recording, and the 40 Sea Areas used until the present date were defined (Heppell, 1964). Unfortunately the reasons behind the choice of Areas were not given. The definition of many of the Area boundaries appears arbitrary. In 1966 Stella M. Turk, the incumbent Marine Recorder, drew a detailed recording form which was to provide a standard method of data recording and which made information retrieval simpler. Forms of this type were in use until the introduction of the Biological Records Centre methods which are based on the use of general field cards and 80-column individual species cards (Turk, 1972).

When this method was introduced the emphasis of recording moved away from recording by Sea Areas to recording by 10km squares. Introduction of the field cards with the impetus directed towards recording by 10km square led to an increase in the number of littoral records. But ambiguity and slowness of dissemination of information (especially of that published) had led to some confusion and loss of quality of records such as obtained by localisation only to the 10km square and not to the site.

In 1972 a system of Area Representatives was introduced to spread the work of initial data processing which had up to then been solely in the hands of the Marine Recorder. The recent large inflow of information on mollusc distribution for the coastal 10km squares has been largely due to the efforts of the Area Representatives themselves who in general have not been able to command additional support despite repeated requests for assistance (Pain, 1976).

The problems which we are now hoping to solve are therefore not new and have already been touched on by Smith (1975). In hindsight the introduction of the scheme based on 10km squares of the National Grid has proved hasty and ill-conceived, as it was so unsuitable for offshore recording. The expansion of coastal recording has therefore not been matched by an increase in offshore records. Since 1974 there have been repeated attempts to obtain a decision from the Biological Records Centre on the future of offshore mollusc recording but as yet no decision has been made. This lack of directive has resulted in the lopsided concentration on littoral recording. It has even been suggested that littoral and offshore recording should be divorced from one another altogether. This overlooks the fact that the coastal fringe is simply a specialised part of the whole marine environment, more work now indicates that species formerly regarded as littoral have a much greater depth range. Thus any recording dichotomy is undesirable.

In an attempt to give offshore recording the boost it undoubtedly needs so that it can take its proper place, consideration has been given to the production of a unified grid system into which all mollusc records could be incorporated. It was immediately apparent that the extension of the present 10km National Grid recording system was totally impracticable because -

1. No convenient and accurate method by which the individual collector can convert other methods of offshore location such as Decca Navigator to the National Grid exists.

2. The National Grid used on the British mainland is different from the Irish Grid, thus causing problems for offshore recording along most of the west coast of the British Isles.

In designing a grid system to be used for all marine mollusc recording the following points have to be borne in mind -

1. The system should be as simple and as widely acceptable as possible.
2. Positions of stations whether in latitude and longitude or any other positioning method should be easily fitted into the system.
3. It should be designed so that the data can be easily handled by computers.
4. It should fit in with recording systems used for other marine phyla and those used for major regional ecological programmes.
5. With regard to the success of the 10km system for land and coastal records the size of the smallest recording unit should not be very different from that of the 10km square.

Holme (1974) has described how he used subdivisions of ICES (International Council for the Exploration of the Sea) statistical rectangles for benthic macrofauna mapping in the English Channel. ICES statistical rectangles are based on units of half a degree of latitude by one degree of longitude giving rectangles of slightly varying size as one moves from south to north, equivalent to a 30 by 30 nautical mile square at 60° N. A unit of this size is much too large for the type of recording now in progress, although it has been used previously as by Stephen (1933) in his studies of the distribution of mollusca and echinoderms in the North Sea. We now propose to subdivide the statistical rectangles into 25 units each 6' of latitude by 12' of longitude, that is approximately 11km square, and four times the size of those used by Holme. The present ICES statistical

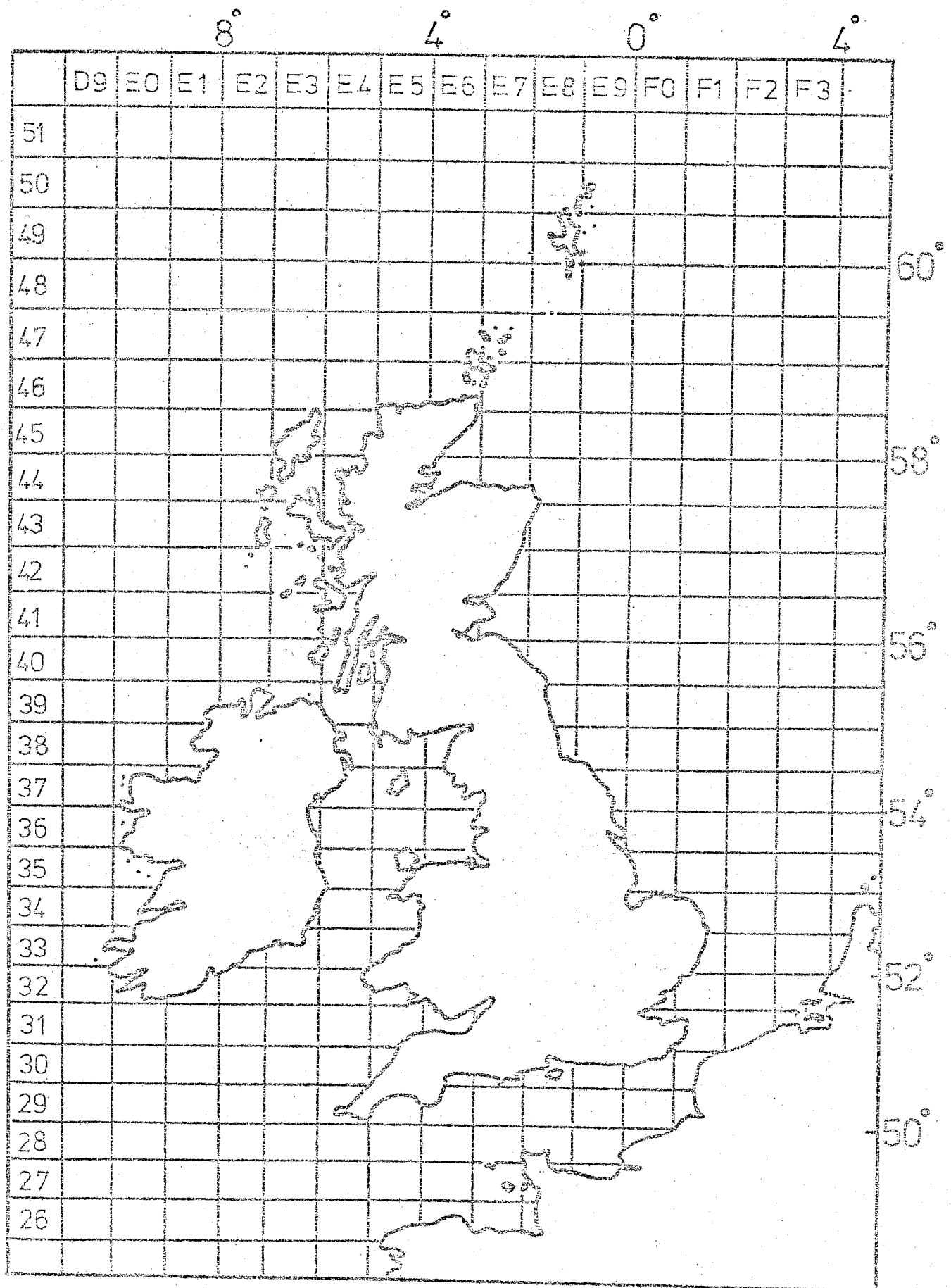


Fig 1 British Isles with ICES statistical rectangles. Porcupine Marine Natural History Society (www.pmnhs.co.uk) newsletter archive

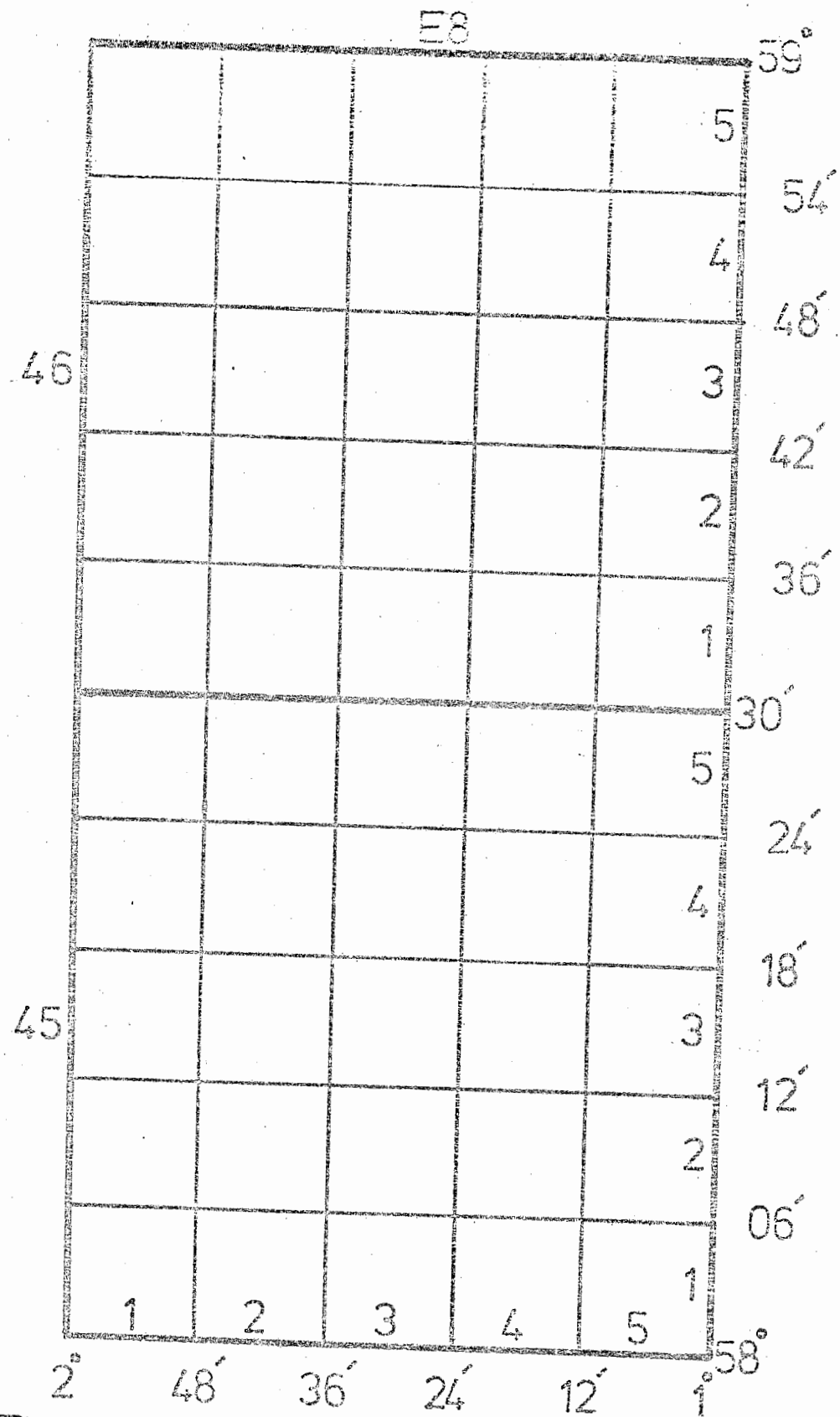


Fig 2 Subdivision of ICES rectangles

rectangles and their codings are shown in Fig. 1, each rectangle being coded by entering the northing first e.g. 43E8. Note that this is the same way as latitude and longitude are quoted, but the opposite of that used for the National Grid. Each rectangle is subdivided into 25 recording units (Fig. 2) which are themselves coded 1-5 in a northerly (first) and easterly direction so that any one unit takes a two digit code e.g. 24. When both are combined the detailed code for a recording unit is expressed e.g. 43E8/24.

Having erected a grid system which by its very nature has two tiers we considered whether Sea Areas should be added as a third level. We concluded that although they had no intrinsic value in themselves they do provide a reasonable logistic framework for the initial data processing as is done by Area Representatives. It seems only logical however, to redefine the larger Sea Area units so that their boundaries coincide with those of the statistical rectangles, thus tidying up the known difficulty of working with two non-integrating dimensions. The opportunity has also been taken to rationalise these units and make all Areas approximately the same size (4-8 statistical rectangles). Contrast the present 6 Areas in the northern Irish Sea with the two for the west coast of the Scottish mainland, each one of which is almost as large as the northern Irish Sea. The location of the boundaries of the new Areas does not, it is admitted, also coincide with the UTM boundaries, because they were chosen for geographical convenience using the Pentland Firth as the starting point. The proposed new Areas are shown in Fig.3. They have been given a simple numerical code from 01 to 33 prefixed by the letters UK. No attempt has been made to ascribe names to these new Areas as there would be overlap in the use of names with those of the present Sea Areas and this would lead to confusion. The distant offshore regions have not been included in the new Areas as it is considered that the small volume of records from these parts of the sea could most conveniently be dealt with by the Marine Recorder.

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Any dog that a porcupine nudges
Cannot be blamed for harbouring grudges.
I know one hound that laughed all winter
At a porcupine that sat on a splinter.

Discussion - Sunday 13th February 1977.

The chaired discussion was tape-recorded. The following synopsis gives the main points raised, and a more detailed transcript is lodged in the Society's files. The first half of the discussion was on the processing and mapping of records, following upon the talks given by Peter Gibbs and David McKay. The Chairman's opening remarks concerned personal involvement and the instinct for mapping before the computer stage, which needs encouragement by feed-back. Marine recording is the poor relation of terrestrial recording and the manpower resource will have to be used differently.

Norman Hammond of the Carlisle Natural History Society asked what PORCUPINE had to offer the amateur and queried whether the right approach was being made to them. A show of hands revealed that there was a large number of amateurs present.

John Cullinane then spoke on the Cork Harbour Survey, which is to continue for some years. He complained of the lack of attention to the botanical side of marine surveys and was glad to see that in PORCUPINE botanists were not neglected.

Steve Knight gave a dissertation on computer storage as a tailpiece to Harry Powell's talk. In describing the computer package that he has designed to process site information he stressed that only data entered into the system is retrievable and therefore it is important that no potentially valuable information be discarded in preliminary analysis. Alan Stubbs of the Nature Conservancy Council explained that its involvement with marine recording was new. BRC was involved in research, NCC in conservation. A total rethink on strategy was to take place with Roger Mitchell in charge of marine matters. Marine recording schemes were within the terms of contractual arrangements with BRC, who are now in a position to contemplate marine atlases for algae and littoral molluscs. Maps were obviously needed soon as feed-back or progress reports. It was necessary to think about the relationship of inshore and off-shore records. Data could be collected on any suitable co-ordinates. It was short-sighted to see the mapping and grid problems in a British context only, and he foresaw use of the UTM grid on a world-wide scale as it was already being used throughout Europe for terrestrial recording schemes. A computer can transfer data from one type of co-ordinate to another. However, he considered that the important thing was not the production of maps but the data bank to bring out habitat structures. Other speakers brought up such points as the necessity for the maximal use of minimal recording manpower; people want to know how the recording resource is distributed, i.e. by feed-back maps, and recorders would like to use the grid which will be used for the final maps; the nature of the information to be required by a data bank, whether in the form of master cards and/or site information.

After heated exchanges covering the desirability and necessity of grids and maps and the logistics and financing of recording, a resolution was passed establishing a sub-committee comprising Roger Mitchell (NCC), Phil Palmer (marine recorder, Conchological Society), Eve Southward (echinoderm recording scheme) and David McKay (PORCUPINE records convener) and convened by David Heppell (Royal Scottish Museum). This is to discuss all questions of marine recording and to gather comments from all interested parties. Marine recording was in its infancy and this was an opportunity to get it started properly on a sound basis. David McGrath stressed the importance of local species lists and suggested that there should be a more satisfactory way of publishing them than exists at present. He also pointed out that although people agreed with the ethos of marine recording they did not wish to see recorders' efforts being unacknowledged.

Eifion Jones pointed out that baseline surveys were in a sense misleading as they suggested a steady state. They provided useful indications of the fauna and flora of an area but by their nature obscured any indication of changes in

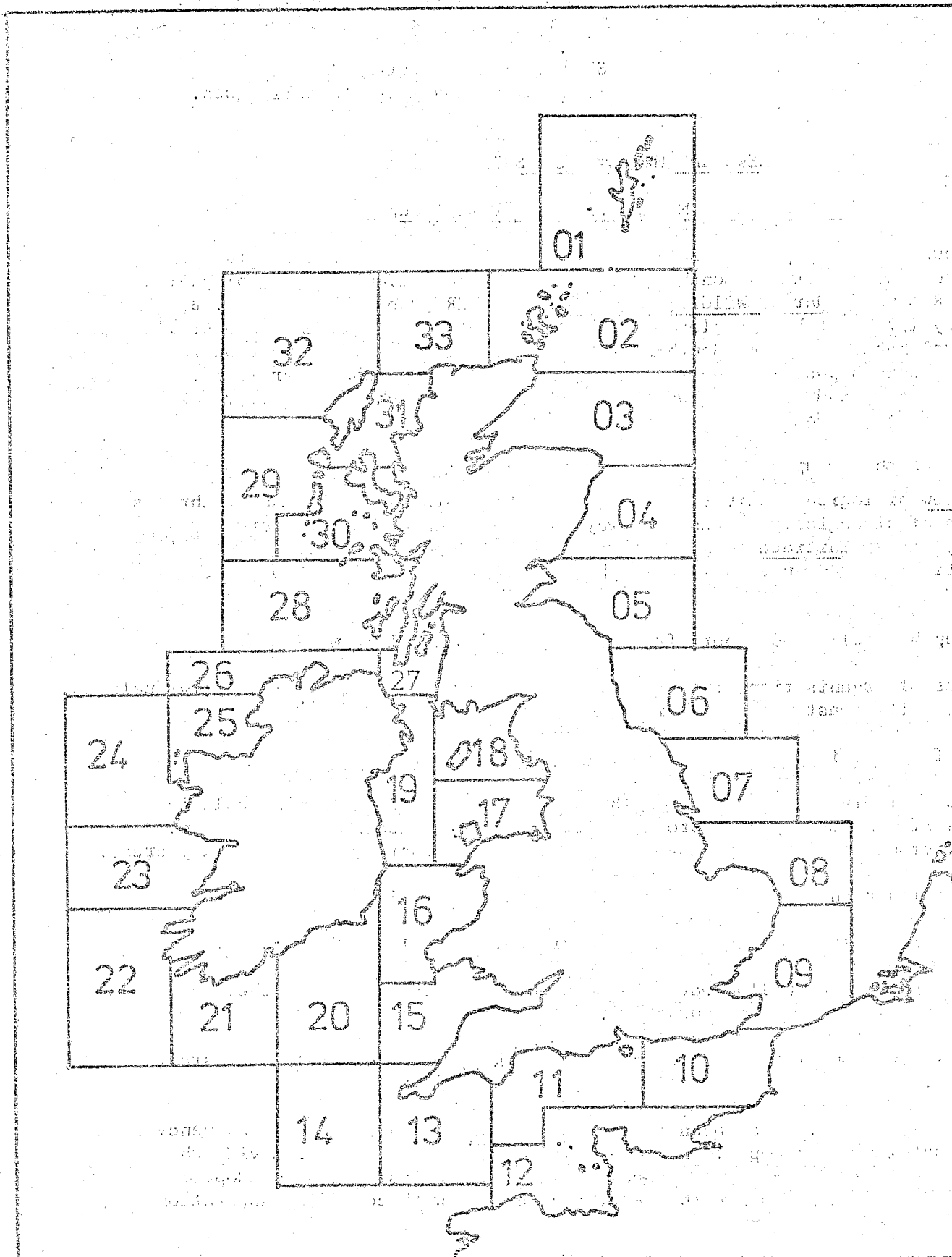


Fig 3 Sea Areas Porcupine Marine Natural History Society (www.pmnhs.co.uk) newsletter archive

its composition. They should be continued over a long period as possible and a single survey should not be used as an excuse for no further investigation of an area. This was generally accepted among scientists but it needed to be stressed to those who funded such surveys.

The discussion ended with considerable disquiet being voiced at the poor state of taxonomy in recording. This was in part due to insufficient supervision and training of recorders but mostly due to the inadequacy of keys and reference works.

Shelagh Smith (Chairman)

With acknowledgements to colleagues.

NEWS AND MEMBERS REQUESTS

The South-West Marine Biology Study Group

This Group of mainly professional biologists held its first meeting in April, 1975 and has met at six-monthly intervals since. Following the publication of the Clark Report on Marine Wildlife Conservation (NERC Publications, ser. B, No. 5, January 1973), it became clear that some form of central index of coastal and sublittoral habitats in the South-West is desirable, so that information is available for such purposes as public enquiries or statements about particular threats in the area, and so that a watch can be kept on the changing pattern of the wildlife of shores and shallow seas in the area.

The work of the Group can be summarised as follows:

"To review biological activity on coasts of the South-West as a whole, threats to sites of biological interest and ways of establishing various forms of control, and to initiate both a central collecting point for biological information and new surveys which might help fill the gaps as these come to light".

The Group has collected papers from its members on the following:

- i. Addresses of organisation, institutes, amenity groups, societies and individuals concerned with coastal conservation.
- ii. A list of sites of special interest in the South-West.
- iii. An account of diving activities in the South-West, including the circulation of Codes of Conduct, special projects, etc., the organisation of diving and the provision of centres and moves to establish underwater reserves in key areas.
- iv. A list of fauna and flora recording schemes, with examples.
- v. A survey of the literature on coastal marine biology of the South-West.
- vi. A list of shore and shallow-water species which are rare, or near their geographical limits in the South-West.
- vii. A list of developments and other activities likely to be harmful to coastal organisms.

Concurrently, a survey has been initiated by NERC and the Nature Conservancy Council on coastal habitat types, and a scheme has been devised to subdivide the coastline on a 'headland-to-headland' basis. This scheme has also been adopted by the Group, as well as by some other bodies concerned with coastal conservation.

- i. rocky shores
- ii. sandy shores
- iii. the sub-littoral

which are at present undergoing field trials. It is the Group's intention later to distribute final versions of these cards, printed on waterproof paper, for the use of amateurs and professionals, so that as full a picture as possible of coastal habitat types and the flora and fauna they support is collected centrally and processed. Similar groups elsewhere in the country are showing an interest in the cards, and eventually it is possible that other stretches of coastline of the British Isles, outside our area, may be recorded by techniques initiated here in the South-West.

Further details can be obtained from:

Professor D. Nichols, Department of Biological Sciences,
Hatherley Laboratories, Prince of Wales Road, Exeter.

Or Dr. N.A. Holme, The Laboratory, Citadel Hill, Plymouth.

Underwater Conservation Year: Species Record Card.

As a part of Underwater Conservation Year, David Erwin and I have undertaken to organise and design a sublittoral species record card. The two main aims of the scheme are firstly to involve 'amateur' divers in recording biological information underwater and secondly to obtain information of value in understanding the ecology and distribution of some of our common sublittoral species. The main species selected (23) have been chosen for their 'indicator' properties in relation to major sublittoral communities and environmental factors; they are all conspicuous and can easily be identified in situ. The species have been selected from the Algae and a number of different invertebrate phyla, and we are asking for both positive and negative records. For those groups with more experience in underwater biology (e.g., university diving groups) a second larger list of species is being compiled which includes locally important species. Whilst recognising that at present we are in an 'education phase' in relation to amateur divers and marine biology we hope that eventually this potentially valuable source of marine records will be realised. We hope to launch the scheme in March of this year, however we would welcome any comments members might have on the project.

Dr. Bob Earll, 26 South Drive, Chorltonville, Manchester 21.

The Norfed Marine Biology Group.

The media in their coverage of diving over the past few years have highlighted the incredible beauty of the undersea world and the organisms inhabiting it. This coverage has led to a heightened awareness among the diving community of the fascinating diversity of marine life in the waters around the British Isles.

Whilst in the past courses and projects have provided sports divers with a brief glimpse of marine life, there have been no continuity of approach which allowed divers to maintain their interest in Marine Biology. The NORFED Marine Biology Group are aiming to fill this gap by providing a continuing focal point for divers and non-divers alike to develop their interests in Marine Biology. Our aim is to enhance the enjoyment divers derive from marine life and to develop and cater for the wide spectrum of interests shown by our members. These interests range from close-up photography and keeping marine aquaria to projects involving the construction of an artificial reef.

The group was formed in January, 1976 and since its formation many important lines of contact have been developed. Group members are given priority on both introductory and advanced courses in Marine Biology at the University of Manchester.

The group has developed close links with the University of Manchester, Zoology Department where laboratory facilities and considerable technical expertise have been made available. Close liaison is also maintained with the NORFED photographic society. Monthly meetings concentrate in the winter months on dry meetings where speakers are invited to talk on topics related to Marine Biology. Our programme also includes weekend dives at Marine Stations and popular diving sites around the country. We have close contacts with the 'Identikit' scheme and we are taking an active part in "Underwater Conservation Year".

If you are interested in any aspect of Marine Biology come along to one of our meetings, you'll probably meet someone who shares your interests and we feel sure that you will enjoy your diving all the more as a result.

For further details contact: Mr. M. Smithies, 16 Cherrington Drive, Rochdale. Phone: Rochdale 341448.

Research in progress at Manchester

by F. AKBARIAN, P. DAY, W. NEWTON, C.W. PETTITT and T. WONG.

1. Experimental study of the uptake of 106 Ruthenium from seawater by Littorina littorea and Nucella lapillus.

A large fraction of the effluent from the Windscale re-processing plant consists of 106 Ruthenium (106 Ru) and the "critical pathway to man" that controls the overall permitted level of radio-active effluent is the amount of 106 Ru in the Cumbrian Porphyra used to manufacture laver bread in South Wales.

Recently the proportion of Cumbrian Porphyra incorporated into the bread has been reduced, and it is now being suggested that 137 Caesium via fish to man should now be taken as the critical pathway, thus allowing the overall level of radio-activity in the effluent to be raised. However, preliminary studies here and elsewhere have shown that winkles can concentrate Ruthenium greatly, and as these shellfish are still consumed by man in quite large quantities we felt the present investigation would be timely. It is hoped the results will also shed some light upon the rate and mode of the uptake in marine gastropods.

Three independent re-circulating tidal culture systems are in use, each containing some 900 specimens of both the gastropods under study. The seawater in each system has been treated to give 200 μ Ci activity 106 Ru per 25 gallons; Tank A has the metal in the nitroso-form, carrier free; Tank B as chloride, carrier free; and Tank C again as nitroso-complex but with added carrier, non-radioactive Ruthenium.

Sub-samples are being taken from these tanks every 14 days, dissected, and the level of 106 Ru in the various parts of the body determined. The experiment started in mid December 1976 and will run for some eight months.

As there was spare capacity in the culture system Nucella lapillus, chosen mainly because its feeding habits differ from L. littorea, was included in the study.

The work here attempted parallels and extends studies already done by other organisations.

2. A survey of Radio nuclides and Heavy metals in Littorina littorea from the eastern Atlantic.

More than 30 samples of 100+ adult L. littorea were gathered for us from around the coasts of the U.K. and Eire, and from the Atlantic coasts of Scandinavia and

Europe. As a preliminary step, we examined a sub-sample from each locality qualitatively to determine what fission products had been absorbed by the littorines.

Ten snails were taken at random from each sample, with no regard for sex or age. Most were stored in a freezer at 20°C for a short time before treatment. The animals were extracted by crushing the shells in a vice and the bodies dried for approximately 24 hours at 110°C in an oven before being weighed.

To standardize the geometry of the counting process the snails were then wet oxidized by heating with concentrated nitric and sulphuric acid, with perchloric acid added in stubborn cases. The resultant clear, colourless liquid was made up to a standard volume of 25 ml. before counting.

Gamma-spectra of the samples were then obtained using a germanium-lithium drifted detector, the counting time being 15 hours for each sample. A long counting time was needed so as to detect radionuclides present only marginally above background radiation level.

So far, samples from about 10% of the sites examined have been found to contain one or more radionuclides significantly above background level and this side of the work is now continuing in further detail. Analysis for heavy metal has been delayed pending the arrival of a new atomic absorption spectrophotometer, but this is now installed so this part of the project can now begin.

We would be pleased to hear from any members of Porcupine or their colleagues who may be interested to learn more of this work.

(Synopsis prepared by C.W. Pettit, 12th February, 1977)

Charles (Bill) Pettit (Manchester Museum) and Philip Palmer (BMNH) are working together on the Scaphapoda of the North East Atlantic. Both would be happy to identify well localised dry or wet preserved material sent to them, and even happier if they were allowed to retain the material for detailed study.

Tom Pain (London) and Philip Cambridge (University of East Anglia) are working on recent and fossil Neptunea and Colus in Britain and Northern Europe, and would be grateful for information on species of these genera from deep water, and especially for material for study including museum specimens.

Echinoderm Survey (see p.16). It is difficult to get up-to-date information about the commonest species. Would members care to answer the following question, without obligation to join any further in the survey: On any specified seashore known to you in 1976 or 1977, is the common starfish Asterias rubens abundant, common, rare or absent in the intertidal zone?

Decapoda Natantia: I am preparing new keys for this group, and would welcome material from the shore and sublittoral around the British Isles. I am willing to identify and return material if desired.

G. Smaldon, Royal Scottish Museum, Chambers Street, Edinburgh.

Limulus polyphemus, in North European waters.

We have received the following letter from Torben Wolff -

Dear Sir,

In the later years I have obtained information about the following findings of adult specimens of the East American Horseshoe (King) Crab, Limulus polyphemus, in North European waters:

North Sea (?), 1974

German Bight (Friesian Is.), 1972, trawler, taken alive

Off Fano, SW Denmark, 1975, trawler, taken alive

NW Jutland, beach, 1971 and 1972

N of Skagen, 1972, trawler (with Nephrops)

Gothenburg, 1974, near beach

Near Laeso, N Kattegat, 1968, 1975, trawler

Swedish west coast, 1969

N coast of Zealand (Sjælland), 1975, beach.

I wonder whether you or your colleagues are aware of any findings at the British Isles. If so, I shall be extremely grateful for as many of the following data as possible:

- 1) Exact locality
- 2) Depth
- 3) Date
- 4) Collecting gear
- 5) Caught alive or dead; if alive, where deposited
- 6) Length and width of body (excl. spine)
- 7) Other relevant information.

There can hardly be any doubt that live specimens were brought over by man and released here. But considering the known stationary character of both larvae and adults in East America, the recorded wide distribution (Friesian Is., all the way round Jutland to North Zealand, at least 800 km is very intriguing - unless of course those releasing the specimens did this in several widely scattered places which seems unlikely.

Yours sincerely,

TORBEN WOLFF.

Anyone with any information about distribution of this species could they please contact Dr. Wolff at the Universitetets Zoologiske Museum, Universitetsparken 15, 2100 København Ø, Denmark, and/or inform the Editor of the Newsletter.

Distribution of Marine Porcupines

Early records suggested a northern and western distribution for the Marine Porcupine, but lately a considerable number of southern records have been sent in. A full list of records will be issued with the June Newsletter but a summary of results to date is given below. Any additional records will be gratefully received by the Hon. Treasurer; recording forms are available from David Heppell, Royal Scottish Museum, Edinburgh EH1 1JF.

Known distribution as at 23 February 1977 (100 records): Scotland (39), England (27), Irish Republic (11), N. Ireland (5), Wales (4), France (4), Germany (4), Netherlands (2), Channel Is. (1), Belgium (1), Norway (1), Sweden (1).

Members may be interested in the following Newsletters and may wish to contact the people below for further particulars.

Editor of Amphipod Newsletter:

Wim Vader
Tromsø Museum
N-9000 TROMSØ
Norway.

Polychaeta - A newsletter of Polychaete Research

David Dean, Editor
Professor of Oceanography and Zoology
Director, Ira C. Darling Center for Research, Teaching and Service
University of Maine at Orono
Walpole
Maine 04573, USA.

Forthcoming Events

27th August - 3rd September, 1977 at Orkney Field and Arts Centre, Birsay.
Supplementary meeting in the form of a field course on littoral fauna and flora particularly on rocky shores (also diving). Organised under the auspices of BRISC (Biological Recording in Scotland Committee) by David Heppell, Royal Scottish Museum, Chambers Street, Edinburgh, from whom further details are available.

Marcus Wallenberg Foundation
For International Co-operation in Science
Address: Box 16067 S.103 22 Stockholm

The Kristineberg Centenary Symposium on Deep-Sea Faunas - History, Differentiation and Adaptation is to be held on August 14th - 17th, 1977. The venue is The Kristineberg Marine Biological Station, Sweden.

A Symposium on The Deep Sea - Ecology and Exploitation is to be held on August 10th - 13th, 1977. The venue is The Grand Hotel, Saltsjöbaden, near Stockholm.

The Malacological Society of London

- 18 - 19 May 1977. Evolutionary Systematics of Bivalve Molluscs.
Joint meeting with the Royal Society.
Carlton House Terrace.
- 12th October 1977. Diving for Marine Molluscs in East Africa.
Mr. Gregory H. Brown.
Department of Zoology, Bristol University, 2.30p.m.
- 12th November 1977. Estuarine Molluscs in Science and Commerce.
Joint meeting with Estuarine Biological Association.
Bedford College, London, N.W.1.
- 7th December 1977. The Live Mollusca of the Kenya Reef.
Mr. F. Pinn.
Royal Veterinary College, London, N.W.1, 5.30p.m.

ALL who are interested are very WELCOME to attend.

The sixth congress of the UNITAS MALACOLOGICA EUROPAEA will be held in Amsterdam at the Free University in the period 15-20 August, 1977.

For further information apply to:-

Kongresbureau V.U., De Boelelaan 1105, Amsterdam - The Netherlands.

12th European Symposium on Marine Biology
Stirling (Scotland) 5th - 12th September 1977.

Preliminary announcement

Due to circumstances beyond the control of the committee it has not proved possible to hold the 12th EMBS at Kiel as expected. The venue has been transferred to the University of Stirling, Scotland, where the symposium will be held from Monday 5th September to Monday 12th September 1977.

Theme: Physiology and Behaviour of Marine Organisms.

The Biological Curator's Group, Geological Curator's Group and Systematics Association.

The Function of Local Natural History Collections

A conference will be held at the University of Liverpool Halls of Residence 22/23 September 1977.

Further details, programme and registration form are available from:

Mr. E.F. Greenwood,
Assistant Director (Academic),
Merseyside County Museums,
William Brown Street,
Liverpool L3 8EN.

Nature Conservancy Council/Royal Society of Edinburgh

Symposium: The Natural Environment of the Outer Hebrides. Tuesday, 11th and Wednesday, 12th October, 1977.

For further information apply to:-

Dr. J. Morton Boyd,
Nature Conservancy Council,
12 Hope Terrace,
Edinburgh 9.

Limulus in the Mediterranean

Geoff Smaldon informs us that Limulus occurs in the Mediterranean around Malta. David Heppell suggests that he comes north for the warm summer!

Caryophyllia smithii

I would be very grateful to Porcupine members who have records of the Devon Cup Coral Caryophyllia smithii from the continental shelf, coastal and inshore waters, West and North of Scotland, the North Channel and the North and West of Ireland as far South as 54° 40' N, if they could send details of the records to me,

John B. Wilson,
Institute of Oceanographic Sciences,
Wormley, Godalming, Surrey, GU8 5UB.

Those records that I knew about in 1974 were published in 1975 (Journal of the Marine Biological Association, Vol. 55, pp. 611-625). Since then, some additional offshore and inshore records have been obtained. It is hoped to publish these soon. Any additional records would therefore be most useful and would of course be fully acknowledged in the paper.

The Editor is at present working on Cephalopods from British waters and would be grateful for any distribution records together with ecological notes and specimens if possible.

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