

COURSE IN SUBLITTORAL MARINE ECOLOGY LUNDY, JULY 28—AUGUST 11

For two weeks in 1974, nine hardy students were exposed to just about every sort of weather Lundy has to offer and to just about every type of equipment and most of the methods available for carrying out basic ecological work underwater. The idea of the course was to train students in the techniques of working underwater and in the concepts of sublittoral ecology so that they will be able to plan ecological projects of their own without having to rely on trial-and-error. Keith Hiscock, Richard Hoare, Stewart Willis, David George, Ed Drew and Jim Atkinson were the lecturing staff. Operating from the laboratory in the old Hotel kitchen and from the beach diving hut, instruction was given in the use of techniques of descriptive biological survey, quantitative sampling, photography, and the use of suction samplers, a towed sledge, underwater tape recorders, SubCom wireless communication gear, grids and tapes for survey and mapping, resin casting for decapod burrows, profiling, mapping zonation and other techniques too numerous to mention here. The lectures covered the ecology of rock and soft substrate animal communities, plant communities, pollution and conservation, techniques of sampling, activity rhythms, etc. Lundy proved to be an excellent locality at which to run the course and, in spite of winds coming from every direction over the two weeks, it was possible to dive somewhere every day.

KEITH HISCOCK

THE OCCURRENCE OF SOME TRACE METALS IN ORGANISMS COLLECTED FROM LUNDY

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Introduction

In recent years the need has been recognised for more systematic information on the natural or background concentrations of various trace chemical elements in marine organisms, water and in sediments. This information is particularly needed for those chemical species which are being increasingly mobilised or introduced by man's activities on global or local scales. It was considered of interest to obtain some preliminary information on the concentration of mercury, together with some other trace metals, in typical organisms collected from Lundy, which represents a near-shore environment intermediate between coastal and oceanic conditions. These measurements also give background data against which subsequent changes in concentration can be assessed. The concentrations of copper in these organisms have been reported previously (Jones *et al.* 1973).

In the present work the concentrations of mercury, arsenic and cadmium were determined by neutron activation analysis. The methods of collection and analysis, together with a more detailed discussion of the results have been reported elsewhere (Jones, in press). Only a summary is given here.

Results

The concentrations of trace metals in the organisms studied are given in Table I. All values are on a dry weight basis and are for whole organism material without shells, unless otherwise stated.

Mercury

Concentrations of mercury range from 0.10-2.9 ppm. These values are in good agreement with the range of concentrations in a number of coastal organisms, collected mainly from the Solent region (Leatherland and Burton, 1974). The present results closely follow the range of levels detected by other workers in the U.K. for organisms collected from estuarine and coastal regions. In some near-shore environments elevated levels of mercury can arise from sewage discharge (Klein and Goldberg, 1970; Cranston and Buckley, 1972), but most of the data quoted for organisms have been considered to represent background or near background levels.

Arsenic

The levels of arsenic range from 2.2 to 68 ppm, the highest concentrations occurring in the crabs, *Macropipus puber*, and *Cancer pagurus*. Comparisons for this element are limited since few determinations have been made by modern methodology. Elevated concentrations occurred in the gills and ovary of the scallop, *Pecten maximus*, as was the case for mercury. In the limpet, *Patella vulgata*, the concentration was higher than recent results reported by Peden *et al.* (1973) for limpets collected from the Somerset coast of the Bristol Channel.

Cadmium

Concentrations of cadmium ranged from 0.13 to 22 ppm. The relatively high level in *Patella vulgata* is in agreement with other workers findings for this region.

Conclusion

In summary the levels of mercury, arsenic and cadmium in marine organisms collected from Lundy do not appear to be affected by localised artificial sources of these elements.

Acknowledgements

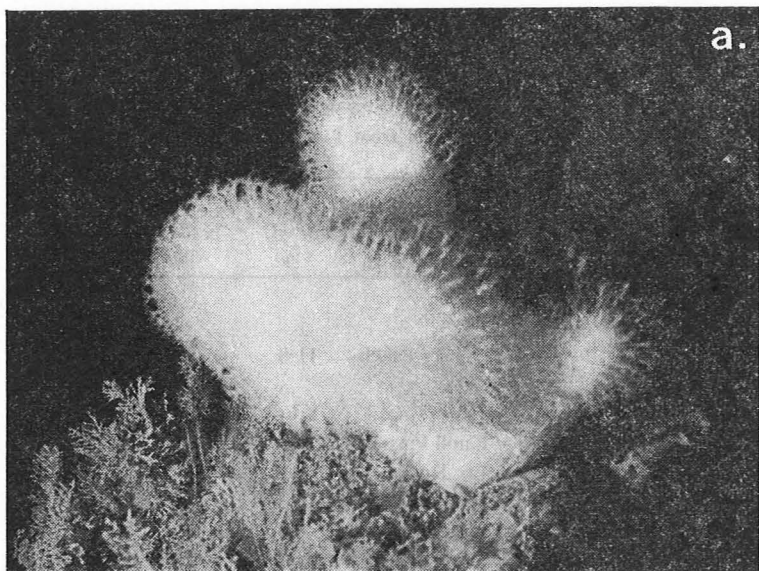
This work was supported by the Lundy Field Society. Specimens were collected by David Lane and the underwater photographs were taken by Keith Hiscock. I am indebted to Dr J. D. Burton for discussion and criticism of the manuscript.

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Table I. The Concentration of Mercury, Arsenic and Cadmium in Selected Organisms Collected from Lundy.

Species	Area collected	Dry wt. (%)	Concentration		
			Hg	As	Cd
(ppm dry weight)					
ALGAE					
CHLOROPHYCEAE					
<i>Enteromorpha compressa</i>	Quarry Beach	11.8	0.78	2.2	—
ANTHOZOA					
<i>Alcyonium digitatum</i>	Knoll Pins	19.8	0.11	18	—
<i>Alcyonium digitatum</i>	Lee Rocks	13.3	0.16	12	—
<i>Alcyonium glomeratum</i>	Quarry Beach	21.7	0.14	—	—
<i>Alcyonium glomeratum</i>	Knoll Pins	26.4	0.18	7.3	—
ECHINODERMATA					
<i>Marthasterias glacialis</i>	Quarry Beach	36.3	0.27	8.9	0.13
<i>Holothuria forskali:</i> Gut	Gull Rock	11.6	0.29	37	—
MOLLUSCA					
<i>Pecten maximus:</i>	Knoll Pins				
Adductor muscle		24.6	0.17	14	0.47
:Gills		11.9	0.75	35	—
:Vellum		20.4	0.12	18	0.54
:Ovary		32.3	0.30	37	1.57
<i>Nucella lapillus</i>	Quarry Beach	34.5	0.35	37	—
<i>Patella vulgata</i>	Quarry Beach	23.4	0.10	23	22
ARTHROPODA					
<i>Macropipus puber:</i> muscle	Quarry Beach	20.8	0.87	68	—
<i>Cancer pagurus:</i> muscle	Knoll Pins	20.9	0.75	68	11
<i>Palinurus elephas:</i> muscle	Lee Rocks	20.0	2.9	38	4.4
hepatopancreas		48.0	0.34	21	9.9



0.10	8.9	0.21	20.3	Quartz Beach	Alcyonium digitatum
—	37	0.29	11.0	Gull Rock	Alcyonium glomeratum

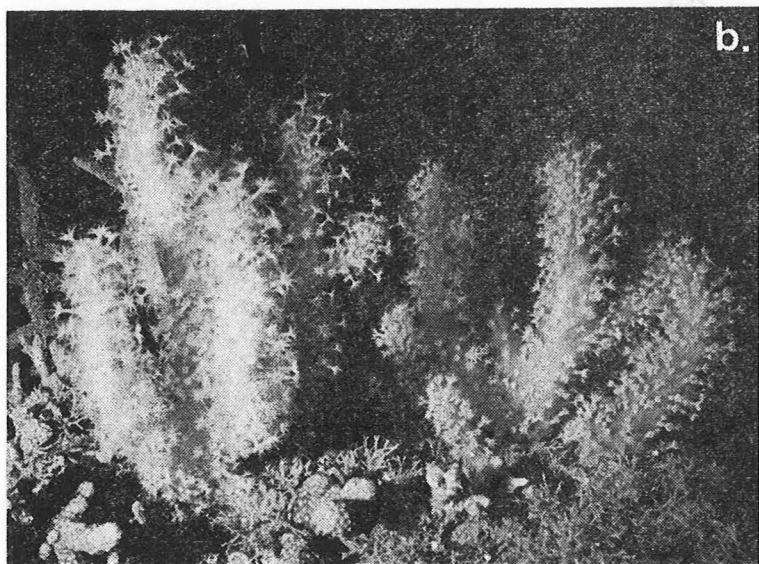


Plate I. Two of the species used in the analysis for trace metal concentration. (a) *Alcyonium digitatum*, (b) *Alcyonium glomeratum*. Collected from Knoll Pins at a depth of about 20 m.