

THE CONCHOLOGISTS' NEWSLETTER

No. 108

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

March 1989

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Market Harborough,
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Produced by THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

THE FUTURE OF CONCHOLOGY

(based on a Presidential address, March 1988)

I. INTRODUCTION

With some trepidation I have called this article "The Future of Conchology". It is aimed at giving you, the members, an opportunity to think of how your interests and the activities of the Conchological Society might develop in the coming years and of what part you wish to play.

Firstly it looks at what is meant by Conchology, that is the type of activities it embraces; secondly at some of the achievements of Conchology, both in general and with reference to the activities of the Conchological Society and its members, and finally it attempts to extrapolate from these achievements to what conchologists might do in future.

II. CONCHOLOGY

Chambers's Twentieth Century Dictionary defines "Conchology" as (simply) "the study of molluscs and their shells" and "Malacology" as "the study of molluscs". The addition of "and their shells" is not important, though in this country there have been differences in emphasis between the activities of the Conchological Society with its interests in shells, molluscan distribution, and ecology (which do not generally demand special facilities) and those of the Malacological Society which has given more attention to molluscan anatomy, physiology and behaviour, where institutional laboratory facilities are more necessary.

We will never know who the first conchologist was, though the use of shells for ornament goes back at least as far as cave-dwellers in the Dordogne 30,000 years ago as Peter Dance points out. (A History of Shell Collecting, E. J. Brill, 1986). In his Presidential Address on the Evolution of the Conchologist ten years ago (*J. Conch. Lond.* 29(8):329-332) Peter Negus suggested two motivations for early conchologists which I cannot better: "Can my girlfriend wear it?" and "will it bring me good luck or protect me from the Evil Eye?" It is doubtful if the latter any longer applies but it is now certain that collecting shells and studying molluscs is a world-wide activity occupying people from many countries and walks of life (despite the impression that persons of Western European origin have comprised the majority of conchologists in the past).

Not only is the geographic spread of the study remarkable, the range of interest of conchologists is so also. Some collect shells for their beauty and variety of shape; others seek new or rare specimens - the quest for novelty and rarity has had an important formative effect on the study of molluscs, the literature on them, and on some approaches to molluscan taxonomy, not to speak of shell values. Land,

freshwater and marine molluscs all have their enthusiasts. Others have a less habitat-based approach and specialise in particular groups, say a class or a group of families. Popularity seems to be somewhat related to the variety available. Gastropods seem to be especially favoured but relatively few people (all experts) are interested in opisthobranchs, Chitons and Scaphopods unfortunately much less so. Fossil molluscs do not generally attract as much attention as living ones, but many conchologists have at least some interest in them. Some are more interested in the field work needed to study or acquire molluscs than in curation of a collection and writing up results. Others become enchanted by conchological literature, shell artefacts and mollusc-related curiosities. In fact nearly all of us are interested in several aspects of Conchology. Most of these centre round 3 questions:

1. What species is this and how does it relate to others?
2. How does it function?
3. Where do molluscs live? (What was it like in the past? Is the pattern changing?)

III. ACHIEVEMENTS

Turning to achievements and the first question, even such early writers as Lister (Historia Conchyliorum, 1685-92) and Rumphius (Amboinische Raritetkamer) were considering these points. Although no-one could pretend that a complete answer has been achieved, an enormous amount of effort, excellently summarised by Peter Dance's book "A History of Shell Collecting", has been concentrated on descriptive work. Estimates of the number of molluscs vary; Peter Dance (op. cit) puts the total of recent species described by 1900 at about 50,000 which he qualifies by a probably conservative 1971 estimate of 46,810. On the other hand Alan Solem (The Shell Makers, Wiley-Intersciences, 1974) gave 100,000 living and 20,000 species of fossil molluscs, but does not say whether this is those described or give a basis for the estimate and the fossil total appears to be low. Whichever estimate is closest to the truth this amount of description is clearly a major achievement.

The second question "How?" seems generally to have excited the conchological mind much later than "what?". Even though Jan Swammerdam dissected snails and drew their anatomy in the 1660s (Solem, op. cit), the development of literature on molluscan anatomy and physiology does not seem to have accelerated until the growth of zoology as a science in the latter part of the 19th. Century, somewhat after Darwin's Origin of Species was published in 1859. One way to illustrate this in non-scientific fashion is to compare the date distribution of the references in Fretter and Graham's Ray Society Monograph on Prosobranchs (1962) with similar data on the references in Dance's History of Shell Collecting. Most of the Fretter and Graham references were produced after 1880 while those in Shell Collecting reflect relatively steady production extending back into the 18th. Century and earlier. Figures given by Solem (op. cit) reflect the growth of work on function (as well as descriptive and biogeographical papers) and demonstrate how the production of papers on molluscs has increased to over 2,000 per annum with only temporary slowing down during the 2 World Wars; Solem estimated that between 94,400 and 100,400 papers on molluscs were produced up to 1972.

This aspect of molluscan studies has by now determined all the major features of molluscan anatomy, reproduction, development, functioning of the nervous system and parasitology. (Some aspects of such studies, like those on the nervous system of Aplysia are aimed at having a much more general application than purely the study of molluscs and I would not really count these as 'Conchology'.) However much still remains to be done in this general field as very little is known, in detail, of the anatomy and functioning of most species of living mollusca.

Thirdly although "where do molluscs live?" may have started simply as informa-

tion needed by collectors in order to acquire more specimens, it has become important not only as part of biogeography in general but also for molluscan conservation. In these times of rapid modification of our environment we need to know where species live, under what conditions, and what changes are taking place in order to make conservation measures or persuade others to do so.

It is arguable that the most important corporate achievements of the Conchological Society are its accumulation and publication of distributional data. The Society's work on the distribution of non-marine molluscs in Britain, first as a vice-comital census beginning in 1881 (Crowley, 1975, J. Conch. Lond. 28(5): 265-294) and later on the basis of a 10 Km grid has been clearly and thoroughly described by Michael Kerney (1967, J. Conch. Lond. 26(3): 152-160 and in January 1988's lecture). Study of the distribution of the marine mollusca of the British Isles started later, the Society's first Marine Recorder being appointed in 1924, and this work is of course not as easy as non-marine recording as access to living sublittoral marine mollusca requires special facilities, but the Society has been able to produce the Sea Area Atlas under the leadership of Dennis Seaward and his predecessors and with help from the Nature Conservancy Council. This atlas clearly shows the major features of past and present distribution round the British Isles.

The last achievements of Conchology are much more intangible. These are the bringing together of like-minded people by means of this Society and others here and abroad, and such international bodies as *Unitas Malacologia*; the exchange of ideas and discoveries which meetings and publications enable - Newsletters are as important as Journals in this respect - and the combination of stimulation and relaxation that these activities produce. Without these invisible "achievements" there would be no Conchology such as we know and love.

IV. THE FUTURE

So, what of the future? There is no indication that the answer to "What is this mollusc?" is anywhere near complete. Not only are there habitats which are incompletely explored such as bathyal and abyssal waters - see for example Metivier on bathyal Nuculacea of the Azores (1982, J. Conch. Lond. 31(1): 39-44), the Persian Gulf (Kathleen Smythe, 1979 J. Conch. Lond. 30(1): 57-80) and land areas like NW Australia (e.g. Solem, 1984, J. Malac. Soc. Aust. 6(3-4): 155-180), but also new discoveries are being made near at hand. Stella Davies's papers on Arionid slugs (1979, Segregates of the *Arion hortensis* complex with description of a new species *Arion owenii*, J. Conch. Lond. 30(2): 123-128 and 1987, on *Arion flagellus* and *A. lusitanicus*, J. Conch. Lond. 32(6): 339-354) show that discoveries on identification are still to be made in Britain. There is no sign of a slackening in the steady flow of other taxonomic papers many of which describe new species and elucidate taxonomic work already done (like Graham Oliver's recent, May 1987, papers in J. Conch. Lond. 32(5): 263-278, 279-288 on *Noetellia* and on *Estellacar* and *Rectangulacar* which relate Recent and fossil species, and David Holyoak's 1986 work on Maltese Clausiliids (J. Conch. Lond. 32(4): 211-220). For those with the skills and the time for taxonomic work there is enough to do for many years ahead. I am sure new techniques will be developed or applied, but also old techniques such as detailed shell measurements (dangerous in the hands of such as Bourguignat) can be used with care to provide new insights into relationships. For example careful measurement of the Turrid posterior sinus has been used by Carole Hickman (1976, Bull. Amer. Paleont. 70(292): 11-119) to establish species and higher relationships in NW American early Oligocene turrids.

What is however unlikely to happen as a precursor to descriptive work is a matching of the levels of collecting activity and volume of material acquired by the early collectors and placed in museums. This is not to dismiss collecting as a hobby for the future as it seems to be an innate part of human nature (I am addicted) and is not to be under-estimated as a source of pleasure and relaxation.

For descriptive and taxonomic Conchology perhaps the most revolutionary technical aid that has been developed in the last 20 years is the use of the Scanning Electron Microscope. This has opened up a whole new world of detail on shell sculpture and construction, on the beauty of "micro-molluscs", and on the complexity and adaptation to purpose of the radula. All of this can be seen with marvellous clarity without the limitations of a shallow depth of focus imposed by conventional optics. SEM photography is here to stay. "Professional" workers with access to SEM equipment will continue to make outstanding use of it and I would hope that facilities will become more available to non-professional conchologists in the not too distant future.

The answer to "How does it function?" will undoubtedly continue to be refined. I believe that this work will look increasingly at elucidating modifications of mollusca in relation to specialised ways of life. Recent examples of such work are Morton's work (1984, J. Conch. Lond. 31(3): 359-372) on the adaptation of the Pandorid bivalve Frenamya ceylandica to life on the surface of soft muds and observations on Solemyidae which have reduced alimentary tracts by Reid and Brand (1987, J. Malac. Soc. Aust. 8: 41-50) who examined 2 Australian solemyids in which symbiotic bacteria contribute to the acquisition of nutrition by the bivalves.

Like distributional and ecological Conchology this sort of work can assist conservation of molluscs since it will help us to understand the relationship between how a particular species has evolved and its environment and, hence, how vulnerable a species is to a change of environment.

On "where does it live?", I am sure that distributional and ecological Conchology is a growing field which will enable many, who are not necessarily professional scientists, to contribute to Conchology in the future. The Conchological Society must continue the national surveys on which we have already achieved so much. The deliberate revision and periodic reissue of the marine and non-marine atlases will enable monitoring of general trends: both reductions in occurrence (like the declining frequency of Helicella itala and Helicigona lapicida in parts of Britain) and the spread of new arrivals (non-marine examples include Boettgerilla pallens and Deroceras caruanae whose dispersal requires explanation, how does B. pallens, which is largely subterranean in habit, get into Gloucestershire beechwoods?).

One area of distributional work, which the Conchological Society should consider as an extension, is more specific studies of species which are significant because their status within Britain is changing, perhaps to the point where they are at risk of extinction. On the marine side something of this approach is developing in relation to Truncatella subcylindrica. For non-marine molluscs such species as Segmentina nitida and Lymnaea auricularia are possible candidates.

It is not only at a national level that such work should proceed. Tetrad mapping has been completed for the Isle of Wight and is in progress elsewhere (for example Suffolk and Bedfordshire). Though mapping at this level of detail is too big a task to be organised centrally by the Conchological Society, individuals and small groups should consider doing it on a vice-comital basis. Other smaller area studies could be devoted to specific questions like David Holyoak's 1978 study on the effect of pollution on Balea perversa's distribution in the Brighton area (J. Conch. Lond. 29(6): 319-324).

On even smaller areas there is much that individuals can do to assist in, and give advice to, conservation studies. Detail, say down to a level of 100 metre squares, can be illuminating and of assistance in site management - for instance where was Zenobiella subrufescens found in a wood, which will at least indicate areas of known molluscan interest. More could also be done by combining informa-

tion from molluscan distribution on a site with that on other species, such as how bank clearance combined with dredging along part of a disused canal is reflected in the distribution of the Whitethroat and Physa fontinalis. Nor need this type of recording be confined to non-marine sites; it can easily be extended to littoral sites and (with diving or dredging) off-shore. Furthermore it is a type of work that can be used to introduce and encourage young people and new members to conchology.

The most precise type of distributional study is that undertaken to study the precise environment of species. Such work is not new, but it continues to develop and I am sure that it will be extended in future. Recent examples include Richard's paper (1985, J. Conch. Lond. 31(4): 207-224) on molluscan zonation on rocky shores in Malta, and papers by Clarkson and Shepherd and Kargas and Shepherd on Chiton and Archaeogastropod distribution on boulders on a southern Australian shore (1985, Proc. Malac. Soc. Aust. 7 (1-2): 35-44, and 1984, 6 (3-4): 101-112).

For the future of Conchology at an international level, I would hope to see more co-operative work to produce, say, a European atlas of non-marine mollusca, continuing what has been achieved already. I am sure that bodies like Unitas Malacologia, the Conchological, Malacological and kindred societies, with their publications, will play an important part in the international exchange of learning and ideas on Conchology.

Finally, even those of us (not me) who are paid for it regard Conchology as a provider of enjoyment, wonder at the beauty and diversity of molluscs, and of relaxation and companionship. This has been an important achievement of Conchology and I fervently believe that it will continue to be so in future.

My thanks to: my wife Pat for her patience while I produced this, to David Holyoak for advice on the draft, Peter Dance and to all the many contributors to literature from which I acquired facts and ideas.

David Long

A CAPTIVE BREEDING PROGRAMME FOR SEYCHELLES SNAILS

In August 1988 I started a captive breeding programme for the land and fresh-water snails of Seychelles. At present this involves only a small number of species kept in four aquaria and vivaria. I intend to expand this in the near future to cover all endemic and indigenous species of Seychelles snails. The aims and progress to date of this programme are briefly described below:

1. Aims

These are to provide a captive nucleus of all forms (species and geographical races) found in Seychelles to act as a safeguard against possible future extinctions. The project will also enable research into the ecology and behaviour of the snails to be undertaken. The snail fauna of Seychelles is almost, if not completely, intact with only two or three possible extinctions. These species may be found to survive in unstudied areas. This situation may change in the near future. The main threat is that of the presence of the introduced carnivorous snail Euglandina rosea, if this species expands its range there is little doubt that many endemic species will follow many of the Pacific tree-snails to extinction. For this reason effective conservation measures for endemic forms are urgently required. Research into the ecology of snails is vitally important if key populations are to be protected. Research with captive populations is the only practical way to obtain the required information. Determining the ecological requirements of the snails is a long-term

project but is no less important than the basic captive breeding programme.

2. Progress of the captive colonies

2.1 Species

At present the following species are being maintained:

Streptaxidae - Edentulina dussumieri

Zonitidae - Pilula mahesiana
Kaliella subturritula

Acavidae - Stylodonta unidentata

Enidae - Pachnodus niger
P. velutinus
P. niger x velutinus (natural hybrid)

Helicinidae - Helicina theobaldiana

Viviparidae - Cleopatra ajanensis (f. silhouettae)

Thiariidae - Melanoides tuberculata

Lymnaeidae - Lymnaea mauritiana
L. natalensis

Planorbidae - Gyraulus mauritanus

2.2 Methods

The pond snails are all kept in a community aquarium with several very young exotic but widespread fish (Tilapia mozambica).

The land snails are kept in three vivaria, one with E. dussumieri, one with K. subturritula, H. theobaldiana and a mated pair of P. niger and P. niger x velutinus. The third contains S. unidentata and the remaining Enidae. All three contain large populations of the small P. mahesiana. This last species provides a food source for very young Streptaxidae and help to ensure that excess wastes are removed or recycled. I intend to separate out the species of Pachnodus in the future to maintain separate colonies of P. niger, P. velutinus and P. niger x velutinus. There is no conservation justification for separating the species as hybridisation is occurring naturally in all areas. The species will be maintained separately for research purposes only.

The vivaria have gravel bases for drainage and are planted with ferns and small creepers. A thick layer of leaf litter is also provided for shelter and as a supplementary food supply.

2.3 Diet

All species are fed a basic diet of paw-paw fruit (Carica papaya) smeared onto the sides of the vivaria. Ground egg shell is periodically added to the fruit as a calcium source. Pieces of egg shell are also left in the vivaria for the same reason. This diet is suitable for both herbivores and carnivores. The carnivores are also given small Achatina spp. as an extremely abundant exotic prey species.

2.4 Breeding

In the month following the establishment of the colonies the following species were observed mating:

P. niger with P. niger x velutinus, P. niger (pure pair), E. dussumieri.

Births/eggs are expected from these species towards the end of 1988. The common Pilula mahesiana has bred well in all three vivaria.

In the aquarium the following have bred:

Melanoides tuberculata, Gyraulus mauritianus, Lymnaea sp. (one or both species).

3. Further work

I intend to expand the colonies maintained to include all Seychelles species, hopefully I will be able to collect most species during 1989. It is also my intention to widen the scope of this project to all threatened land snails from tropical island groups. The conditions in Seychelles are typical of such islands, this means that no special temperature/humidity controls are required and this would avoid many of the problems the Partula breeding centres have had in temperate climates.

The urgency of the need for such a captive breeding centre cannot be stressed too often. A large number of snails are known to have become extinct in recent years. This number is insignificant when compared to the number of species in grave danger of extinction. The vast majority of these species are from tropical islands, over the next few years the snail fauna of the tropics may well be seriously depleted.

Justin Gerlach

OBSERVATIONS ON THE FRESHWATER MOLLUSCA OF SOME CHESHIRE MARL-PITS

OVER FORTY-FOUR YEARS

Summary. A 17-year survey of the freshwater Mollusca of marl-pits in part of the Wirral peninsula of Cheshire has been published (McMillan 1959, 1963). The survey has been repeated on a smaller scale in 1974-84 and the results are here presented. Changes in the molluscan fauna are noted and discussed.

INTRODUCTION

There are few studies of changes in the molluscan faunas of ponds over a long period. More than forty years ago I began to study the molluscan faunas of the water-filled marl-pits around Bromborough and adjacent areas of Eastham, Raby and Thornton Hough, all in the Wirral peninsula of Cheshire (see sketch-map McMillan 1959): a 17-year study of the Mollusca of some two hundred such ponds yielded interesting results. In subsequent years observations were made as opportunity allowed although a depressingly large number of the studied ponds had disappeared. However, it was felt that a follow-up of those ponds which had survived would be of interest and accordingly this account was compiled.

It had been hoped to use some of the data gathered by a Manpower Services team

which in 1981-82 had made a survey of Merseyside water-bodies in public ownership. Their data were deposited in the Data Bank of Liverpool Museum. Unfortunately the information available was unclear and it was not found possible to utilise it.

Elton (1933, p.23) has raised the question as to whether the species composition varies not only spatially but also from year to year and therefore an ecological survey based on the results of ten years' collecting might give a somewhat misleading picture of the total number of species ever present in one year. Nevertheless, it was decided to use the results obtained over the eleven year period of 1974-84. This included the abnormally dry (drought) years of 1975 and 1976 as well as the very wet spring of 1983. Occasional notes made in 1985-87 have been used but are not included in the tables of species set out on p. 159 nor in the calculations of molluscan losses and gains.

The molluscan names used are those of the Atlas of the non-marine Mollusca of the British Isles (ed. Kerney), 1976.

THE HABITAT

Marl-pits were dug to get "marl" (clay, more or less calcareous) with which to dress and improve land for agricultural purposes (see Davies 1960, p.110). The pits were usually fairly deep (20 ft. or more in some cases) and are characterised by a sloping side where the waggons were loaded and a vertical face where excavation ceased. Those studied ranged in size up to nearly half an acre in area. It should be emphasised that marl-pits are necessarily "closed" ponds without inflow or outflow and independent of the natural drainage.

Cheshire is strewn with such pits, now mostly water-filled and serving as watering-places for livestock. Latterly, with piped water readily available the pits were not needed and often filled in deliberately or used as rubbish tips.

In Cheshire the practice of marling seems to have fallen into desuetude about the eighteen-eighties, lingering longest in the sandy area of Delamere (Strahan 1882, pp. 34-5). Most of the local (i.e. Bromborough) pits seem to have been dug about the time the open fields were enclosed (see McMillan 1959, p.301) more than two hundred years ago. Few, however, can be dated with any degree of accuracy. Extracts from Bromborough Manor Court Papers show that in 1719 Thomas Cooke was fined for washing his sheep in "ye Rake Pitts" and a trespass on Wetcroft Pit in 1739 is mentioned. Pits beside the Rake, an ancient Bromborough lane, survived until the nineteen-twenties (F. O. Jones, pers. comm.). A group of fields all called Wetcroft on a Mainwaring Estate map of c. 1731, and now metamorphosed into Croft Avenue, Bromborough, held several pits until about 1945 and one (Woodslee Pond) survives. On this Mainwaring Estate map (which covers much of Bromborough parish) forty-two pits are marked; of these twelve were extant in 1940 but only one survives today (1987). The Tithe Map (1840) shows between 180 and 200 pits (the total depending upon whether one counts confluent pits singly or otherwise!). The 6" O.S. map (Sheet SJ38SW) was surveyed in the nineteen-fifties and shows seven pits.

Numerical comparisons are not reliable; pits may or may not be indicated on estate maps or the Tithe Map, but the sad conclusion is clear - we are rapidly losing all our local ponds.

My earlier survey gave details of the hardness of the water of the pits and of their then liability to drying-out in times of drought.

METHODS

Of the pits studied in the earlier survey twenty-six of those surviving were

taken at random and examined, each several times yearly and at different times of the year. Mollusca were collected by handscoop only, so Anodonta spp. may have been missed.

The following list gives the twenty-six pits re-surveyed 1974-84 inclusive and the NGR for each pit. The numbers are those of the earlier survey (to facilitate comparison).

Boycott (1930, p.8) classified the resistance of ponds to drought, and of the twenty-six pits re-surveyed 1974-84 thirteen are Boycott's Class A (not much shrunk), eleven are Class B (considerably shrunk but open water present) and two are Class D (dry; bottom soft; humus present). Some have deteriorated in their drought-resistance since the first survey and have been demoted (e.g. no.7 is now Class D instead of B).

List of pits studied 1974-84

<u>Drying class</u>	<u>No. in original survey</u>	<u>Grid Reference</u>
A	5 (Woodslee Pond)	SJ345826
A	6	SJ345826
D	7	SJ343824
B	13	SJ322814
A	16	SJ345807
D	18	SJ337819
D	19	SJ337819
A	28	SJ339831
A	34	SJ332830
A	39	SJ326813
B	41	SJ331815
B	42	SJ330816
A	51	SJ345805
A	54	SJ344811
A	57	SJ342810
B	59	SJ331829
B	64	SJ333814
A	65	SJ337805
A	86	SJ338827
A	99	SJ355839
A	109	SJ327832
B	112	SJ325833
B	131	SJ324834
B	157	SJ324822
B	158	SJ325823
B	172	SJ318830

Note: even since this paper was written some of the pits studied have been

obliterated by the heavy hand of 'progress'.

COMPARISON OF MOLLUSCAN FAUNAS 1940-57 and 1974-84

The molluscan fauna of these twenty-six pits comprised sixteen species (excluding Pisidium spp.) from 1940-57. They were distributed thus:

<u>Lymnaea peregra</u>	in 17 pits
<u>Gyraulus albus</u>	in 14 "
<u>Sphaerium corneum</u>	in 14 "
<u>Hippeutis complanatus</u>	in 8 "
<u>Sphaerium lacustre</u>	in 7 "
<u>Lymnaea auricularia</u>	in 6 "
<u>L. stagnalis</u>	in 6 "
<u>Acroloxus lacustris</u>	in 6 "
<u>Planorbarius corneus</u>	in 5 "
<u>Armiger crista</u>	in 2 "
<u>Lymnaea palustris</u>	in 1 pit
<u>L. truncatula</u>	in 1 "
<u>Aplexa hypnorum</u>	in 1 "
<u>Potamopyrgus jenkinsi</u>	in 1 "
<u>Planorbis carinatus</u>	in 1 " (a shell)
<u>Anodonta cygnea</u>	in 1 "

Pisidium spp. were obtained from sixteen of the same 26 pits and the following species were represented in 1940-57:

<u>Pisidium milium</u>	in 9 pits
<u>P. subtruncatum</u>	in 8 "
<u>P. casertanum</u>	in 3 "
<u>P. nitidum</u>	in 2 "
<u>P. pulchellum</u>	in 1 pit
<u>P. obtusale</u>	in 1 "
<u>P. personatum</u>	in 1 "

Pisidium spp. were not systematically collected during the re-survey and the results obtained during 1974-84 have not been considered here.

The four pits which formerly held the rare Pisidium pseudosphaerium (nos. 3, 8, 77 and 142) have unfortunately all vanished.

In 1974-84 the twenty-six re-surveyed pits yielded the following eleven species of Mollusca (excluding Pisidium spp.) distributed thus:

<u>Lymnaea peregra</u>	in 15 pits
<u>Gyraulus albus</u>	in 11 "

<u>Hippeutis complanatus</u>	in 9 pits
<u>Sphaerium corneum</u>	in 7 "
<u>Planorbarius corneus</u>	in 7 "
<u>Lymnaea stagnalis</u>	in 6 " (1 introduction)
<u>Sphaerium lacustre</u>	in 4 "
<u>Acroloxus lacustris</u>	in 2 "
<u>Armiger crista</u>	in 2 "
<u>Planorbis planorbis</u>	in 2 "
<u>Anodonta cygnea</u>	in 1 pit

NOTES ON SOME OF THE MOLLUSCA IN THE PITS

Potamopyrgus jenkinsi (Smith). Occurred in one pit (the Lilypit - no. 6 of earlier survey) from 1947-53 but then disappeared and frequent searches since 1953 have failed to re-find it. This pit is partly spring-fed and P. jenkinsi was present only around the spring. Such sporadic appearances and disappearances are characteristic of the species and are not necessarily linked with any changes in the habitat.

Lymnaea auricularia (L.). Disappeared from six pits (nos. 5, 6, 54, 99, 112 and 158) and has not, so far as I know, appeared newly in any of the re-surveyed pits.*

Footnote: *two live L. auricularia were taken in pit no. 109 on 22.vii.1986.

Lymnaea palustris (Muller). Has apparently deserted a pit (no. 18) in which it formerly occurred. The same pit yielded Lymnaea truncatula and Aplexa hypnorum (the latter only once) and neither species has been found during the re-survey. It seems that both records represent unsuccessful colonisations.

Planorbis planorbis (L.). It appears that this species is spreading in the area studied. It was not taken during the 1940-57 survey except in one pit (now gone) and an adjacent garden pond (made out of two pits). Three live specimens were experimentally introduced into Woodslee Pond (no. 5 of earlier survey) on 3.vi.1965. Nothing was seen of the species subsequently and it was assumed that the introduction had failed. But on 29.iv.1986 numerous specimens were found floating among Lemna. Specimens were also found in a tiny artificial pool in a nearby garden where the species was certainly not present previously. P. planorbis has also appeared in three other pits (nos. 109, 112 and 131) since 1979.

Planorbarius corneus (L.). As this is a large and unmistakable species it is unlikely to have been overlooked and its present occurrence in seven out of the twenty-six pits re-surveyed may be significant. It is not thought to be native in Cheshire (Oldham 1896 & 1908; McMillan 1944). Shrubsole senior is known to have introduced the species to a pond in Queen's Park, Chester, about 1884 (Tomlin in litt. 27.xi.1944). Whitehead (see Fisher & Jackson 1936) who collected in Bromborough in the summer of 1856 did not find it nor was it recorded from the Wirral by either Byerley (1854) or Higgins (1891). Stelfox (pers. comm.) suggested that P. corneus, a favourite aquarium snail, was introduced in the first place but it is difficult to see how "secondary" introduction to other ponds could take place. The shells of very young specimens bear spiral rows of periostracal hairs which might assist transport on scraps of plants, but snails a little older have fat little shells that look unsuitable for transport, even on that standby, birds' feet. Anyhow, the

species is spreading in the district although the means remain obscure.

Anodonta cygnea (L.). First found in Woodslee pond in 1971 but under suspicion of introduction, either deliberately (as in some Raby pits) or else as glochidia on fish. Both carp and pike have been introduced since the earlier survey and no doubt there have been earlier introductions.

DISCUSSION

As ponds age, naturally emergent plants encroach more and more upon the area of open water eventually developing into marsh and at long last (if left undisturbed for a sufficient length of time) to woodland. This is the fate of most ponds, such as cattle-ponds.

Marl-pits are as a rule fairly deep (often 7 to 10 metres) and steep-sided so do not need regular cleaning out as the relatively shallow cattle-ponds do. Therefore disturbance of the marl-pit fauna by this means can be discounted. And obviously colonization by plants of such deep pits could only take place very slowly.

Nevertheless, many pits, by silting and colonization by land plants, are approaching the end of their natural life. Especially those surrounded by willows lose their water more quickly and are more rapidly colonized by emergent plants (if not too heavily shaded).

Stagnant ponds, such as marl-pits, when nearing old age often have a thick layer of decaying vegetable debris flooring them and this is inimical to molluscan life. One pit (no. 7) revealed five feet (2.5 metres) of rotting vegetable debris at the bottom when the pit went dry temporarily during the drought of 1976. In the prolonged and severe droughts of 1975 and 1976 some of the smaller pits dried up completely or were reduced to an inch or so of water overlying black mud, almost anaerobic; pits surrounded by trees suffered most. Pits in woodland or heavily shaded, sometimes contain no Mollusca at all.

Under deteriorating conditions I have found Lymnaea stagnalis, L. peregra and Planorbis corneus to be the most tolerant and I was startled to read that Boycott (1930, p.11) considered L. stagnalis, Planorbis corneus and Hippeutis complanatus "particular species". This is certainly not my experience of these species in north-west England. I have seen L. stagnalis in tiny little garden pools, apparently existing upon rotting newspapers, and P. corneus is a favourite aquarium snail because of its tolerance of unfavourable conditions. Pacaud (quoted by Macan [1963, p.93]) kept P. corneus alive for eight months on a diet of cigarette paper.

It is possibly significant that in the marl-pits studied P. corneus has increased. During 1940-57 the species occurred in only sixteen pits out of 130 which held Mollusca; in 1974-84 it was found in seven out of twenty-six of the same pits, but newly in only two of them.

The results of the re-survey when compared with those obtained in the earlier survey of the same twenty-six pits, showed twenty-seven gains in number of species present per pit, an average of about one "new" species per pit. During the same period, however, fifty-seven losses were recorded, an average of more than two species "lost" from each pit.

In 1940-57 there was a total of ninety-one occurrences of molluscan species in these twenty-six pits; the same pits in 1974-84 had only sixty-six occurrences.

It is not suggested that these figures are more than approximate (it is easy to overlook such species as Armiger crista and Acroloxus lacustris) but nevertheless

they do show that the number of molluscan species per pit is diminishing. And as ponds are disappearing so rapidly re-stocking becomes more difficult as sources become increasingly scarce.

The history of the molluscan fauna of one Bromborough pond is given here, because this pond by the fortunate chance of being in a Nature Reserve has escaped obliteration, and further changes can conveniently be monitored.

The pond in question is Woodslee Pond (No. 5 of the earlier survey), and NGR SJ345826; it is situated behind Woodslee School, Croft Avenue, Bromborough. Its age is not accurately known but it is marked on a Mainwaring Estate Map of c.1731 and on the Tithe Map (1840). The 1st. ed of the 6" O.S. map (Cheshire Sheet 22, 1882) shows three closely-adjacent pits; the 2nd. ed. (1899) shows the pits merged into one large pond; no doubt this was done when the big house Woodslee was built about 1878 and the pits were made into an ornamental feature. Much later the northern pit was filled in, and in its present state the pond covers nearly half an acre ($\frac{1}{4}$ hectare approx.). Maximum depth is believed to be 9 ft. (3.0 metres) but much is shallower, part being only about 2 ft. deep. This pond has been under regular observation since 1942.

As already mentioned Elton (1933, p.23) queried whether a fauna varied from year to year as well as spatially. Observations on Woodslee Pond from 1942 to date (1987) show that the following species of Mollusca were present every year during those forty-five years; Lymnaea peregra, Planorbis corneus, Gyraulus albus, Hippeutis complanatus and Sphaerium corneum. Lymnaea auricularia was present every year until 1956, after which date it has not been seen again in the pond despite frequent searches. Anodonta cygnea was taken for the first time in 1971 but may have been introduced, and Sphaerium lacustre was obtained for the first time in 1981. Pisidium spp. were not collected regularly but P. subtruncatum was taken repeatedly in various years, P. casertanum in 1954 and P. milium in 1981.

On 29 March 1956 six Lymnaea stagnalis were experimentally introduced. They had multiplied by 1958, but not, it would seem, to the detriment of the species already present, and the species has remained to date a stable member of the pond fauna.

A nearby pit (the Lilypit, No. 6 of the earlier survey) and distant only c. 50 ft. from Woodslee pond acquired L. stagnalis by some unexplained means between 1956 and 1960 and similarly lost L. auricularia after 1956.

As showing how freshwater snails respond to improved living conditions Pit 109 may be adduced. Formerly much shaded and overgrown it held only L. peregra, Gyraulus albus and Sphaerium corneum during the earlier survey, and conditions had become so poor that in 1967 no molluscs were obtained by several searches. Recently it has been much tidied up, rubbish removed, and a "beach" of pebbly concrete made. It is now evidently much to molluscan liking for in July 1986 it held L. stagnalis, L. peregra, L. auricularia, Planorbis planorbis, Gyraulus albus and Anisus vortex. So it appears that this pit acquired six species in nineteen years.

The resistance of freshwater Mollusca to severe frost is also a factor influencing their distribution, but was not considered during the earlier survey. Nevertheless it ought to be considered among the many other factors collectively responsible for the snails of our ponds. Prolonged ice-cover can reduce the snail population, sometimes quite dramatically (see McMillan 1969). Woodslee Pond was very hardhit by the very severe winter of 1962/63 and was completely frozen over for 72 days (Christmas Eve 1962 until 5 March 1963). When the ice-cover began to disintegrate on 6 March a foot-wide bank of dead snails was revealed around the margin of the pond. The total number of specimens must have run into hundreds of thousands. This catastrophic reduction of the molluscan fauna, however, seems to

have had no lasting effect, although some species were very much slower than others to regain their former numbers.

Between 6 March 1963 (when melting ice began to leave margin of pond clear) and 12 July numerous visits were made, at least once a week, and on each occasion the number of snails obtained in an hour by handscoop was noted. These data summarised show that Planorbis corneus was the most successful survivor; numerous living specimens were taken on 16 March when much of the pond was still frozen. L. stagnalis was not so successful; on 16 March only three snails were taken; the first juvenile on 12 July. L. peregra was curiously slow to recover; despite careful search none was found until 24 March when a single adult was taken. On 27 April the first Sphaerium corneum occurred, fifty-eight specimens of all sizes so presumably breeding had taken place. Gyraulus albus was not re-found until 12 May.

CONCLUSION

The present molluscan faunas of these Cheshire pits represent the accumulation of many years of dispersal. They also suggest a deteriorating habitat and that the pits, considered as a molluscan habitat, have in most cases passed their zenith.

Pip (1986) studied the colonization by freshwater molluscs of a chain of thirty-nine Canadian ponds and concluded that the establishment of any species depended upon a large array of factors including chance. After more than forty years' study of Bromborough pits I cannot but concur with Pip's conclusion.

ACKNOWLEDGMENTS

The records of Pisidium spp. are all based upon specimens identified either by the late A. W. Stelfox or Dr. J. G. J. Kuiper, to whom I am grateful. Susan Nicholson kindly drew my attention to the references to local pits mentioned in the Bromborough Manor Court Papers.

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Nora McMillan, Department of Invertebrate Zoology, Liverpool Museum

MARINE MOLLUSC MAPPING SCHEME - SEA AREA WIGHT S15

PROGRESS REPORT No. 2

Since my first report which appeared in Conchologists' Newsletter No. 103 (December 1987) I have the following Post-Atlas changes to record:

<u>Tonicella rubra</u>	new <u>A</u>	Whitecliff Bay, IOW 50°40.01' N 01°05.51'W. Aug. 1988. IJK/JML
<u>Acanthochit. crinitus</u>	a to <u>A</u>	Hanover Pt. IOW 50°39.05'N 01°27.91'W. Feb. 1988. IJK/JML
<u>Gibbula tumida</u>	c to <u>A</u>	Off Nab Tower, E. of IOW. 50°35.03'N 00°59.86'W. Jun. 1988. JML
<u>Skenea nitens</u>	a to <u>A</u>	Whitecliff Bay, IOW 50°40.06'N 01°04.68'W Jul. 1987. JM/JML
<u>Tricolia pullus</u>	a to <u>A</u>	Shanklin, IOW 50°37.11'N 01°10.21'W Feb. 1988. IJK/JML
<u>Lacuna parva</u>	a to <u>A</u>	Colwell Bay, IOW 50°41.35'N 01°32.45'W Aug. 1988. IJK/JML
<u>Littorina obtusata</u>	new <u>A</u>	Nodes Pt. IOW 50°42.38'N 01°06.25'W May 1988. IJK/JML
<u>Cingula semistriata</u>	c to <u>A</u>	Hanover Pt. IOW 50°39.05'N 01°27.91'W Feb. 1988. IJK/JML
<u>Alvania crassa</u>	a to <u>A</u>	Hanover Pt. IOW 50°39.05'N 01°27.91'W Feb. 1988. IJK/JML
<u>Rissoa guerini</u>	c to <u>A</u>	Shanklin, IOW 50°37.14'N 01°10.21'W Feb. 1988. IJK/JML
<u>Cingulopsis fulgida</u>	new <u>A</u>	Durlston Head 50°35.65'N 02°56.50'W Sept. 1988. IJK/JML
<u>Rissoella diaphana</u>	new <u>A</u>	Durlston Head 50°35.65'N 02°56.50'W Sept. 1988. IJK/JML
<u>Omalogyra atomus</u>	c to <u>A</u>	Newtown, IOW 50°43.05'N 01°24.43'W Feb. 1988. IJK/JML
<u>Skeneopsis planorbis</u>	a to <u>A</u>	Alum Bay, IOW 50°36.50'N 01°21.69'W Aug. 1988. IJK/JML
<u>Ammonicera rota</u>	a to <u>A</u>	Isle of Wight, 50°41'N 01°33'W Sept. 1988. IJK/JML
<u>Tornus subcarinatus</u>	c to <u>A</u>	SW of Hanover Pt. IOW 50°37.8'N 01°29.7'W Jun. 1988. JML

<u>Velutina velutina</u>	c to A	S of The Needles, IOW 50°37.35'N 01°34.3'W Jun. 1988. JML
<u>Lamellaria perspicua</u>	a to A	Saltdean, 50°47.70'N 00°02.10'W Sept. 1988. IJK/JML
<u>Philbertia linearis</u>	c to A	off Nab Tower, E IOW 50°36.48'N 01°53.25'W Jun. 1988. JML
<u>Haminoea navicula</u>	a to A	Newtown, IOW 50°43.05'N 01°24.43'W Apr. 1988. R. Herbert/det. T. Thompson
<u>Philine aperta</u>	a to A	Poole Bay. 50°41.69'N 01°51.10'W Jun. 1988. JML
<u>Odostomia scalaris</u>) syn. <u>O. rissoides</u>)	a o A	Whitecliff Bay, IOW 50°40.01'N 01°05.51'W Aug. 1988. IJK/JML
<u>Eulimella laevis</u>	new C	E of Sandown Bay, IOW 50°38.2'N 01°06.7'W Jun. 1988. JML
<u>Limapontia senestra</u>	new A	Whitecliff Bay, IOW 50°40.01'N 01°05.51'W Aug. 1988. IJK/JML
<u>Dendronotus frondosus</u>	new A	E of Culver Cliff, IOW 50°39.43'N 01°04.7'W May 1988. JM/K. Collins
<u>Jorunna tomentosa</u>	new A	Poole Bay 50°41.08'N 01°53.58'W Jun. 1988. JM/K. Collins
<u>Antiopella cristata</u>	new A	Poole Bay 50°41.08'N 01°53.58'W Jun. 1988. JM/K. Collins
<u>Nuculana minuta</u>	a to A	off Nab Tower, E IOW 50°36.12'N 00°55.05'W Jun. 1988. IJK/JML
<u>Musculus discors</u>	a to A	Foreland, IOW 50°40.54'N 01°04.53'W Feb. 1988. IJK/JML
<u>Astarte triangularis</u>	c to A	Whitecliff Bay, IOW 50°40.06'N 01°04.68'W Jul. 1988. JM/JML

Over the past year extensive fieldwork has been carried out on the Isle of Wight in conjunction with Mr. Ian Killeen. This work will continue until all accessible shores have been surveyed. Further east in S15 the shore between Worthing and Peacehaven has been sampled at various points. So far I have been unable to record Nucella lapillus from this stretch of coast although I note from the Society's record cards which I hold that Mr. Dave Adams and Mr. Phil Palmer both recorded this species from this area ten years ago. Nucella also seems to have disappeared from the Solent coast of the Isle of Wight. The plight of this animal and the adverse effects of TBT in antifouling paint, thus rendering Nucella incapable of breeding, has been documented by G. W. Bryan et al. (J. mar. biol. Ass. [1987], 67, 525-544).

A highlight of the past year was Southampton University Oceanography Dept.'s Summer Cruise in which I was invited to participate. This enabled me to record molluscs from grab samples from some forty stations in S15 including Christchurch/Poole Bay, Swanage Bay and around the Isle of Wight.

In conclusion, a field meeting took place at the western extremity of S15 centred on Swanage over the weekend 24th./25th. September 1988. This well-organised and successful meeting was much enjoyed by those who took part. Eight sites were visited and two marine species new to S15 were recorded (see listing above).

I should particularly like to thank Ian Killeen and Phil Palmer for help with fieldwork. I am also grateful to the following for help in various ways: Roger Bamber, John Baxter, Roger Herbert, Antony Jensen, Jenny Mallinson, Dennis Seaward, Martin Sheader, Tom Thompson, Stella Turk and Gray Williams.

Jan Light

FIELD MEETING TO SWANAGE - SEPTEMBER 1988

One of my most vivid memories of Conchological Society field trips is of a weekend based in Swanage from 19 to 21 June 1970. Then, as a junior member I travelled from the Isle of Wight to Swanage by bus. The itinerary included dredging in Swanage Bay, geology at Chapmans Pool, marine collecting at Shell Bay and Kimmeridge Bay. (A report appeared in Conchologists' Newsletter No. 36).

Taking over as Field Meetings Organiser offered a chance for a little self-indulgence by arranging to lead another weekend in the area on 24 and 25 September 1988. This beautiful part of Dorset offers much to the conchologist: estuaries, sandy bays and rocky shores for marine molluscs, limestone grassland for land snails and classic Jurassic formations for the palaeontologist. Although many marine lists have been compiled for this area over the years there are surprisingly few live records. Therefore one of the main objectives of the weekend was to obtain live records from a number of different squares.

In addition to regular attendees our party was joined by Australian members Des and Bernice Beechy and their two daughters. A grey and windy Saturday was spent on the northern part of the Isle of Purbeck:

1. Southern end of Brand's Bay, Studland (SZ 023848). A saltmarsh with tidal channels with Hydrobia ulvae and, interestingly, Littorina littorea living on Halimione portulacoides (Sea Purslane).
2. Bramble Bush Bay (SZ 033863). A sand and shingle shore with live Hydrobia ulvae, Crepidula fornicata and Cerastoderma edule. (Total number of species - 5).
3. Shell Bay (SZ 037864). This well-known sandy beach has yielded many long lists: although success can never be guaranteed, we were not disappointed. The receding tide revealed a series of rich strandlines. Well over sixty species were recorded, however only eleven were found alive: Patina pellucida, Patella vulgata, Gibbula cineraria, Lacuna pallidula, L. vincta, Littorina mariae, Rissoa parva, Crepidula fornicata, Buccinum undatum, Cerastoderma edule, and Spisula solida. The last species was found commonly lying on the sand, whereas most of the others were found on a small rocky outcrop at the southern end of the bay.
4. Studland Bay (SZ 042823). This site had been saved till last so that the rocky ledges below the chalk could be examined at low water. It was therefore disappointing to discover evidence of pollution in this southern part of the bay. Many of the weeds appeared unhealthy, species such as Corallina officinalis and Cladophora rupestris were absent, and turning rocks revealed anaerobic mud. Despite these factors eleven live species were recorded: Patella vulgata, Gibbula cineraria, Littorina littorea, L. obtusata, L. mariae, L. saxatilis, Rissoa parva, R. membranacea, Crepidula fornicata, Loripes lucinalis and Hiatella arctica. (Total number of species - 25). Several land snails were recorded in the wooded gully between carpark and shore.

After the day's recording activities, the meeting later re-convened to socialise over an enjoyable evening meal at a local restaurant.

On Sunday, low water was not due until 16.00, therefore there was ample opportunity for studying the terrestrial molluscs of the area. Two sites were visited: Kingston Forest and Durlston Head.

5. Kingston Forest (SY 954795). A large mixed deciduous and conifer woodland

with coppice where a rather unspectacular list of eighteen species was recorded. The leader's nonchalance was dispelled, however, when Bernice pointed out that compared to non-marine collecting in Australia, this was spectacular!

6. Durlston Head (SZ 035773). Old ivy-covered limestone walls and grassland proved an excellent hunting ground for calciphiles. Sixteen species were found including Pomatias elegans, Pyramidula rupestris, Cernuella virgata, Cochlicella acuta and Helicigona lapicida.
7. Durlston Bay (SZ 036773). The path down to the shore was precipitous and our descent attracted attention from an Airsea rescue helicopter! After being convinced of our well-being, the crew left us to continue our descent to a shore that proved to be well worth the effort. The littoral zone was composed of large boulders of Purbeck limestone with several 'classic' rockpools. The abundance of weeds both in terms of numbers of species and density of growth was in stark contrast to the shore at Studland. The molluscan assemblage was equally rich; the full list is given below but amongst the more noteworthy finds was a large specimen of Aplysia punctata, which escaped notice in the field but was found in a bagful of weeds taken home for washing and processing. These weed samples also yielded the first Sea Area 15 records for Rissoella diaphana and Cingulopsis fulgida. Skeneopsis planorbis was also very common and, interestingly, this species had been re-found as a post-1950 Area 15 live record only three weeks earlier at Alum Bay, Isle of Wight. The total list was 25 species of which 21 were alive.
8. Peveril Point (SZ 041786). Although not quite as clean or as luxuriant in weeds as Durlston, this reef of Purbeck 'marble' nonetheless yielded a respectable list of marine molluscs (19 species of which 16 were alive). Rissoella, Skeneopsis and Cingulopsis were again found at this site, the latter being particularly abundant.

The full list of live species from Durlston (D) and Peveril (P) is as follows:

	D	P		D	P
<u>Lepidochitona cinereus</u>		X	<u>Lacuna pallidula</u>	X	X
<u>Patina pellucida</u>	X	X	<u>L. parva</u>	X	
<u>Patella vulgata</u>	X	X	<u>L. vincta</u>	X	
<u>Patella depressa</u>	X		<u>Rissoa parva</u>	X	X
<u>Gibbula cineraria</u>	X	X	<u>Onoba semicostata</u>	X	X
<u>G. umbilicalis</u>	X	X	<u>Rissoella diaphana</u>	X	X
<u>Tricolia pullus</u>	X		<u>Cingulopsis fulgida</u>	X	X
<u>Littorina littorea</u>	X	X	<u>Skeneopsis planorbis</u>	X	X
<u>L. mariaae</u>	X	X	<u>Aplysia punctata</u>	X	
<u>L. saxatilis</u>	X	X	<u>Musculus discors</u>	X	
<u>L. neritoides</u>	X	X	<u>Lasaea rubra</u>	X	X

The weekend was successful both from a conchological and social point of view and this is what the field meetings programme aims to achieve. Taking part in fieldwork with a group of like-minded enthusiasts is a rewarding and enjoyable activity and it is hoped that more members will participate in the varied programme which has been arranged for 1989.

Ian Killeen, [REDACTED], Felixstowe, Suffolk, [REDACTED]

FLORA THOMPSON ON SNAILS

The writer Flora Thompson (1876-1947) is best known for her trilogy 'Lark Rise to Candleford' which was based on the countryside and characters from her own childhood in a village on the Oxfordshire-Northamptonshire borders. Although this book is mostly the story of the people in it, Flora Thompson was a perceptive observer of the countryside and had a keen eye for natural history. In the 1920s she wrote a monthly countryside column for the magazine the 'Catholic Fireside', a series which continued for several years, later re-named "The Peverel Papers". These articles have been reprinted in two books - A Country Calendar and other Writings selected and edited by Margaret Lane published by the Oxford University Press (1979 and 1984, £2.95) and The Peverel Papers - a Yearbook of the Countryside by the Author of Lark Rise to Candleford by Flora Thompson published by Century in 1986 (£10.95). In the November chapter of The Peverel Papers is an account of snails which is quoted below. Whilst looking at the fungi she came across a tiny snail - Vallonia, which she says is very common on the grassland of the South Downs and she was evidently taking a closer than average look at the specimens. When writing this Flora Thompson would have been living at Liphook in Hampshire where her husband was a postmaster and she, too, worked for the Post Office. The chalk downs are not far from this part of Hampshire and well within her capabilities for walking. After the Vallonia, Flora Thompson goes on to consider attitudes of people towards slugs and snails and tells the story of a family of children from an impoverished household who were kept healthy and well nourished by eating slugs!

June Chatfield

The Peverel Papers, pages 202-204 - Flora Thompson's writings on snails:

"Against the green of the mosses in the woods this month the late autumn fungi stand in all manner of fantastic shapes, some brightly coloured, others ivory white, spongy yellow, or ranging through all the dingy browns of decay. Beneath the pine trees the ruddy warty-cap still flourishes like flowers in a garden, its glowing brick-coloured disc set off with yellow bosses. For those adventurous ones who dare to eat fungi, this favourite dish of theirs is still in season, but most of the other edible kinds have fallen into most unappetising decay. The bolet, or penny bun, no longer looks freshly glazed from the baker's oven, as it did a few weeks ago, but has swollen into monstrous shapes, great sponges and umbrellas turned inside out, masses of corruption, over which slugs crawl and bluebottles hover.

Upon one huge specimen I overturned to-day an assembly of tiny white snails had gathered, whether for food or warmth I cannot say. This little white snail, "pulchella", as it is called by the scientific observer, is very common upon the South Downs. Being only about the tenth of an inch in circumference, it is often taken for the baby of the yellow Roman snail, but it is a quite distinct family, and the tiny, bead-like atoms are already fully grown. Upon the Downs it may be seen in scores, clustering upon the wild thyme and other short herbage; and it is said to contribute largely to the richness and flavour the famous Southdown mutton.

The snails alone would make a winter walk in the most commonplace scenery interesting, for it is surprising to find the number of varieties existing side by side in any lane or hedgerow. The spotted or garden snail is a common sight everywhere, although few notice it, excepting children and gardeners. Between the snail and the latter there is a deadly feud (deadly to the snail, at least), for its taste in vegetables is too human to make it a welcome guest in any garden. The youngest of green peas, the crispest of lettuce, the fattest asparagus stems, the peach ripening upon the wall - the taste for such things is fitting in man, but out of place in a snail.

Children and boys are the only friends of the garden snail; the former love to hold it by the shell and chant the immemorial charm:

"Snail, snail, put out your horn,
And then I'll give you a barleycorn,"

just for the pleasure of seeing the sensitive horns, in which, most probably, the snail's senses of sight, touch, and hearing are concentrated, slowly and cautiously put out, as though newly growing.

These largest of our land snails were a favourite dish with the Romans in Britain, and are said to be eaten in certain districts in the West of England to this day. If so, the cooks in those parts deserve credit, for once during the war, inspired by a newspaper article, I experimented upon a dish of them. After an elaborate and prolonged preparation my dish was set upon the table, in appearance much like stewed oysters in melted butter. Alas for appearances! The should-have-been savoury tit-bits tasted exactly like morsels of stewed rubber; and, although I brought both the appetite and the obstinacy of the pioneer to the dish, I could not away with even one of its contents.

In spite of this personal failure, it is quite probable that no one need starve while there are slugs and snails to be found and a fire is forthcoming to cook them by. In a certain village in the Midlands there used to be a tradition dating from the old sheep-stealing days that once a poor widow with a large family was suspected of receiving and hiding stolen mutton, because, having no means excepting the starvation allowance of the relieving officer, her children were yet the plumpest and rosiest in the parish. One day the authorities searched her cottage and found a barrel of meaty morsels salted down in her larder. This at first was taken for finely minced mutton, but, upon examination, proved to be slugs which she gathered in wet weather to provide all the meat her children were likely to taste ..."

GENERAL NOTES

GALEODEA RUGOSA (L.) OFF THE IRISH COAST

In an interesting discussion on the origin of specimens of Galeodea rugosa (L.) found off south-west Ireland (Conch. NL. 95: 307-8, 1985), O'Riordan questioned the post-1950 live record for Fastnet S37 shown in the Sea Area Atlas of Marine Molluscs of Britain and Ireland (1982, NCC/Conch. Soc.), and listed all Irish reports known to him.

The Atlas record derives from the Marine Recorder's Report for 1976 (J. Conch. 29: 122-4) as follows:

"Fastnet (37): L. Atkins reports that 5 specimens of Galeodea rugosa were trawled 27 miles west of Sybil Point in 1968"

The Recorder's preamble indicated that the record was of live animals. This reference was overlooked in O'Riordan's list.

Mr. Atkins tells me that he obtained the information at second hand but saw a specimen which was of a dead shell. He cannot now from memory confirm that any live animals were found. There is therefore some doubt over the Atlas post-1950 live record for Fastnet S37. Marshall's record (J. Conch. 13: 197, 1911, as Cassidaria tyrrhena) of several living specimens trawled "off the south west of Ireland in 50-60f." may refer to Fastnet S37 or to Labadie S40.

D. R. Seaward (Marine Recorder)

THE START OF AN INTEREST

Working at Kew on the 15 December last year (1987) a young colleague came to me and said that a visitor working near him had expressed a desire to see me and that we were old friends. The name P. N. Thompson did not immediately ring any bells but I realised it had something to do with my distant past. It turned out we had been at school together and had not seen each other since the early 1940s. It was not until later that evening that I remembered that it was his interest in shells that really started mine and that he had put a note in a roneographed production we grandly called the Luton School Scientific Magazine or words to that effect. Amazingly a search in the European reprints section of my library unearthed a copy of this schoolboy effort and it is reproduced here; at least 47 years later.

"

SHELL COLLECTING

In collecting shells it should be remembered that although a 'dead' shell is better than none, 'live' shells should be gathered if it is at all possible. This is because shells of dead animals deteriorate in colour and texture.

Some shells are of course just picked up but for fresh-water forms, a tin with a gauze bottom is necessary. The mud off the bottom can then be sifted for species which burrow into the slime. Shells can be carried in any small box, such as a match-box, care being taken that strong shells are not put with fragile ones as the latter are liable to be broken.

Live animals are killed by plunging them in boiling water, and are removed in the manner of winkles with a fine wire needle or hook. (small ones should not be removed.) Before placing in the collection, all shells must be cleaned. Elbow grease in conjunction with a fairly stiff brush is best for this, but some fresh-water species are encrusted with lime or iron oxide, and this is removed by immersing them in oxalic acid (do not leave too long).

Small shells are best kept in glass tubes with the name of the species and the locality on the cork (again do not put strong shells with fragile ones). Large species on the other hand are kept in shallow cardboard trays, which can easily be made from sheets of cardboard fastening the edges together with gum paper. Shells may also be gummed on to cards but this method takes up a lot of room and they cannot be examined at will.

P. N. Thompson "

It is not often one can remember precisely what started one's interest in anything but I remember being somewhat peeved that someone was interested in something I knew nothing about.

Bernard Verdcourt

AN ARCHIVE RELATING TO L. E. ADAMS (1854-1945)

Probably few members of our Society see the catalogues of the prestigious dealer in books and manuscripts, Maggs of Berkeley Square. In their catalogue 1090 for Autumn 1988, which most unfortunately I did not see until early December, item 743 is headed 'Rare slug manuscript' and is 'A collection of material from the library of L. E. Adams b. 1854 naturalist'. This archive consisted of four parts. 1. A collection of his own reprints including one on the Mollusca of Northamptonshire, one on Algerian Mollusca and one on the mole. 2. A collection of reprints sent to Adams by others. 3. Sets of plates for the second edition of his well known book 'The collector's manual of British land and freshwater shells, 1896. The mention of an original drawing for plate 10 is puzzling since in the book this plate is from a photograph. 4. Clearly the most interesting part of the archive, a notebook of Adams dated 1897 comprising 22 pages with 22 coloured figures of

slugs with manuscript notes on localities. A copy (not coloured) of one of these plates is included in the catalogue and figures Irish specimens of Lehmannia marginata.

With the intention of purchasing this collection for the main archives of the Conchological Society at Leeds I rang up Maggs but the item had been sold. It would be most interesting to check the naming of the slugs. L. E. Adams' Manual is I think an excellent work for its time but was quite expensive in terms of percentage of the average weekly wage at 8 shillings plain and half a guinea coloured which works out about 3½ old pence per plate - if the colourers got 2d a plate they were lucky.

I was elected a member of the Society on the 10th. April 1943; Adams died on 20 Sept. 1945. There is a rather sparse obituary by Tomlin in J. Conch. 22: 204 (1946).

Bernard Verdcourt

REQUEST FOR ASSISTANCE

Mr. Michel R. Hughes, [REDACTED], Chudleigh, Devon, [REDACTED], and Dave Bolton from Exeter Museum are compiling a tetrad atlas for the non-marine mollusca of Devon. A big project. They would be very pleased to hear from people visiting the county who might like to assist in the survey and undertake particular squares. Please write.

COPY DATES FOR NEWSLETTER CONTRIBUTIONS

Copy for the March	issue should reach me	before	6th. January
" " " June	" " " "	"	6th. April
" " " September	" " " "	"	6th. July
" " " December	" " " "	"	6th. October

Newsletter Editor

APPLICATIONS PUBLISHED IN THE BULLETIN OF ZOOLOGICAL NOMENCLATURE

The following application was published on 16 December 1988 in Vol. 45, Part 4 of the Bulletin of Zoological Nomenclature. Comment or advice on this application is invited for publication in the Bulletin and should be sent to the Executive Secretary, I.C.Z.N., British Museum (Natural History), Cromwell Road, London SW7 5BD, U.K. Case 2643 Iphinoe Bate, 1856 (Crustacea, Cumacea): proposed conservation.

M. Bacescu, Muzeul National de Istorie Naturala 'Grigore Antipa', Sos. Kisselef 1, Bucuresti 79744, Romania. L. B. Holthuis, Rijksmuseum van Natuurlijke Historie, Postbus 9517, 2300 RA Leiden, The Netherlands.

Abstract. The purpose of this application is the conservation of the generic name Iphinoe Bate, 1856, of cumacean crustaceans by the suppression of the unused senior homonym Iphinoe Rafinesque, 1815 (Arachnoidea) and also the senior homonym Iphinoe H. & A. Adams, 1854, which is in occasional use for a restricted genus of gastropods.

MARINE BIOLOGY COURSE to be held at Marine Biological Station, at Millport, Isle of Cumbrae, Scotland, from 5 - 12 August 1989. The cost is £165 including full board. Further information from: Dr. W. Fowler, Adult Education Centre, 59 Oakfield Avenue, Glasgow.

EXCHANGE WANTED: Mr. C. D. Knight, [REDACTED], Hucclecote, Gloucester, who lived in Zanzibar for 12 years, collects cowries and cones. He would like to contact other collectors, particularly anyone in his area, who would like to exchange specimens.

Printed by: D. C. Armsworth, [REDACTED], Baldock, Herts. [REDACTED]

THE CONCHOLOGISTS' NEWSLETTER

No. 109

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

June 1989

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Market Harborough,
Leicestershire,

Produced by THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

CONFESSIONS AND EVOLUTION OF A NOVICE CONCHOLOGIST

Since joining the Society in 1987, I have read the Journals and Newsletters with great interest and have been awed in most instances by the obvious dedication and scientific knowledge of the various contributors.

What does not always come through though is the background information, the story behind the headline or article.

Is it all seek and find, count and measure, or does sometimes something go wrong? Does anything funny ever happen?

Personally I have enjoyed every minute in the pursuit of my new-found interest, and look forward constantly to my next activity in the field.

The plea from Mr. Negus in the September 1988 issue of the Newsletter for contributions has arrived to coincide with a period of inactivity here and has caused me to attempt to relate my experiences in shell collecting in the nearby Red Sea at Rabigh in Saudi Arabia.

It all begins on a bright sunny Friday morning in March 1986 during a stroll along the shore line within the perimeter of the Refinery site, beyond which we are not permitted to wander until in possession of the appropriate gate pass.

During the stroll I casually observed the flotsam and jetsam and also the old and broken shells which abounded there. Among this debris I noticed a particularly attractive little fellow which I picked up and examined. It was a pretty little thing which I decided to keep for my young daughter. The continuation of my stroll was devoted to a closer examination of the shells on the shore but nothing further of interest was located. When I think back to that period, that could have been the end of my shell collecting, but, fortunately as it turned out, it was to be only the beginning.

The working hours on this project comprise ten hours per day, six days per week, with each Friday off for good behaviour. The available amenities for sport or other entertainment are not to my taste, so something other than constant reading or sleeping was going to be required to occupy my time and mind.

It was perhaps two Fridays later that a few of us decided to visit a beach outside the site limits with the sole intention of swimming, sunbathing or just general lounging about, and this also presented the opportunity to further indulge in a bit of beachcombing to see if there were perhaps any further pretty shells which I might collect for my daughter.

They were there in abundance and in all sorts of shapes and colours, and many of them were on the move!

This was my first introduction to the hermit crab as a shell collector in its own right. I have previously come across these fellows in Malta where I remember they were put to use as a bait for fishing, discarding their adopted home. If I have seen them on beaches in Sumatra or Brazil, it obviously has not registered or I just ignored them.

The collecting of various different specimens was soon commenced utilising the services of a discarded plastic water bottle within which the crabs composed a frantic chorus of activity.

Whilst actively collecting on the beach, the need to remove the crab and clean the shell never entered my head, but this was soon to be appreciated.

My accommodation here is a cabin on an ex-cruise ship where the bathroom facilities provided for the passenger are entirely adequate for a passenger during a cruise, but obviously did not include the requirements of the travelling conchologist with a bottle full of extremely active crabs. There is, fortunately, a bidet in the bathroom, and, since I did not have too much sand to wash from between my toes, this was pressed into service. The deposit of my finds into a mixture of soap suds and lukewarm water went a long way towards curtailing their further activities. Thereafter, a semi-skilled "safe cracking" job with the aid of some cunningly designed bent paper clips ensured the final evacuation of the occupants of the shells. At this point all shells had the same name - pretty.

Several weeks of this type of activity followed and produced a number of different species of pretty shells which were put on display in my cabin.

It was during a visit to a bookshop in Jeddah that I spotted a book about shells which I purchased, and from which I attempted to identify the specimens I had so far collected, but with not a lot of success, mainly because a lot of the shells described in the book originated in other parts of the World. A further purchase of a book describing shells in the Red Sea finally provided me with the information I wanted, and I became more intrigued to learn that there were many more shells I had not yet come across.

My first attempts at locating shells on the sea bed by snorkelling over and among corals and rocks proved not to be too successful. I was totally enchanted with the varied and colourful marine life, with the consequence that no real productive collecting took place. On the few occasions when a likely specimen was located and had been obtained, I found that it was empty, and that in any case I was now reduced to having only one useful hand, the other being used to hold and transport my find.

Further studying of my shell books now informed me that most shells were nocturnal and would be hiding throughout the day, so it would be a case of locating these hiding places, and, while snorkelling around, several likely rocks were spotted which could probably be turned over if I had a suitable implement. However, the problem of transportation was still in existence, and although I had thought about a plastic mesh bag, I discarded this idea since obtaining the information that certain of the shells I might find could hurt!

It was about then that I decided that another approach should be examined.

The next visit to the beach involved a sortie into the water on foot, suitably protected with a pair of stout-soled trainers and a make-shift lever. A few rocks were located and turned over so that the underside could be examined by looking

through the glass in my face mask. A couple of extremely pretty shells were found in this manner and which I could identify as cowries. These were taken back to my cabin to go through the cleaning process already tried, and which proved to be totally inadequate. There was more to the collecting of shells than meets the eye, so further study was indulged in. The shells I had collected started to smell a bit so had to be discarded over the side of the ship - quickly!

Before re-commencing activities it was decided that a whole new approach was necessary and that further equipment was required.

A short length of large-bore plastic pipe was obtained into which was fitted a piece of shaped perspex sealed with an adequate glue compound. This, together with a lever for turning over rocks and a pair of stout industrial gloves, was sufficient to enable operations to re-commence in earnest.

The first expedition was unforgettable. Viewing the activities between the rocks and coral boulders was in itself a suitable reward for the effort so far expended, and provided an excellent deviation from the task in hand. However, there was work to be done.

Various rocks were located and overturned with different results. Most produced nothing of note, but perseverance brought its rewards. Again several different types of cowrie were found, and also my first Textile Cone. This was carefully transferred into my "see-through" box which I was using to hold collected shells during my activities. Rocks which I had turned over were returned to their original position, as had been encouraged in my literature. Several other cowries and cones were found during this expedition and, at the end of the day, they were taken to my cabin where they spent the night in a bucket of fresh water, which I was advised would be sufficient to kill the animal within. The following day they were transferred to an area on site near my place of work where they were covered in sand, of which there is no shortage here! This served to feed the local ant population. As far as the transfer of the Textile Cone was concerned, I continued to treat this as though it was still alive since I do not always believe all I read.

Several days later these were exhumed for further examination and this episode nearly put paid to my new-found hobby there and then! There are smells, and there are smells, but, boy, this was something else!

A vessel of water was quickly obtained and there the offending parties were submerged and allowed to settle. A later rinse from an outside tap soon dispelled the problem, and my now desirable specimens were taken to my cabin for the final touches. The cowries were thoroughly rinsed in fresh water and dried, but the cones were subjected to an overnight soak in a mixture of clorox and water.

The following morning my eyes told me that the cowries were clean on the outside, but my nose told me that further cleaning was needed on the inside, so these were put back into fresh water until I could get to them that evening. A further soak and a bit of probing round curves with bent paper clips and a lot of shaking up and down soon dislodged the offending residue. Having been pre-warned through my experience with the cowries, the cones were subjected to a further examination on removal from the clorox mixture, and as it turned out, just as well. In future I was to leave specimens buried in sand for a much longer period to ensure that the ants and other insects had more time to clean out the insides of the shells prior to final rinses or soaking.

Having given the cones a final going over with a stiff brush to remove some clinging residues from the "blunt" end, my first specimens were ready and details were entered on the beginnings of a card index filing system showing all details of my finds.

This was to form the first of the shells to be located in the Red Sea, and I was "hooked". All previous shells which I had won from the hermit crabs were donated to my daughter, as previously intended, but this collector's collection had commenced in earnest.

There followed several Friday outings, but since transport availability was not of the best and, therefore, what was available had to be shared among several of us, it became necessary to attempt to organise a way of getting to other areas of beach, otherwise I would be forced to come to the same place each week. Initially this was no problem since there was plenty of area to search, but ultimately the place became too familiar.

I was, therefore, fortunate to be introduced to a Greek who regularly went out each Friday for the purpose of spear fishing, and not always to the same place, and I managed to get an invitation to join him. I was warned beforehand that this would be an all day affair from sunrise to sunset, so water and food would be required. (In the early days this comprised Pepsi Cola and sandwiches, but has since been replaced by water and fruit.)

The first day out was to be the forerunner of many over the next almost two years, and immediately indicated that further equipment was going to be required if I was to take full advantage of the opportunities, now available, to investigate and search the varied terrains I would encounter.

The Greek had a four-wheel-drive Landrover truck which enabled us to visit many areas where a normal car, or pick-up, would have trouble reaching, but, more important, could carry any equipment I was likely to require. However, I did not have this equipment yet, so manufacturing commenced. Requirements evolved through experience encountered from time to time, and items were added at intervals.

The practice of wading into the water with the "see-through" box and a lever was sufficient for my early days, but, as I became more successful in finding more shells, before long those which I had found began to impede my view, since these were in the box, and it became a ritual to return to shore from time to time to "unload", have a drink and a cigarette. At times, I was working quite a distance from the shore, which meant a lot of time was being spent walking backwards and forwards to my area of operations. Also, some rocks were being found which were difficult to turn over with the lever I had, and was at times frustrating.

Further equipment was required, and a long discussion with my Greek friend soon produced the first item. This was to be a floating raft affair, or platform, made of thick polystyrene sheeting with a thick strip of the same material mounted on the four sides to give a shallow box type design which was connected to a length of nylon rope which would loop over my wrist. This, in one stroke, solved the problem of where to put collected shells and could carry my water jug and cigarettes in another container. Such a vessel required to be named and properly launched, and was christened the "TH TH UNTHINKABLE", with launching procedures being completed by pouring a bottle of "7-Up" over it, due to the obvious lack of champagne or other suitable liquid.

A garden rake was purchased which would enable me to perform two tasks: one was to pull over rocks and coral boulders, and the other would be to rake among the sand to see what could be found. The rake operated well enough, but the wooden shaft soon weakened and broke when put to a real test, so the whole thing was adequately strengthened. A strip of metal was welded over the top of the rake head and the wooden shaft was replaced with a longer length of tubular steel. This was a winner and has been in constant use now for almost three years.

Before turning over a rock or a coral clump, I grip the far side of the object

with the head of the rake and give it a good shake backwards and forwards before pulling it towards me. In that way, anything under there which I do not wish to know about will have plenty of time to vacate the premises away from me, and also enables any shells hidden in crevices to fall out for examination. Turning over these large and extra large rocks is very good exercise for the back, arms and legs, but can also be full of surprises. Who knows what may be under the next one? Very often it can be nothing to write home about, but not always. It does not always follow that the larger the rock the more likely the find will be worth the effort, but every large stone encountered presents its own challenge. It must be turned over. Of course, it must also be turned back on completion of the investigation, and the need for this becomes apparent when clusters of cowrie or cone eggs are frequently spotted.

Some of the fish and animals to be found under the odd rock from time to time, and which have not moved too far, are the stonefish, lionfish and various sea-urchins, including the black diadema. These are, of course, left well alone. Also often found near a coral clump or rock, half buried in the sand, is the basking blue-spotted reef sting-ray, and, at odd unexpected moments, a moray eel will show its head or make its getaway from you.

On one occasion when I was attempting to tease a very attractive-looking Lambis from under a ledge on the far reef, a moray lunged at the rake and then disappeared hurriedly. He obviously took exception to being disturbed and I am not sure if he accepted my apology or not. The Lambis remained unexamined.

These days, before getting too close to coral clumps and large rocks, I tend to do a circular examination of the area around it; much like a sub-mariner on a periscope, but in reverse. Whether or not I further investigate the area will depend a lot on what I find there, and whether or not it will move away.

During my now longer excursions into the briny, I was to come across all types of terrain and conditions, notably areas where there were quite a few large depressions on the reef flat which were fairly deep and filled with sand. Several experimental digs with the rake had produced the odd Terebra, but it was obvious that this tool was inadequate for the job, so a further visit to the drawing board was indicated. After several attempts, a design of the required implement which would produce the desired result was produced and the appropriate department was contacted in order to fabricate same. After using bribery, blackmail and other inducements, the tool was eventually ready to commence operations.

This tool comprised a sturdy basket-type receptacle made of galvanised cable tray with appropriate apertures, on which a series of strong digging teeth were welded to the bottom edge, and the whole was welded to a stout two metre long tubular steel handle with two bracing struts. It looked like a large rake with a lawn mower grass box between the teeth and the handle.

It could be hard work to use at times, but then part of the benefit of my shell collecting activities is also exercise, and this tool provided that a-plenty. It was also to produce quite a few shells from places where, previously, I had been walking and only scratching the surface. It also flushed out the odd other marine specimen which always came as much as a surprise to him as it was to me. On the reef flat at Mastwah, one sweep of this dredging tool frightened the life out of an electric ray and gave me an unexpected shot of adrenalin! However, we both got over it and went our respective ways.

There is one particular area where the indentation in the reef flat is quite extensive and where there are fairly large coral heads dotted here and there in it like giant underwater stepping stones. Here, it was possible to dredge through the sand while standing on top of these clumps, gaining a lot of leverage. By working

the areas around these clumps, some excellent finds were recorded of various species of Terebra (affinis, babylonia, amanda, dimidiata and even a few maculata). It was also in this hole that I found my one and only Pterygia crenulata, form undulata. Also present there was an abundance of Sand Dollars at various stages of growth, plus many dead and broken shells.

Although it proved to be hard work dredging these holes, it was always the uncertainty of what I might find which kept me going, and even standing on top of one of the coral heads for a breather and a smoke can be a fascinating experience, especially when the water is calm and crystal clear. The multitudes of the various fish of all shapes, sizes and colours which appear can be quite breathtaking and can cause the rest period to be extended more than was intended, but worth every "wasted" minute.

Total concentration in an area of holes, large rocks, clumps of seaweed, etc., is a 'must' when looking out for specimens and also any unwelcome visitors. Consequently it can be disconcerting when a dark shape comes rushing at a great speed towards you. It is with some relief though, to realize that this is the shadow of a seagull flying above you, but it will fool you every time. I heard a story about one chap who was diving and who noticed a dark shape appear beside him. He lashed out at this with a knife, and, as far as we know, this black plastic rubbish sack will no longer be a danger to others.

The Coast Guard are now familiar with the sight of the "TH TH UNTHINKABLE" bobbing around at various places along the coast, and also the odd character who is attached to it.

At spasmodic times in the past, when the fishermen wanted to operate at a different area from me, it was arranged that I would be dropped off wherever I wanted to go, at an early hour in the morning, and would be collected later in the day. During the intervening hours I had the World to myself apart from the odd visit of the Coast Guard on his patrol, who was no doubt puzzled by the fact that there was no other vehicle parked anywhere near the vicinity of my operations. However, he would give a toot of his horn and I would give a wave, which was enough for us both to continue our respective operations.

There are various places along the shore where, in the tidal flat, there are large areas of rough gravel or sand with silt. Dredging these areas produces a "cloud" in the water when the silt is disturbed. I have found that by dredging in long lines, side by side, and then having a rest while the current dispels the silty cloud, that a subsequent examination with the "see-through" box can often be very rewarding. Not always, but often.

Various species of bivalve have been found in this manner, plus several species of Terebra. Not counted in these finds were the bones from barbequed goats which are to be found in plentiful numbers near some beach areas.

There are other areas in the tidal flat where, at low tide, it is well worth a visit, especially one particular area where a "sand island" appears. The varieties of shells which are exposed under these conditions could fill several buckets and can produce a gem of a find now and then. Walking over these areas in a grid pattern search with back and shoulders exposed to the very hot sun is not recommended to the casual searcher, who should wear some protection.

To be found on the reef flat during low tide are many beautifully coloured nudibranchs, which can be observed at very close quarters where these have been trapped in the many shallow pools on the reef. There can be several other surprises sometimes trapped there, so it is good sense to "look before you leap", otherwise you could be leaping after you have looked!

From time to time in earlier days, a group of us would go to a beach area with the intention of having a fresh fish barbeque, with sometimes the odd octopus. (This was to make sure everyone got a leg!)

The only equipment taken for the barbeque was a fabricated grille-affair which was mounted over a "box" made of rocks. Fuel, in the form of driftwood, is plentiful and it does not take long to reduce this to a bed of glowing embers.

The food is provided fresh from the sea, of course, and some beautiful fish were submitted from individual catches for approval prior to cooking. Any excess was taken back to site to go into a deep freeze for another occasion.

Before anything started, however, the "TH TH UNTHINKABLE", full of my own equipment and some of the equipment of the various fishermen, was to be found bobbing about along the edge of the reef, while I searched for whatever I could find, but mainly to supply fresh water and cigarettes to the fishermen at very reasonable prices. At a pre-arranged time, most of the fish which had already been caught were put on board the platform for transportation ashore, when the fire was lit and tended and the fish were cleaned. About an hour later all the guys would start to make their way to shore, fully ready to do justice to the catch when cooked.

In payment for all earlier services, the fishermen would often take the trouble to pick up the odd specimen of shell or coral for me on the way out, which was always much appreciated. I have some very fine pieces of coral at home in U.K. as a result of this activity.

They were the enjoyable early carefree days which, unfortunately, seem to be a thing of the past now that the Coast Guard have been provided with a track, almost as good as a road, which now provides access to more areas of the beach for almost any kind of vehicle, including buses. Even some small islands, which previously could only be reached by Landrover at low tide, are now joined by causeways which has completely ruined the previous natural beauty of the whole area.

Although these causeways have in-built large diameter steel pipes to allow tide flows, the shallow lagoons between these islands will no longer be the same, and large flocks of flamingos, which used to be found there, are no longer seen.

At one time, in one particular lagoon, there was an abundance of Strombus tricornis in all stages of development, but during recent visits, I have been unable to find even one despite an active search. There is a way out of the lagoon around the other side of the island, where there is deeper water, so, hopefully, they have merely migrated.

The various tools being carried on the "TH TH UNTHINKABLE" had been gradually added to from time to time, and now included several more items found to be required.

One item was a scoop affair, again made of galvanised cable tray with a piece of tubular steel about 60 cm long, and which was really an extension to my arm. This was used to collect items from the sea bed which were a little bit out of normal reach, and especially to collect items near mysterious-looking holes. It was exclusively used whenever the retrieval of the Conus textile or striatus was required.

Another item was a length of thick-gauge steel wire also about 60 cm long, with a loop handle on one end and a sharpened hook shape on the other. This has proved most useful in obtaining items found in a narrow crevice or in a hole.

Last, but not least, is my "comforter". This is a fairly strong trident type

head attached to a wooden stave about a metre and a half long. I keep it in case of the need to repel boarders, or to discourage inquisitive visitors, and is fortunately not often used, but it has been used.

The "see-through" box I commenced with has also been replaced with a much larger wooden box measuring about 60 cm x 30 cm, which provided me now with a much broader and better view of the underwater activity. This is also attached to my wrist with a length of nylon rope, so that both hands can be more or less free when necessary.

My normal Friday expeditions commence early in the morning when there is little or no wind, and as a result the sea is calm with very good visibility. From just around noon the wind can steadily increase in activity, and the resultant wave and current action will stir up sand and silt enough to make visibility difficult in those areas. In general I tend to transfer activities at that time to the reef flats where the hard surface makes visibility O.K. Should the wave action be too much for comfort, however, then I return to shore and engage in some long walks along the shore line whilst doing a bit of beachcombing.

During these days away from the site there have been occasions which stay in the mind, and which also provide tales to relate to my children in letters home, otherwise there would not be much to write about from here.

On one occasion, we went to a beach which was reputed to be very remote because access was not easy, and where I hoped to investigate near-virgin territory. Apart from the scenery, which made the trip worthwhile, nothing out of the ordinary was located although there were plenty of shells there. However, at one spot, I thought I was on to something.

A bright reddish colour caught my eye in a crevice in the coral, and there followed a fair amount of activity in order to bring this out for examination. The more resistance I experienced, the more determined became the effort expended, until eventually the prize was claimed. It was soon identified as BACTERIA MINIATURUS 1.5v - EXIDE c.1960.

So much for remote "virgin" beaches!

At Mastwah, in an area where about 20 km of soft track had to be negotiated in order to reach our selected beach, a walk along the shore line turned up an object not expected to be found there. It was an almost complete, but well corroded, Singer sewing machine of obvious vintage! How this machine got to this position will be a puzzle to me forever I think. There were, for sure, many places nearer to the village (about 25 km away) where this could have been ditched, and it was certainly much too heavy to have been washed ashore from any passing ship; so where did it come from?

At this same area, the tidal flat is very shallow and the reef is a fair distance from the shore. During the time it takes to walk to the reef through the calm water, some of the marine life which can be observed there over a distance is beautiful to see, and some surprising encounters can be experienced. Rays are to be seen in abundance, mainly the Reef Sting Ray, which offers no problems since our movements are anything but quiet, and quite deliberately so! However, they are a sight to behold with those distinctive blue spots.

It is at Mastwah, when I become really conscious of the variety of equipment and tools I am using on my expeditions. According to the time of the low tide, all this material has to be carried to or from the water for quite a distance, and involves about three trips. However, it is worth it to see what the area has to offer.

Over the past few years of operation, the main objective has been to locate different species of shells in order to enhance my collection, and also to indulge in much needed exercise in the fresh air and sunshine, and in general to "re-charge the batteries".

A successful expedition is not, therefore, necessarily one which has produced a "find", but one which has produced overall satisfaction during the time spent looking.

J. M. Douglas
c/o. Petrola International S.A., P.O. Box 29430, Rabigh 21911, Saudi Arabia

COLLECTORS IN EAST AFRICA

- 13 F. Stuhlmann (part 2)

List of molluscs described from material collected by Dr. F. L. Stuhlmann in
Tanzania, Uganda and Zaire*

Inserted in the front of the copy of Beschalte Weichtiere in the British Museum (Nat. Hist.) set of Deutsch-Ost-Afrika at 74 Dbq & fD, is a letter from von Martens to E. A. Smith which accompanied about 30 lots of specimens collected by Stuhlmann sent for Smith's expert opinion. Some of these had been identified with Smith species and others were tentative new species. Smith has summarised his reply to von Martens on the letter, crossing out where the identifications are wrong and agreeing that some were also new to him. It follows that some of these specimens are paratypes but I have not had time to hunt for them all in the general collection, although some have come to light in the past (e.g. one of Helix butumbiana - see J. Conch. 31: 179 [1983]). Some of the specimens which Smith informed Martens were not correctly identified were later described as new and one can work out what they are from the localities given and genera used. One at least, von Martens finally published under a different name from that used in the letter - this is Subulina columellaris, finally published as bicolumellaris. I found this specimen and the original label had the bi added by Smith.

B. Verdcourt

Achatina stuhlmanni von Mts., 1892. Zaire, W. of the Upper Ituri R. (type**). Same. Ancylus stuhlmanni von Mts., 1897. Tanzania, Lake Victoria, Bussisi (type).

Burnupia stuhlmanni (von Mts.).

Ampullaria erythrostroma Reeve var. stuhlmanni von Mts., 1897. Zaire, SW. Kassenje (syntypes). Pila ovata (Ol.).

Ampullaria gordonii Smith var. bukobae von Mts., 1897. Tanzania, Bukoba (syntypes). Pila ovata (Ol.) (mentioned from three sites - Ufer des See, eine Tumpel und Kleine Bach).

*Although Stuhlmann collected a few molluscs in Mozambique (von Martens, 1897; Connolly, 1925) all were known species.

**All types are in the Zoological Museum of the Humboldt University, East Berlin with the exception of a few elsewhere. Where the word type is used the exact kind of type is not known as it is not always clear if there is more than one specimen and I failed to note this during my visit in 1959.

Ampullaria ovata (Ol.) var. deckeni von Mts., 1897. Zanzibar, Muera Brücke & Tanzania, Bagamoyo, Mengwa-Teich (also Pangani [Schmidt] and unlocalised [von der Decken] syntypes). Pila ovata (Ol.) (adusta Reeve form).

Ampullaria ovata (Ol.) var. emini von Mts., 1897. Zaire, Lake Albert Edward, Rumande. Tanzania, Karagwe, Kagera R. at Kayonsa and Lake Victoria, Nyemirembe (Namirembe) (also ? Kenya, Mhugu (Neumann) (syntypes). Pilsbry & Bequaert give the type locality as Nyemirembe which can be accepted as a choice. Pila ovata (Ol.) (gordoni [Smith] form).

Atoxon aurantiacum Simroth, 1895. ? Tanzania, W. Mpororo Mts., SE. near Migore (holotype†) (Mpororo Mts. are on the Uganda, Tanzania, Rwanda border). Atoxon pallens Simroth.

Atoxon brunneum Simroth, 1895. Zaire, Ruwenzori at Semliki Ferry (holotype†). Atoxon pallens Simroth.

Atoxon flavum Simroth, 1897. Zaire, W. of Lake Albert Edward, Kishakka (Katambaru) (syntypes†). Atoxon pallens Simroth.

Atoxon lineatum Simroth, 1895. Tanzania, S. Lake Victoria, Kome Islands. (syntypes†). Atoxon hildebrandti Simroth.

Atoxon martensi Simroth, 1910. 'Ostafrika' (holotype†). Same.

Atoxon pallens Simroth, 1895. Zaire, NW. of Lake Albert, Kirima (syntypes†). Same.

Atoxon robustum Simroth, 1895. Tanzania, Lake Victoria, Kome Islands (holotype†). Atoxon hildebrandti Simroth.

Atoxon taeniatum Simroth, 1895. Zaire, Undussuma (syntypes†). Atoxon pallens Simroth.

Atoxon variegatum Simroth, 1895. Tanzania, Lake Victoria, Kome Islands (holotype†). Atoxon pallens Simroth.

Atrichotoxon punctatum Simroth, 1910. 'Ostafrika' (holotype†). Same.

Bithynia (Gabbia) puteana von Mts., 1897. Zanzibar Island (syntypes). ? Gabbia puteana (von Mts.).

Buliminus retirugis von Mts., 1895a (as retivugis). Zaire, Ruwenzori (Runssoro), W. slope of Butagu Valley in bamboo forest at 2500 m. (holotype). Cerastua trapezoidea (von Mts.).

Buliminus stuhlmanni von Mts., 1895a. Zaire, Semliki Valley: Karevia at W. foot of Ruwenzori, 1175 m., Bukende, Buginda (Bugundi, Orani) and Ongonya. Uganda, Manyonyo (syntypes). Pseudoglessula stuhlmanni von Mts. Pilsbry (1919) selected Karevia as the type locality. There should be a syntype in the BM.

Buliminus trapezoideus von Mts., 1892. Zaire, Ruwenzori, W. slope of Butagu Valley in bamboo forest at 2600 m. (holotype). Cerastua trapezoidea (von Mts.).

Buliminus (Rhachis) trichrous von Mts., 1891. Tanzania, Usagara, Ukwere, (Ukwera), Kissemo, Emin & Stuhlmann (type). Rhachistia picturata (Morelet).

Buliminus ugandae von Mts., 1895. Uganda, Manyonyo (Manyonyo) (holotype at Berlin, paratype at BM). Conulinus ugandae (von Mts.).

Cyclophorus elatior von Mts., 1892. Zaire, Migere in Butumbi (syntypes). Maizania elatior (von Mts.).

Cyclophorus intermedius von Mts., 1897. Zaire, between Ngesi and Mwutan-Nsige, W. of Issango-Itiri (no collector actually given). Uganda, Murchison-Bai, Mjongo (syntypes). Maizania elatior (von Mts.).

Cyclophorus (Ditropis ?) papillaris von Mts., 1892. Zaire, Migere in Butumbi (type). Afroditropis papillaris (von Mts.).

Cyclostoma letourneuxi (Bgt.) var. stuhlmanni von Mts., 1897. Tanzania, Usakami to Usagara, Mkatta-Bach (Emin & Stuhlmann) (Type). Tropidophora letourneuxi stuhlmanni (von Mts.).

Ennea amicta var. brevior von Mts., 1897. Zaire, Bundeko, E. of the Issango R. (syntypes). Gulella pupa (Thiele). Thiele gives the locality as Butumbi but worked with the same material as von Martens, see Pilsbry (1919:228). Strictly speaking this should be called G. brevior but Thiele's name is well known.

Ennea brevis Thiele, 1911. Zaire, Migere in Butumbi (type). Ennea curvilamella sensu von Mts. in part, non Smith. Gulella brevis (Thiele).

Ennea excavata von Mts., 1892. Zaire, Butumbi (type). Gulella excavata (von Mts.).

Ennea exogonia von Mts., 1895. Zaire, Ruwenzori, W. slope of Butagu Valley, 2600 m.

(type). Gulella exogonia (von Mts.).
Ennea geminata von Mts., 1895. Zaire, Ruwenzori, Butagu Valley, bamboo forest at 2600m. Uganda, Manyonyo (syntypes). Ptychotrema geminatum (von Mts.).
Ennea latula von Mts., 1895. Zaire, Butumbi, Migere (type). Gonaxis ('Marconia') latula (von Mts.).
Ennea limbata von Mts., 1892. Zaire, Ruwenzori, W. slope of the Butagu Valley at 2600 m. (syntypes?). Ptychotrema limbatum (von Mts.).
Ennea linguifera von Mts., 1895. Zaire, Semliki Forest, Bukende and Ongenya (syntypes). Gulella (Primigulella) linguifera (von Mts.).
Ennea ovalis Thiele, 1911. Zaire, Ruwenzori, camp III, 3100 m. (type). Ennea curvilamella sensu von Mts., 1897 in part, non Smith. Gulella ovalis (Thiele).
Ennea paradoxula von Mts., 1895a. Zaire, Ruwenzori, Karevia (type). Ptychotrema paradoxulum (von Mts.).
Ennea planidens von Mts., 1892. Zaire, Semliki Valley, Bugundi (Orani) (Buginda) (type). Gulella planidens (von Mts.).
Ennea quadrinodata von Mts., 1895. Zaire, Semliki Valley, Bukende (type). Ptychotrema quadrinodatum (von Mts.).
Ennea runsorana von Mts., 1892. Zaire, Ruwenzori, Karevia (syntypes). Von Martens later (1897) spelt the epithet with two ss. Ptychotrema runsoranum (von Mts.).
Ennea stuhlmanni von Mts., 1892a. Uganda, Masaka, Buddu (holotype). Ptychotrema stuhlmanni (von Mts.).
Ennea triplicina von Mts., 1895. Zaire, Semliki Valley, Bugundi (type). Gulella (Plicigulella) triplicina (von Mts.).
Geostilbia stuhlmanni von Mts., 1897. Zaire, Ruwenzori, W. slope of Butagu Valley, bamboo forest at 2600 m. (type). Nothapalus stuhlmanni (von Mts.).
Glessula runssorina von Mts., 1895. Zaire, Ruwenzori, Butagu Valley at 3100 m., 'Lager III' (syntypes). Bocageia runssorina (von Mts.).
Hapalus delicatus (Taylor) var. gracilior von Mts., 1897. Zaire, Semliki River, Ongenya (type). Opeas delicatum gracilior (von Mts.). This is unlikely to be related to the typical coastal race. Pilsbry (1919) puts it in Curvella.
Hapalus conoideus von Mts., 1892. Zaire, Migere in Butumbi, 'am Südufer des Ngesi' (type). Curvella conoidea (von Mts.).
Helicarion auriformis Thiele, 1911. Zaire, Ruwenzori, W. slope of Butagu Valley at 2600 m. (also Schubotz specimens from Kwidjwi Island and Upper Ituri) (syntypes). Helicarion lymphascens sensu von Mts., 1897 non lymphaseus Morelet. Mesafricarion auriformis (Thiele). Pilsbry (1919) selected the Butagu Valley as type locality.
Helicarion issangoensis Thiele, 1911. Zaire, Semliki R. ferry (Issango) and Ruwenzori, W. foot, Karevia (syntypes). Helicarion cailliaudi sensu von Mts. in part non Morelet (as Vitrina). ? Chlamydarion issangoensis (Thiele).
Helicarion stuhlmanni von Mts., 1895a. Zaire, Ruwenzori, W. slope of Butagu Valley, in bamboo forest, 2600 m. (type). Chlamydarion stuhlmanni (von Mts.).
Helicarion subangulatus von Mts., 1895a. Zaire, Semliki Valley, Bukende (Bundeko fide von Mts., 1897 - almost the same place, as pointed out by Pilsbry (1919) (type). Same (correct genus not known).
Helicarion succulentus von Mts., 1895a (as succulentes). Zaire, Ruwenzori, W. slope of Butagu Valley, in bamboo forest, 2600 m. (type). Chlamydarion succulentus (von Mts.).
Helix bellula von Mts., 1892a. Uganda, Buddu (said to have been collected by Emin & Stuhlmann) (type). Trochozonites bellula (von Mts.).
Helix bukobae von Mts., 1895. Tanzania, Bukoba (type). Halolimnohelix bukobae (von Mts.).
Helix butumbiana von Mts., 1895. Zaire, Migere in Butumbi (holotype; one specimen in BM has been considered a paratype). Prositala butumbiana (von Mts.).
Helix karewia von Mts., 1892. Zaire, W. foot of Ruwenzori, Karewia (type). Haplohelix karewia (von Mts.).
Helix runssorina von Mts., 1895a. Zaire, Ruwenzori, W. slope of Butagu Valley at 3000 m. and Camp III, 3100 m. (syntypes). ? Halolimnohelix runssorina (von Mts.).
Isidora strigosa von Mts., 1897. Tanzania, Lake Victoria, Bukoba (also Masai-Nyika

(Neumann) and Lake Victoria (Emin & Junker) (syntypes). ?Bulinus trigonus (von Mts.).

Isidora transversalis von Mts., 1897. Tanzania, Lake Victoria, Bumbide Island, Ndukali (type). Bulinus transversalis (von Mts.).

Lanistes stuhlmanni von Mts., 1897. Tanzania, Dar es Salaam (syntypes). Same.

Lanistes ovum (Peters) var. plicatus von Mts., 1897 (non von Mts., 1879, a Madagascan species). Tanzania, Ugogo, Ilindi (Emin & Stuhlmann) (also between Tabora and Lake Tanganyika (Böhm & Reichard) (syntypes). Lanistes ovum (Peters).

Limicolaria acuminata von Mts., 1895. Zaire, W. of Lake Albert, NW. Lendu, forest of R. Boa at about 2°10' N. (type). Limicolaria flammulata (Pfr.)

(All Limicolaria reductions are those of Crowley and Pain, 1970).

Limicolaria cailliaudi (Pfr.) var. stuhlmanni von Mts., 1891. Tanzania, Ugogo, Matangisi (type). Limicolaria cailliaudi (Pfr.).

Limicolaria colorata 'Smith' var. fuscescens von Mts., 1897. Zaire, S. shore of Lake Albert Edward, Migere and Iwinsa in Butumbi. Tanzania, Bukoba, Karagwe, Kufuro (syntypes). Limicolaria martensiana fuscescens von Mts. (Smith never described a Limicolaria colorata). Pilsbry (1919) does not mention the Tanzanian locality.

Limicolaria martensiana (Smith) var. multifida von Mts., 1895. Zaire, between Lakes Albert and Edward and W. foot of Runssoro (Stuhlmann); Kenya, Lake Victoria (Fischer; Neumann) (syntypes). Limicolaria martensiana martensiana (Smith).

Limicolaria martensiana (Smith) var. pallidistriga von Mts., 1895. Zaire, S. of Lake Albert Edward, Matambuka (Vichumbi) (type). Limicolaria martensiana (Smith).

Limicolaria nilotica (Pfr.) var. emini von Mts., 1891. Tanzania, Ugogo, Mjassa (syntypes). Burtoa nilotica giraudi (Bgt.).

Limicolaria nilotica (Pfr.) var. oblonga von Mts., 1895. Tanzania, S. shores of Victoria Nyanza (later references give between Bukesse and Ngome) (syntypes). Burtoa nilotica giraudi (Bgt.).

Limnaea humerosa von Mts., 1897. Uganda, Mengo. Tanzania, Lake Victoria, Itole (also Ubugwe, Irangi and Bubu R. near Irangi (Neumann)) (syntypes). Lymnaea natalensis Krauss.

Limnaea nyansae von Mts., 1892a. Tanzania, Lake Victoria, Bukoba, Tavalyo (Towalio) near Ndukali (syntypes). Lymnaea natalensis Krauss.

Limnaea undussumae von Mts., 1897. Zaire, W. Lake Edward, Rumande. Tanzania, Undussuma, brook beyond the Tararo (syntypes). Lymnaea natalensis Krauss.

Pilsbry (1919) chose Undussuma as the type locality.

Melampus hypoleucus von Mts., 1897. Zanzibar Island, between Ngambo and Nasimoyo (also Tanzania, Pangani (Conrad) (syntypes). Same.

Melania tornata von Mts., 1892a. Zaire, Duki R., near Buessa, W. of Lake Albert Edward (syntypes). Potadoma tornata (von Mts.).

Mutela bourguignati Bgt. var. smithi von Mts., 1897. Uganda, Buddu (also ?Kenya, Mhugu (Neumann) and Tanzania, Bussisi and Maissome Island (Emin Pasha)) (syntypes). Same.

Mutela bourguignati Bgt. var. truncata von Mts., 1897. Uganda, Buddu (also ?Kenya, Mhugu (Neumann)) (syntypes). Same.

Mutela nilotica (Cailliaud) var. emini von Mts., 1897. Zaire, Lake Albert, near Kassenje, also used for spoons in S. Undussuma and by the Babira (Wandel-Wawira) probably from Ituri R. (syntypes). Mutela emini von Mts.. Pilsbry and Bequaert (1927) have very sensibly restricted the type locality to near Kassenje as all the material Stuhlmann saw probably came from Lake Albert.

Opeas limpidum von Mts., 1897. Zaire, Bukende (type). Streptostele limpida (von Mts.).

Opeas streptosteloides von Mts., 1897. Uganda, Buddu (von Mts. states Emin Pasha and Stuhlmann but the latter went alone to Uganda) (type). Streptostele streptosteloides (von Mts.).

Opeas subvaricosum von Mts., 1897. Zaire, Ruwenzori, Camp III (type). Varicostele subvaricosa (von Mts.).

Physa trigona von Mts., 1892a. Tanzania, Lake Victoria, SW. Creek, Bukome (type). Bulinus trigonus (von Mts.).

- Planorbis apertus von Mts., 1897. Zaire, Lake Albert Edward, Kirima (type).
Ceratophallus apertus (von Mts.).
- Planorbis choanomphalus von Mts. var. basisulcatus von Mts., 1897. Tanzania, Lake Victoria, Kassarasi Island and Bukoba Bay. Zaire, Lake Albert Edward, Vitschumbi, subfossil (syntypes). Biomphalaria choanomphala (von Mts.).
- Planorbis sudanicus von Mts. unsp. group major von Mts., 1897. Based on many specimens including references to previous authors Smith, Bourguignat and Sturany; Stuhlmann localities: Tanzania, Karagwe, Ruanyana See near Weranyanye, Zaire, Lake Edward, Kiruwe, Vitschumbi and Katarenge (subfossil) (syntypes).
Biomphalaria sudanica (von Mts.).
- Sphaerium stuhlmanni von Mts., 1897. Tanzania, Lake Victoria, Bussisi (Busisi), Smyth-Sund (type). Same.
- Spatha divaricata von Mts., 1897. Tanzania, Lake Victoria, Speke Gulf, Simin R. near Massansa (Emin & Stuhlmann) (type). Aspatharia divaricata (von Mts.).
- Spatha rotundata von Mts., 1897. Tanzania, Wembere Steppe, near Nyaua (type).
Aspatharia rotundata (von Mts.).
- Spatha stuhlmanni von Mts., 1897. Zaire, Undussuma, Ituri R. (Emin & Stuhlmann) (type). Aspatharia stuhlmanni (von Mts.).
- Spatha trapezia von Mts., 1897. Uganda, Lake Victoria, Buddu (von Mts. states Emin & Stuhlmann but the latter went alone to Uganda). Tanzania, SW. Lake Victoria, near Nyemirembe and Nyamagotso (Emin & Stuhlmann) (also Tanzania, Bukoba and ?Kenya, Mhugu (Neumann)) (syntypes). Aspatharia trapezia (von Mts.).
- Spatha trapezia von Mts. var. senilis von Mts., 1897. Uganda, Buddu, Towalio and Soweh Island (Emin & Stuhlmann see note above) (syntypes). Aspatharia trapezia (von Mts.).
- Spatha wahlbergi (Krauss) var. dorsalis von Mts., 1897. Tanzania, Ugogo, Ilindi (Hirindi) and Myesse (Mssesse) (Emin & Stuhlmann) (also Mozambique, R. Zambezi, Tette and Sena (Peters) (syntypes). Aspatharia wahlbergi hartmanni (von Mts.).
- Streptaxis pusillus von Mts., 1897. Zaire, Ituri R., Bukende (syntypes). Gonaxis pusillus (von Mts.). There should be a specimen at the BM.
- Streptostele costulata von Mts., 1892. Zaire, Butumbi (syntypes). Same. Syntype at BM.
- Streptostele costulata von Mts. var. minor von Mts., 1897. Zaire, Ruwenzori, Karewia. Uganda, Buddu (syntypes). Streptostele minor von Mts. Raised to specific rank by Pilsbry.
- Stuhlmannia picta Simroth, 1893. Tanzania, Bukoba, Bussiro (syntypes[†]). Bukobia picta (Simroth). Stuhlmannia Simroth is a later homonym of Stuhlmannia Michaelsen, 1890. There is also a Stuhlmannia Taub., 1895 in the Leguminosae but that of course is not affected in any way by zoological names.
- Subulina bicolumellaris von Mts., 1895. Zaire, Ruwenzori, Karewia, 1175 m. (syntypes). Same. Syntype in the BM.
- Subulina castanea von Mts., 1895a. Zaire, Ruwenzori, 2500-3800 m. (syntypes).
Oreohomorus castaneus (von Mts.).
- Subulina elegans von Mts., 1895. Zaire, Ngesi to Mwutan, Ongenya, Bundeko, Bukendi, Bugundi, Migere. Uganda, Monyonyo (syntypes). Pseudoglessula elegans (von Mts.). There is a syntype in the BM.
- Subulina mamboiensis Smith var. nitida von Mts., 1897. Zaire, Migere in Butumbi (syntypes). Oreohomorus nitidus (von Mts.). Raised to specific rank by Thiele.
- Subulina mamboiensis Smith var. circumstriata von Mts., 1897. Zaire, Ruwenzori, bamboo forest, 2600 m. (type). Oreohomorus circumstriatus (von Mts.). Raised to specific rank by Thiele.
- Subulina paucispira von Mts., 1892. Zaire, Ruwenzori, Karewia and ferry at R. Ituri (syntypes). Nothapalus paucispira (von Mts.). Following Pilsbry and Connolly I leave this curiously formed specific epithet as a noun - the genus is masculine.
- Subulina pergracilis von Mts., 1897. Zaire, between Lake Albert Edward (Ngesi) and Lake Albert (Mwutan), Issango Ferry, W. Issango, Itiri, and Bukende (syntypes). Same.
- Subulina perstriata von Mts., 1895. Zaire, Migere in Butumbi (type). Same.

Subulina pinguis von Mts., 1895. Zaire, Bukende on the Issango (type). Same.
Subulina silvicola von Mts., 1895. Zaire, Migere in Butumbi (type). Subulona silvicola (von Mts.).
Subulina subcrenata von Mts., 1895. Zaire, Migere in Butumbi (type). Same.
Subulona clavaeformis Thiele, 1911. Tanzania, Uluguru Mts., Lukwangule Peak, 2500 m. (syntypes). Subulina mamboiensis sensu von Mts. in part non Smith. Same.
Succinea corticalis von Mts., 1895. Tanzania, Wembere Steppe (syntypes). Probably Quickia concisa (Morelet).
Tayloria iterata von Mts., 1897. Tanzania, Uluguru Mts., Tegetoro, (type). Same.
Thapsia curvatula von Mts., 1897. Tanzania, Uluguru Mts., Tegetoro (also East Usambara Mts., Derema (Conradt) and Magao, Kitohau (Lieder)) (syntypes). Same.
Thapsia hanningtoni Smith var. fasciata von Mts.. Zaire, Ituri Ferry. Uganda, Manyonyo (syntypes). Identity not certain but unlikely in reality to have anything to do with true hanningtoni and much more likely related to T. cinnamomeozonata Pilsbry and T. eucosmia Pilsbry both described from the Ituri Forest.
Thapsia hanningtoni Smith var. stuhlmanni von Mts., 1897. Zaire, Butumbi and W. foot of Ruwenzori, Karevia. Tanzania, S. Lake Victoria, Kome Island (syntypes). Identity uncertain but probably not related to hanningtoni.
Trichotoxon (Spirotoxon) elegans Simroth, 1897. Tanzania, Kingani R., Dundee (syntypes†). Urocyclus elegans (Simroth) (Spirotoxon used as genus and subgenus in the same paper).
Trichotoxon maculatum Simroth, 1897. Uganda, Sesse (Sese) Islands, (holotype†). Trichotoxon heynemanni Simroth.
Trichotoxon (Spirotoxon) stuhlmanni Simroth, 1903. Tanzania, without recorded locality (holotype†). Urocyclus elegans (Simroth).
Trochonanina mesogaea von Mts., 1895. Zaire, W. of Lake Albert (type). Same.
Unio ambifarius von Mts., 1897. Tanzania, Dar es Salaam (holotype). Caelatura ratidota (Charmes).
Unio multicolor von Mts., 1897. Tanzania, SW. Lake Victoria, Sirwa Island and Bukoba (also near Bukoba (Neumann)) (syntypes). Caelatura hauttecoeurii ruellani (Bgt.).
Unio ngesianus von Mts., 1897. Zaire, Lake Albert Edward (Ngesi), NW. shore, Kishakka and subfossil near Kaha-ekjo (syntypes). Caelatura stuhlmanni (von Mts.).
Unio stuhlmanni von Mts., 1897. Zaire, SW. Lake Albert Edward, Vitschumbi (Vichumbi), Kiruwe and Katarenge (syntypes). Caelatura stuhlmanni (von Mts.).
Vaginula aequatorialis Simroth, 1895. Zaire, Ongonya (holotype†). Laevicaulis stuhlmanni (Simroth).
Vaginula decipiens Simroth, 1895. Tanzania, Lake Victoria, Mwanza, Ssosswe Island (type†). Laevicaulis striatus (Simroth).
Vaginula obscura Simroth, 1895. Zaire, Undussuma (type†). Laevicaulis striatus (Simroth).
Vaginula schnitzleri Simroth, 1893. Zaire, W. foot of Ruwenzori, Karevia, 1300 m. (holotype†). Laevicaulis stuhlmanni (Simroth).
Vaginula striata Simroth, 1895. Zaire, W. Lendu, Massiba (Massobba) (type†). Laevicaulis striatus (Simroth).
Vaginula stuhlmanni Simroth, 1893. Zaire, Ruwenzori, Beni, 1300 m. (holotype†). Laevicaulis stuhlmanni (Simroth).
Vaginula substriata Simroth, 1895. Zaire, Kibali-Ituri, W. Lendu, Abumbi R., 1200 m. (holotype†). Pseudoveronicella liberiana (Gould).
Vitrina?oleosa von Mts., 1895a. Zaire, Ruwenzori, Camp IV (syntypes). Same.
Vivipara costulata von Mts., 1892a. Tanzania, Lake Victoria, SW. end, Kassarosi Island (syntypes). Bellamyia costulata (von Mts.).
Vivipara costulata von Mts. var. trilirata von Mts., 1897. Tanzania, Lake Victoria, Bumbide Island, Ndukai (type). Bellamyia costulata trilirata (von Mts.).
Vivipara meta von Mts., 1897. Tanzania, S. Lake Victoria, Kassarosi Island (Kassarasi) (syntypes). Bellamyia phthinotropis (von Mts.).
Vivipara phthinotropis von Mts., 1892a. Tanzania, SW. part of Lake Victoria, Namagotso (Njamagotso) (type). Bellamyia phthinotropis (von Mts.).

Vivipara rubicunda von Mts. var. subturrita von Mts., 1897. Tanzania, S. Lake Victoria, Bussisi (holotype). Bellamya unicolor (Olivier) (fide D. S. Brown in litt.).

Vivipara trochlearis von Mts., 1892A. Tanzania, Lake Victoria, Sirwa Island (syntypes). Bellamya trochlearis (von Mts.).

Vivipara unicolor (Olivier) var. conoidea von Mts., 1897. Zaire, Lake Albert Edward, S. end, Iwinsa, subfossil (syntypes). Bellamya capillata conoidea (von Mts.).

Vivipara unicolor (Olivier) var. elator von Mts., 1897. Tanzania, Lake Victoria, Bussisi, Smyth Sund and Emin Pasha Gulf, Nyemirembe (syntypes). Bellamya unicolor (Olivier).

(part 3, final, will appear in the next issue of the Newsletter)

A NOTE ON OTALA PUNCTATA AND OTALA LACTEA

(ALSO MENTION OF OTALA APALOENA)

This is intended to be mainly a comment on the distinction between Otala punctata (Müller 1774) and Otala lactea (Müller 1774), discussing whether these names correspond or not to different species. The distinction constitutes an old problem, since the two specific names were proposed by Müller as referring to different species, but in practice it is often difficult to separate them. Recently the difficulty is echoed in a note by Mr. A. Menez in the Newsletter No. 101, June 1987.

It may be asked whether there are really two species, or only one polymorphic species in which the punctata is one form or a group of related forms, other forms being distinguished as belonging to another group, within a different species called lactea.

I have been studying both the polymorphism and the genetics of Otala lactea and found that punctata individuals segregate together with non-punctata ones. As anyone knows, segregation is the name given in Mendelism to the appearing of different classes or phenotypes in the descendants of a certain couple of individuals.

The best way to distinguish between two species is to apply the so-called biological criterion: the co-specific forms, or varieties, or sub-species, etc. (but not truly separate species) which are being considered may exchange genes between themselves. The exchange of genes in successive generations is what a genetic segregation demonstrates. Therefore, in the present case the segregation in one descendant of two types of shell, one with the granulate aspect of the punctata forms, the other without this aspect and corresponding to forms included in lactea, indicates that the two types belong to the same species.

The forms or varieties (the two designations are a question more of taste than of taxonomic rank) included in lactea have been described in old taxonomic work (for example, Bourguignat). Summarily, the varieties included in lactea are said to show dark bands which may be or may not be dotted or interrupted by white marks. The bands may be fused or separate and two albino types are also considered to belong to the species lactea. If the bands are all fused, the shell may look dark brown. The albinos are in one type with milky marks, in another type entirely white. Other varieties refer to the size of the shell.

The supposed species punctata appears to be less variable. The shell has a

dotted appearance where no bands are visible, or bands are present but without sharp edges and they are heavily dotted by whitish points or marks.

The varieties of the lactea plus punctata circle of forms may be understood by considering the basic features of their polymorphism. The bands may be either solid or decomposed into pigmented lines, or still, they may be more or less heavily dotted by whitish points or short segmentary marks. The dots and marks correspond to more calcified elements which constitute the shell. Decomposition into lines and the dotting may occur in bands whose colour goes from very light brown or fawn to dark brown and black. The heaviest decomposition into pigmented lines leaves no trace of bands, the lines then occupying also the umbilical region of the shell. These particulars, band colour, dotting and lines are genetically determined.

Bands, basically five, may fuse into one (all bands fused), or two groups, and there may be heterosematism: bands present only on the upper or the lower half of the shell. Every one of these characteristics is also genetic.

Shell ground colour may vary from whitish ivory to medium brown and, although rarely, albino shells without any pigmentation are segregated due, as usual, to a recessive Mendelian factor. Albino shells still show the basic structures of their bands, lines and dots, according to the rest of the genetic constitution of the individual.

All full grown shells, excepting the albino ones, show the typical pigmentation of the mouth, which goes from light brown to deep black and, for every shade, increasing colouration with the age of the snail. Juveniles do not show this pigmentation and I suspect that the question of the mouth having or not hard edges depends also on the age of the specimen and on circumstances which may have influenced shell growth. All combinations of ground shell colour, band pigmentation and mouth colouration may occur in nature, as also they appear in genetic segregations. The globous or depressed form of the shell, and therefore the contour of the mouth, as also the relative growth of the whorls are equally of genetic determination, although somewhat variable in expression.

According to these facts and the results I am obtaining in genetic work with the Otala of Portugal, the lactea and the punctata appear to be the same species. The specific name lactea seems preferable because it is more in use, not only in systematics but also in work in physiology, ecology and genetics. Besides, this name is mentioned in the original book by Müller in vol. II, page 19, the name punctata appearing afterwards on page 21.

There is another species, or so considered, now (in Real & Testud) referred to as Otala apalolena (Bourguignat 1867) and formerly (in Germain) as Archelix apalolena (Bourguignat 1867), whose characteristics are similar to those of punctata forms.

The differences between apalolena and the punctata plus lactea circle of forms are described by Bourguignat 1867, considering the characteristics of the shell and the reproductive system. In reality these differences appear to be gradual, instead of clear-cut, as would be necessary to distinguish unequivocally the three species. Thus it seems possible that apalolena is also a group of forms belonging to the lactea species, perhaps with geographic differentiation into a sub-species inhabiting, in addition to the Corsica Island, a restricted area in the South of France (East Pyrennes) probably prolonging through Catalonia.

In Bourguignat reference is made to different forms of punctata and lactea being more frequent in certain areas of Algeria and more recently the same is noted with respect to Morocco and Gibraltar by Menez. It would be worthwhile to

investigate the co-specificity or not between apalolena and lactea by means of genetic crosses. The apalolena is becoming so rare in France that it is urgent to do this work.

I do not know whether these conclusions on the lactea and the punctata forms apply to countries other than Portugal, for example Spain, Gibraltar and North African countries. There is a rather simple way of establishing whether distinct forms are co-specific. Individual broods of laying snails are collected and the snails which hatch from the eggs are reared, up to maturity if necessary so as to observe then their full characteristics. Regular appearance of distinct forms from individual broods indicates that such forms belong to the same species. Of course, complete proof that we are dealing with one species only needs that observation be extended to more than one generation, since different but allied species may occasionally hybridize, but interspecific hybrids are infertile or almost so. As a rule, however, the observation of what comes from individual broods is enough so that conclusions may be drawn on the co-specificity of distinct forms.

It may be remembered that in the lactea plus punctata circle of forms solid dark brown or black bands are recessive, relative to bands decomposed into lines or heavily dotted, so that crossings between solid-banded snails produce descendants exclusively with the same character. Given the habit of helicids of repeated pairings for fertilization, it is expected that in not too small populations the majority of the snails become fertilised by others of dissimilar characteristics, so that more than one class, with distinct characteristics, results from one brood.

R. M. Albuquerque de Matos

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THE MARINE MOLLUSCS OF PORTLAND HARBOUR AND THE FLEET, DORSET

The Weymouth area has a history of almost two centuries of molluscan studies, having engaged the attention of such well known workers as Pulteney, Forbes and Hanley, Gosse, Mansell-Pleydell and Sykes during the nineteenth century.

The last two decades have been particularly fruitful; some of the most recent work has in part been a response to potential and actual recreational and developmental pressures upon Portland Harbour and the Fleet, in order to assess and demonstrate the conservation value of these two important localities. In the process, unusually good cover of the sublittoral has been provided.

Since much of this is perhaps not readily accessible to members (see references), the marine molluscs of these two areas are listed below, with a brief indication of their status there. Sources of all the data are given, and these should be consulted for more detailed information. Descriptions of the shores and sublittoral covered are included in my articles of 1980, 1986a and 1987b.

The Fleet is an SSSI, private nature reserve and Ramsar site; the western side of Portland Harbour is an SSSI. Due to the conservation status and the presence of the Naval Base, access and collecting is restricted in some areas.

A total of 158 species is recorded live post-1950, 130 from the Harbour and 89 from the Fleet; 60 occur in both. Several are rare or local; two are not currently known elsewhere in Britain or Ireland, one of these being new to the British fauna (Paludinella and Caecum).

Unusual communities and habitats are represented, with some species living in atypical conditions. Others are southern or western species, at or close to their limits of distribution. The double low tide of Weymouth Bay is another factor presumably significant in the local marine ecology.

I should be grateful to hear from anyone visiting the area who may be able to add to the knowledge of the marine life of Portland Harbour and the Fleet.

DENNIS R SEAWARD
Area Representative, Sea Area 16, Portland

Sherborne, Dorset,

8th December 1988

SPECIES LIST

Records are from Seaward, 1980 and 1986a for The Fleet, or Seaward, 1987b for Portland Harbour, except where otherwise stated. All data known to me at December 1988 is included.

Species names and order generally follow the Sea Area Atlas; where different, the name used there is given in brackets.

Species	Portland Harbour	The Fleet
LORICATA		
<u>Leptochiton (Lepidopleurus) asellus</u> (Gmelin)	-	A, oc
<u>Lepidochitona cinereus</u> (L.)	A, fr	A, oc
<u>Callochiton achnatus</u> (Brown)	A, oc	A, oc
<u>Acanthochitona crinitus</u> (Pennant)	A, oc	A, ra
GASTROPODA: PROSOBRANCHIA		
<u>Emarginula fissura</u> (L.) (<u>reticulata</u>)	E	-
<u>Emarginula conica</u> Lamarck	-	A, fr
<u>Diodora graeca</u> (L.) (<u>apertura</u>)	C	-
<u>Patella vulgata</u> L.	A, co	A, fr
<u>Patella depressa</u> Pennant	A, ra (CPP)	-
<u>Helcion (Patina) pellucidum</u> (L.)	A, ra	-
<u>Acmaea virginea</u> (Müller)	A, oc	A, fr
<u>Calliostoma zizyphinum</u> (L.)	C	-
<u>Gibbula maus</u> (L.)	A, oc	A, ra
<u>Gibbula cineraria</u> (L.)	A, co	A, fr
<u>Gibbula umbilicalis</u> (da Costa)	A, co	A, fr
<u>Jurubinus (Cantharidus) striatus</u> (L.)	C	C, (DRS)
<u>Monodonta lineata</u> (da Costa)	A, ra, x	-
<u>Skenea serpuloides</u> (Montagu)	A, ra	A, oc (DRS)
<u>Prisolia pullus</u> (L.)	A, oc	A, oc
<u>Lacuna pallidula</u> (da Costa)	A, ra	-
<u>Littorina littorea</u> (L.)	A, co	A, fr
<u>Littorina saxatilis</u> (Olivi) (<u>rudis</u>)	A, co	A, co
<u>L. saxatilis tenebrosa</u> (Montagu)	-	A, co
<u>Littorina neglecta</u> Bean	A, oc	-
<u>Littorina mariae</u> Sacchi and Rastelli	A, fr	-
<u>Littorina obtusata</u> (L.)	A, co	A, fr
<u>Hydrobia ulvae</u> (Pennant)	-	A, fr
<u>Hydrobia ventrosa</u> (Montagu)	-	A, co

<u>Truncatella subcylindrica</u> (L.)	a, x	A, lo co
<u>Cingula trifasciata</u> (J.Adams) (<u>cingillus</u>)	A, oc	A, lo co
<u>Alvania (Cingula) semistriata</u> (Montagu)	A, oc	A, ra (DRS)
<u>Onoba semicostata</u> (Montagu)	A, fr	A, fr? (DRS)
<u>Onoba aculeus</u> (Could)	-	A, lo fr
		(Seaward, 1988)
<u>Manzonina (Alvania) crassa</u> (Zanmacher)	C	A, oc
<u>Rissoa parva</u> (da Costa)	A, co	A, fr
<u>Pusillina (Rissoa) inconspicua</u> (Alder)	A, oc	-
<u>Pusillina sarsi</u> (Loven) (<u>R. albella</u>)	A, ra	-
<u>Rissoa guerini</u> Recluz	A, lo fr	A, oc
<u>Rissoa lilacina</u> Recluz	A, oc	-
<u>Rissostomia (Rissoa) membranacea</u> (J.Adams)	A, lo oc	A, co
<u>Barleeia unifasciata</u> (Montagu)	A, ra	-
<u>Cingulopsis fulgida</u> (J.Adams)	A, oc	C
		(Palmer, 1987)
<u>Paludinella littorina</u> (Chiaje)	a, x	A, lo oc
		(Light, 1986)
<u>Rissoella diathana</u> (Alder)	A, oc	A, oc
<u>Rissoella opalina</u> (Jeffreys)	A, ra	-
<u>Omalogyra atomus</u> (Philippi)	A, ra	A, oc
<u>Ammonicera rota</u> (Forbes and Hanley)	-	?A
		(Palmer, 1987)
<u>Skeneopsis planorbis</u> (Fabricius)	A, ra	-
<u>Tornus subcarinatus</u> (Montagu)	C	-
<u>Caecum armoricum</u> de Folin	-	A, lo co
		(Seaward, 1988)
<u>Turritella communis</u> Risso	A, oc	-
<u>Vittium reticulatum</u> (da Costa)	A, fr	A, oc
<u>Cerithiopsis tubercularis</u> (Montagu)	A, oc	A, oc
<u>Epitonium (Clathrus) clathrus</u> (L.)	A, ra	-
<u>Calyptraea chinensis</u> (L.)	A, ra	A, oc
<u>Crepidula fornicata</u> (L.)	A, co, int	A, fr, int
<u>Lunatia (Natica) catena</u> (da Costa)	C	-
<u>Lamellaria perspicua</u> (L.)	A, fr	A, fr
<u>[Lamellaria latens</u> (Müller)	-	-(delete from Seaward, 1986b (JL))

<u>Trivia arctica</u> (Pulteney)	A, oc	-
<u>Trivia monacha</u> (da Costa)	A, oc	-
<u>Nucella lapillus</u> (L.)	A, ra	-
<u>Ocenebra erinacea</u> (L.)	A, oc	A, ra
<u>Buccinum undatum</u> L.	A, ra	-
<u>Chauvetia brunnea</u> (Donovan)	C	-
<u>Ninia (Massarius) reticulata</u> (L.)	A, fr	A, oc
<u>Ninia (Massarius) incrassata</u> (Strom)	A, fr	A, fr
<u>Ninia (Massarius) pygmaea</u> (Lamarck)	A, fr	-
<u>Mangelia brachystoma</u> (Philippi)	A, oc	A, ra
<u>Mangelia nebula</u> (Montagu)	A, oc	-
GASTROPODA: OPISTHOBANCHIA		
<u>Retusa obtusa</u> (Montagu)	A, fr	A, fr
<u>Retusa truncatula</u> (Bruguiere)	A, ra	A, ra (DRS)
<u>Retusa umbilicata</u> (Montagu)	-	-(delete from Seaward, 1986a)]
<u>Aminoea</u> (Turton and Kingston) sp. (juvs. indet.)	A, ra	A, oc
<u>Adera bullata</u> Muller	A, oc	A, co
<u>Philine aperta</u> (L.)	A, lo fr	-
<u>Philine punctata</u> (J. Adams)	A, oc	-
<u>Philine scabra</u> (Muller)	a	-
<u>Puncina coronata</u> (Quatrefages)	A, fr	A, co
<u>Chrysallida obtusa</u> (Brown)	C	-
<u>Chrysallida indistincta</u> (Montagu)	A, ra	-
<u>Ocostomia plicata</u> (Montagu)	A, oc	A, ra
<u>Ocostomia unidentata</u> (Montagu)	A, oc	A, oc
<u>Ocostomia acuta</u> Jeffreys	A, ra	-
<u>Brachystomia (Ocostomia) eulimoides</u> (Hanley)	-	A, ra (DRS)
<u>Eulimella laevis</u> (Brown)	A, ra	-
<u>Turbonilla lactea</u> (L.) (elegantissima)	A, oc	A, oc
<u>Turagula (Turbonilla) fenestrata</u> (Jeffreys)	A, oc	-
<u>Aplysia punctata</u> Cuvier	A, ra	-
<u>Berthella plumula</u> (Montagu)	a	A, ra
<u>Elysia viridis</u> (Montagu)	A, fr	A, fr
<u>Hermaea bifida</u> (Montagu)	A, ra	-

<u>Hermaea (Placida) dendritica</u> (Alder and Hancock)	A, oc	-
<u>Limapontia capitata</u> (Muller)	A, oc	-
<u>Limapontia senestra</u> (Quatrefages)	-	A, oc
<u>Alderia modesta</u> (Loven)	-	A, ra
<u>Dendronotus frondosus</u> (Ascanius)	-	A, ra
<u>Eoto coronata</u> (Gmelin) agg (juvs)	A, ra	A, ra
<u>Eoto millbayana</u> Lemche	A, ra	-
<u>Goniadoris rocosa</u> (Montagu)	A, ra	-
<u>Arcula gibbosa</u> (Risso) (cristata)	A, oc	-
<u>Acanthodoris pilosa</u> (Muller)	A, ra	A, oc
<u>Aegires punctilucens</u> (Orbigny)	a	-
<u>Palio nothus</u> (Johnston)	A, ra	A, oc
<u>Archidoris pseudoarxus</u> (Rapp)	A, ra (OPRU)	-
<u>Oncidoris bilamellata</u> (L.)	A, ra (OPRU)	-
<u>Corynella pedata</u> (Montagu)	a	-
<u>Aeolidia papillosa</u> (L.)	A, oc	A, oc
<u>Aeolidiella alderi</u> (Cocks)	A, lo fr	A, oc
<u>Eubranchius farrani</u> (Alder and Hancock)	A, ra	A, fr
<u>Eubranchius coriae</u> (Trinchese)	A, oc	A, oc
<u>Eubranchius</u> sp. (vittatus/cingulatus?)	-	A, ra
<u>Tergipes tergipes</u> (Forsk.)	A, ra	-
<u>Tenellia adspersa</u> (Nordmann)	-	A, oc
<u>Cuthona foliata</u> (Forbes and Goodsir)	-	A, ra
GASTROPODA: PULMONATA		
<u>Leucophytia bidentata</u> (Montagu)	a, x	A, co
<u>Ovatella (Phytia) myosotis</u> (Draparnaud)	a, x	A, co
SCAPHOPODA		
<u>Antalis vulgaris</u> (da Costa)	A, ra	-
BIVALVIA		
<u>Nucula nucleus</u> (L.)	A, co	-
<u>Nucula nitidosa</u> Winckworth (turgida)	A, fr (OPRU)	A, ra
<u>Anomia epnippium</u> L.	A, oc	(A, ra) (juvs. indet.)
<u>Mytilus edulis</u> L.	A, fr	A, fr
<u>Modiolus barbatus</u> (L.)	a	A, ra
		(Dyrynda, 1984)

<u>Musculus discors</u> (L.)	a	-
<u>Modiolarca tumida</u> (Manley) (<u>Musculus marmoratus</u>)	-	A, ra
<u>Ostrea edulis</u> L.	A, ra (& int)	A, oc
<u>Trassostrea vias</u> (Thunberg)	A, int	A, int (DRS)
<u>Pecten maximus</u> (L.)	A, ra	-
<u>Chlamys varia</u> (L.)	C	-
<u>Aequipecten</u> (<u>Chlamys</u>) <u>opercularis</u> (L.)	C	-
<u>Loripes lucinalis</u> (Lamarck)	A, co	A, fr
<u>Lucinoma borealis</u> (L.)	A, fr	A, ra (DRS)
<u>Pipiloonta rotundata</u> (Montagu)	E	-
<u>Thyasira flexuosa</u> (Montagu)	A, co	-
<u>Thyasira gouldi</u> (Philippi)	A, oc (OPRU)	-
<u>Relia suborbicularis</u> (Montagu)	c	A, ra
<u>Lasaea rubra</u> (Montagu) f. <u>pallida</u>	a, x	A, lo co (Seaward, 1987a)
<u>Lepton squamosum</u> (Montagu)	A, ra (OPRU)	-
<u>Pellinys</u> (<u>Montacuta</u>) <u>ferruginosa</u> (Montagu)	C	-
<u>Myella bidentata</u> (Montagu)	A, oc (OPRU)	A, ra (DRS)
<u>Acanthocardia echinata</u> (L.)	C	-
<u>Acanthocardia tuberculata</u> (L.)	A, oc	-
<u>Parvicardium ovale</u> (Sowerby)	A, oc	-
<u>Parvicardium scabrum</u> (Philippi)	c	-
<u>Parvicardium exiguum</u> (Gmelin)	A, oc	A, oc
<u>Cerastoderma edule</u> (L.)	A, fr	A, fr
<u>Cerastoderma glaucum</u> (Bruguiere)	-	A, fr/co
<u>Dosinia lunius</u> (L.)	A, oc	-
<u>Venus verrucosa</u> L.	A, oc	A, oc
<u>Circomphalus</u> (<u>Venus</u>) <u>casina</u> (L.)	-	a
<u>Vimoclea</u> (<u>Venus</u>) <u>ovata</u> (Pennant)	A, oc	-
<u>Chamelea</u> (<u>Venus</u>) <u>striatula</u> (da Costa)	A, fr	-
<u>Mercenaria mercenaria</u> (L.)	-	A, x, int
<u>Paphia</u> (<u>Venerupis</u>) <u>aurea</u> (Gmelin)	A, fr	A, oc
<u>Paphia</u> (<u>Venerupis</u>) <u>rhomboides</u> (Pennant)	A, oc	-
<u>Venerupis senegalensis</u> (Gmelin) (<u>pullastra</u>)	A, oc	-
<u>Tapes</u> (<u>Venerupis</u>) <u>decussata</u> (L.)	A, oc	A, oc
<u>Irus</u> (<u>Notirus</u>) <u>irus</u> (L.)	A, oc	A, oc

<u>Lysia undata</u> (Pennant)	B	-
<u>Macra stultorum</u> (L.) (corallina)	C	-
<u>Spisula solida</u> (L.)	C	-
<u>Spisula subtruncata</u> (da Costa)	A, oc	-
<u>Lutraria lutraria</u> (L.)	B	-
<u>Lutraria magna</u> (da Costa)	C	-
<u>Anulus</u> (<u>Tellina</u>) <u>squalidus</u> (Pulteney)	A, oc	B
<u>Anulus</u> (<u>Tellina</u>) <u>tenuis</u> (da Costa)	A, oc	-
<u>Fabulina</u> (<u>Tellina</u>) <u>fabula</u> (Gmelin)	A, oc (DRS)	-
<u>Moerella</u> (<u>Tellina</u>) <u>donacina</u> (L.)	A, ra	-
<u>Macoma balthica</u> (L.)	-	C
<u>Scrobicularia plana</u> (da Costa)	-	C
<u>Abra tenuis</u> (Montagu)	-	A, fr/co
<u>Abra alba</u> (W Wood)	A, co	-
<u>Abra nitida</u> (Muller)	A, oc	-
<u>Gari fervensis</u> (Gmelin)	A, oc	-
<u>Gari depressa</u> (Pennant)	B	-
<u>Azorus</u> (<u>Solecurtus</u>) <u>chamasolen</u> (da Costa)	A, ra	-
<u>Ensis ensis</u> (L.)	A, fr	-
<u>Ensis arcuatus</u> (Jeffreys)	A, fr	-
<u>Ensis siliqua</u> (L.)	A, oc	-
<u>Solen marginatus</u> (Pulteney)	-	A, ra
<u>Phaxas</u> (<u>Cultellus</u>) <u>pellucidus</u> (Pennant)	A, oc	-
<u>Sphenia binghami</u> Turton	A, ra	A, ra
<u>Corbula gibba</u> (Olivier)	A, co	C
<u>Hiatella arotica</u> (L.)	A, oc	-
<u>Gastrochaena dubia</u> (Pennant)	a	-
<u>Pholas dactylus</u> L.	a, x	-
<u>Farnea candida</u> (L.)	a, x	-(delete from Seaward, 1986a)
<u>Farnea parva</u> (Pennant)	-	A, ra
<u>Cochlodesma praetense</u> (Pulteney)	C	-
<u>Thracia phaseolina</u> (Lamarck)	A, oc	-
<u>Thracia villosiuscula</u> (Macgillivray)	C	-
<u>Thracia convexa</u> (W Wood)	A, ra	-
<u>Thracia distorta</u> (Montagu)	a	-

<u>Lyonsia norwegica</u> (Gmelin)	c	-
<u>Pandora inaequalis</u> (L.) (<u>albida</u>)	A, fr	-
CEPHALOPODA		
<u>Sepia officinalis</u> L.	C	C

Abbreviations used:

	pre 1900	1900-1950	post 1950
live record	a	A	A
Fresh shell	b	B	B
worn shell	c	C	C

co - common }
 fr - frequent }
 oc - occasional } in appropriate habitats
 ra - rare }

lo - local (specialised habitat)

int - not native

x - presumed extinct in area

JL - Mrs. Jan Light, pers. obs.

CPP - C.P. Palmer, pers. obs.

ERS - D.R. Seaward, pers. obs.

OPRU - Oil Pollution Research Unit (Howard, Howson and Moore, 1988)

REFERENCES:

- Dyrynda, P. (1984) Investigation of the subtidal ecology of the Fleet lagoon (Dorset). Report to Nature Conservancy Council
- Howard, J., Howson, C., and Moore, J., (1988) Survey of harbours, rivers and estuaries in Southern Britain: Portland and Weymouth Harbours. Oil Pollution Research Unit Report to NCC
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J. Conchology 32:260
- Palmer, C.P., (1987) New records of marine molluscs in the Fleet, Dorset.
J. Conchology 32:384
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- " " " (1986a) The Fleet, Dorset - a saline lagoon, with special reference to its molluscs. Porcupine Newsletter 3:140-6 & 173
- " " " (1986b) Porcupine field meeting at the Fleet, Dorset.
Porcupine Newsletter 3:215-217
- " " " (1987a) Lasaea rubra in an unusual habitat, in the Fleet, Dorset. J. Conchology 32:387

Seaward, D.R., (1987b) *The marine molluscs of Portland Harbour, Dorset.

Proc. Dorset NHAS 108 (for 1986):159-167

" " " (1988) Caecum armoricum de Folin, 1869 new to the British marine molluscan fauna, living in the Fleet, Dorset, within an unusual habitat. Proc. Dorset NHAS 109 (for 1987):165

(References marked thus * list most relevant earlier work known to me).

PUBLICATIONS RECEIVED

NOTE: I will hold these publications for three months in the interest of anyone who would like to borrow them. T. E. Crowley

NATURE CONSERVANCY COUNCIL: 14th. REPORT, 1 April 1987 to 31 March 1988.

The Report comes in the familiar format, systematically arranged, very readable and well illustrated.

The trend of public opinion seems to have moved in favour of conservation, assisted probably by various 'scare stories' in the press, and the Council reports an encouraging trend towards more positive support: to some extent this appears to be world-wide. The NCC is continuing to work very closely with the Government and seems to find its advice increasingly heeded. The areas of antagonism between agriculture and conservation are diminishing, co-operation with Industry increases and local government is showing increasing sensitivity within its area of concern.

Taken in general, this may be regarded as stopping the rot of the last forty years, and if public opinion continues to change positively, we may perhaps look soon for an improvement in the environment more considerable than anything achieved so far.

This is not to say that there are not still some areas of grave concern and these are detailed in the report. These include upland afforestation, fish-farming, proposed docks and tidal barrages in sensitive places, new construction, water pollution and acid rain.

Much is being done in the way of education and a rapidly growing number of people wish to become actively involved - a large proportion of them from the younger generation.

The NCC considers that the Wildlife and Countryside Act of 1981 is working fairly well provided it receives reinforcement from time to time by means of Orders in Council; progress is sometimes slow but the results are encouraging. There is concern however, that Private Bills can still be used as a means of by-passing Public enquiries, and they do not need an environmental assessment.

On the whole, a cheerful report.

POIRIERIA, Vol. 15, No. 4 (January 1988)
(Auckland Museum Conchology Section, N.Z.) Ed. Ian Scott, 25 Halston Road, Balmoral, Auckland 4.

This issue reports, with very natural and sincere regret, the death of Dr. A.W. Baden Powell, and an obituary is attached. Dr. Powell probably did more to popularise the local study of the Mollusca than anyone, and his contribution to the study was certainly outstanding. He originated the Conchology Section of the Auckland Museum as a club for students in 1930 and it continues to thrive. Though a self-taught amateur, Powell became Assistant Director of the Museum and was awarded an Hon. D.Sc. of the University of New Zealand and a Fellowship of the Royal Society of New Zealand.

The publication prints reports of collecting trips and the observation of rareties; there is a note on Athorocophorus bitentaculatus by Martin Walker. This is the Leaf Veined slug; its habits are briefly described and a new habitat noted.

A visit to Tonga is described by Nancy Smith who describes what may be found there with some notes on the preparation of molluscan food by the locals.

Some very fine colour plates are provided with this issue and it is intended that this should become a regular feature. The plates illustrate a thoroughgoing article on the genus Cellana in New Zealand by J. R. Penniket and on the molluscan inhabitants of the Mahia peninsula by David Gibbs.

New locality records are listed and there is a note by W. P. Thomson on the predation of the bivalve Hyridella menziesi by water rats, species not mentioned, much as water voles in this country will eat Anodonta spp. by nipping off the ends of the shell.

Margaret Morley writes on the habits of Musculista senhousia (Benson), rapidly extending its range in the Islands.

GENERAL NOTES

LETTER FROM A MEMBER

"Apart from a holiday in Southern Brittany in 1983, all my collecting has been carried out in the British Isles. This has made choice of collecting locations and subsequent identification of specimens comparatively straightforward. This year we are planning a trip to Canada for three weeks in July and August. We are flying to Edmonton. From there we hire a camper to explore the Edmonton Jasper and Banff areas before driving over the Rockies to Vancouver and the West Coast. I would be delighted to hear from any members who may know the areas to be visited and who may have suggestions for local collecting. As well as collecting modern molluscs I am also interested in Tertiary Fossils. Bill Pocock, [REDACTED], Farnham, Surrey, [REDACTED]."

SELBORNE CELEBRATES 15 - 23 JULY 1989

A festival week in Selborne, Hampshire, to mark the bicentenary of the publication of The Natural History and Antiquities of Selborne by Gilbert White. The programme of events will include the opening of an exciting new exhibition at the museum, as well as music recitals, readings, a symposium, displays, guided walks, lectures, flower festival in the church and garden openings.

For information please write to The Gilbert White Museum, The Wakes, Selborne, Alton, Hampshire, GU34 3JH, enclosing a stamped addressed envelope.

COCHLICELLA ACUTA (Müller) IN BUCKINGHAMSHIRE

Individuals of this attractive snail were found living on farmland in the Buckinghamshire Chilterns in the summer of 1988.

The site is a steep, south-facing slope near West Wycombe, within the 10km grid-square SU89. The soil is a shallow rendzina reminiscent of the Icknield series, over Middle Chalk. The vegetation is coarse, unimproved chalk pasture, ungrazed for several years, and currently dominated by red fescue (Festuca rubra), tall oat-grass (Arrhenatherum elatius) and cocksfoot (Dactylis glomerata), with quite a rich variety of chalkland herbs, including marjoram (Origanum vulgare), wild basil (Clinopodium vulgare), rough hawkbit (Leontodon hispidus), salad burnet (Sanquisorba minor), red clover (Trifolium pratense), black medick (Medicago lupulina) and others.

There are also strips which have been surface-cultivated more recently for the est-

abishment of game crops, including kale, and here the sward is shorter, more open and less varied, with creeping bent-grass (Agrostis stolonifera), creeping buttercup (Ranunculus repens) and ragwort (Senecio jacobaea) more abundant.

The site is on private land forming part of a small agricultural holding. I first noticed the snails on September 21st. 1988 during a visit to advise on the management of the grassland. Their identity as Cochlicella acuta was confirmed by Miss Jill Royston, formerly keeper of Biology and Geology at the Bucks County Museum, and by Dr. M. P. Kerney. On a return visit on October 27th. much smaller numbers were evident.

Grant-aid from the Nature Conservancy Council has since been agreed towards the continuing sympathetic management of this chalk bank, and both vegetation and invertebrate fauna will continue to be monitored.

Dr. C. J. Smith

Buckinghamshire Farming & Wildlife Advisory Group, Stoke Mandeville, HP22 5TA

MAMMALS AS VECTORS OF SLUGS

The suggestion by Stella Davies (J. Conch., 32:352) that urban foxes may play an important part in transporting slugs such as Arion lusitanicus to new districts has received some support from mammalogists.

A note in the summer issue of the Mammal Society Newsletter provoked two responses. One correspondent reported, "My cat has had a lengthy career as a transporter of slugs, the beasts emerging from his fur on being brought into the house. Transport seems to occur most commonly during autumn and winter, and the species most often involved is Milax budapestensis."

Another commented: "My dog, a cocker spaniel, has recently started giving lifts to local slugs, or at least I have recently become aware of it. My garden is a haven for a wide variety of slugs, and on three occasions in the past month after wandering around the garden at night she has returned with one entangled in the long fur on her legs. On one occasion she managed to deposit one of her passengers on the sitting room carpet. The slug itself appeared to be none the worse for its ride, and did not seem to have any difficulty dislodging itself."

There seem to be no records so far of slugs being found on the fur of foxes or other wild mammals; but if the slugs remain attached for only a short time, it is hardly surprising that they have not been observed.

Members with pets might like to pay closer attention to them when they return from nocturnal exercises, especially on warm, damp evenings. It would be interesting to know whether the most frequent phoretic slug is indeed Milax budapestensis: this is mainly a ground-living or soil-dwelling species, less likely than others to drop on passing mammals from vegetation. Perhaps cats, being inclined to dig, will be more prone to Milax, while dogs might be expected to pick up Arion or Deroceras species more often.

Brian Eversham

Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton,
Huntingdon, Cambridgeshire, PE17 2LS

APPLICATIONS PUBLISHED IN THE BULLETIN OF ZOOLOGICAL NOMENCLATURE

The following application was published on 29 March 1989 in Vol. 46, Part 1 of the Bulletin of Zoological Nomenclature. Comment or advice on this application is invited for publication in the Bulletin and should be sent to the Executive Secretary,

I.C.Z.N., c/o. British Museum (Natural History), Cromwell Road, London, SW7 5BD, U.K.

Case 2668 *Drepanites Mojsisovics*, 1893 and *Hyphoplites Spath*, 1922 (Mollusca, Cephalopoda): proposed conservation.
Earle E. Spamer & Arthur E. Bogan
Department of Malacology, Academy of Natural Sciences, 19th. and the Parkway, Philadelphia, PA 19103, U.S.A.

The following Opinions were published on 29 March 1989 in Vol. 46, Part 3 of the Bulletin of Zoological Nomenclature.

Opinion 1518 *Harpa articularis* Lamarck, 1822 (Mollusca, Gastropoda): specific name conserved.

Opinion 1519 *Ammonites neubergicus* Hauer, 1858 (Cephalopoda, Ammonoidea): to be given precedence over *Ammonites chrishna* Forbes, 1846.

CONCHOLOGICAL SOCIETY ANNUAL GENERAL MEETING

At the A.G.M. on 18th. March, Mrs. Marjorie Fogan was elected President and Mr. John Fryer was elected Treasurer. The following were elected to the Council - replacing members who retired - Dr. B. Colville, Dr. D. T. Holyoak and Dr. A. D. Secombe. All other Officers and members of Council were re-elected.

CORRECTION

In Newsletter No. 100, March 1987, 'Notes on an Ethiopian helicid', by B. Verdcourt, page 420 lines 34, 42 & 44 and p.421 line 33, for 'Pfeiffer' read 'Pfeffer' - a different author but with a very similar name! A trap for the unwary editor.

DR. R. TUCKER ABBOTT - new SHELL MUSEUM in Florida

The board of trustees of Sanibel Island's Shell Museum and Research Foundation, Inc. has retained the services of Dr. Tucker Abbott for a 2 year period as Founding Director of the proposed shell museum. His work on the museum will be instrumental in the establishment on Sanibel Island of one of the world's finest exhibit and educational facilities for everyone interested in shells.

REQUEST FOR ASSISTANCE

Euglandina rosea: This introduced carnivorous snail is causing the extinction of many species of tropical land gastropod species in island faunas. Research being conducted at the University of Ulster at Coleraine is being directed at ways of controlling this pest. Live specimens of this snail are urgently required. If you can help please contact: Dr. A. Cook, Department of Biology, University of Ulster at Coleraine, Coleraine, Northern Ireland, BT52 1SA.

Printed by: D. C. Armsworth, [REDACTED], Baldock, Herts. [REDACTED]

THE CONCHOLOGISTS' NEWSLETTER

No. 110

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

September 1989

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Market Harborough,
Leicestershire,

Produced by THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

MOLLUSCAN METEOROLOGISTS

There are several curious and interesting instances in animal folklore of molluscs behaving as prognosticators of the weather. Slugs and snails have frequently been mentioned in this context throughout regional folklore traditions, particularly with reference to their abundance and activity before the onset of rain. Several English rhymes are known on this theme, and Rev. C. Swainson in his "Handbook of Weather-lore", gives the following three examples:

"When black snails cross your path,
Black clouds much moisture hath."

"When black snails on the road you see,
Then on the morrow rain will be."

"Snailie, snailie shoot out your horn,
And tell us if it will be a bonny day the morn."

Clearly, the first two examples have Arion ater in mind. There are references from many sources relating to the abundance of snails as a sure sign of rain. These occurrences are certainly interesting, considering that a proliferation of slugs and snails is more usually associated with the aftermath of a downpour. One report suggests that if snails are seen to climb up evergreens and remain there during the whole day, then rain can definitely be expected. Cooke, Shipley and Read mention Helicids as weather-prophets, and note that certain species climb trees as much as two days before rain if it is to be heavy and continuous. Succinea spp. is reported as behaving in a similar manner, accompanied by a change in body colour, from yellow before rain to bluish after it. In the folklore of Texas, snails climbing up the sides of houses mean rain, and many other versions of this habit are known.

Certain marine molluscs have also been credited with a meteorological function. Thomas Wilsford tells us that: "cuttlefish with their many legs swimming on top of the water and striving to be above the waves do presage a storm, offended with the meteor and the disturbing waters in the deep". This particular phenomenon has also been recorded by other observers, although less dramatically. Wilsford further claims that: "Cockles and most shellfish are observed against a tempest to have gravel sticking hard into their shells as a providence of nature to stay or poise themselves, and to help weigh them down from the bottom by the surges." He also notes that the occurrence of air bubbles over clam beds indicates the imminence of rain.

Weather-lore of the kind described above is probably most prevalent in countries where the climate is uncertain and changeable. Certainly, some of the references to molluscan forecasters are rather fanciful, but there may perhaps, in some instances, be a basis for believing that they are actually sensitive to atmos-

pheric changes. Many other invertebrates, notably insects, are known to be very active or appear in large numbers just before rain arrives. Among other aquatic animals, the freshwater medicinal leech (Hirudo medicinalis), has been observed to demonstrate responses to weather changes, becoming very restless when storms are on the way. Indeed, in Victorian times, serious attempts were made to patent devices involving these animals as living barometers and storm indicators! Clearly, it is not unreasonable to suppose that certain species of mollusca are subject to barometric, vibratory and temperature influences. Terrestrial mollusca must be sensitive to subtle changes in air pressure, humidity and ambient temperatures. Could atmospheric changes also account for the alleged presence of cuttlefish attempting to ride the waves before a storm? It would be interesting to know whether any research has been undertaken into these curious folklore phenomena.

REFERENCES

- Swainson, C. "A Handbook of Weather-lore". London.
Wilsford, T. "Nature's Secrets". London, 1665.
Cooke, Shipley & Read. "Molluscs and Brachiopods". London, 1913.

Mark Lewis

A CASE FOR LITTORIVAGA DALL 1918

My friends often remark that I am the only person who uses the generic name Littorivaga for that bewildering array of forms which we often group under "Littorina saxatilis agg." My friends are tolerant of my foibles, but there has been more than a hint of a challenge to justify my continuing use of Dall's genus. That is right and proper, and I will; but first a bit of history.

1. In the 10th. edition (1758) of Carl von Linné's Systema Natura, the names Turbo obtusatus, T. neritoides, T. littoreus, Nerita littoralis, in that order, are listed together with brief Latin definitions. Linné used his name Turbo for all round-mouthed gastropods that were not Helix. Strangely, he put T. littoralis into Nerita when one might have expected obtusata on overall shape.

2. Olivi, in 1792, described a Turbo saxatilis from the lagoon at Venice: a species retaining fertilised eggs in a brood pouch and releasing crawling juveniles.

3. In 1821 Férussac proposed the genus Littorina for the littoral species of Linné's very broad genus Turbo.

4. Rang, in 1829, nominated Turbo littoralis as type species of Littorina: L. littoralis and L. obtusata are extreme end forms of the same species; since L. obtusata has 'page-priority' over L. littoralis it is the valid name of the species, and also the type species of Littorina. L. obtusata lays eggs but does not incubate them in a brood pouch, and neither does it have a veliger larva.

5. Menke, in 1828, proposed Melaraphe for Linné's L. neritoides. There was a mix-up over designation of type species, but it turned out that the species proposed was a junior synonym of L. neritoides. So L. neritoides is the type species of Melaraphe Menke 1828. This species has a veliger larva, a reduced gill suggesting that it might be an air-breathing prosobranch, basal cusps in the rachidian tooth of the radula, and lives right at the top of rocky shores.

6. In 1827 Brown proposed the genus Neritoides for Linné's L. littoralis, unaware that Férussac had already proposed L. littorina, with the same type species, in

1821. So Neritoides is an objective synonym of Littorina.

That is how it was all through the 19th. century: everything that was round-mouthed and littoral, was called Littorina, and I do not know of anyone who distinguished Melaraphe except H. & A. Adams in their "Genera of Recent Mollusca" 1853-58. However, during this period, anatomical studies proliferated and life cycles were being worked out so that species and genera were increasingly founded on biological characters rather than solely on the shell.

7. Dall, in 1918, noticed that one of his west-coast U.S.A. species, Littorina sitckana Philippi 1846, had neither a veliger larva nor laid eggs; but produced crawling juveniles from within the mantle cavity where it was subsequently found that fertilised eggs were being incubated in a 'brood pouch'. Dall proposed the genus Littorivaga for this 'viviparous' American west-coast species which, surprisingly, resembles our own west coast species L. nigrolineata.

8. Since Littorina littorea, now an American expatriate, was clearly neither oviparous (egg-laying) nor ovoviviparous (brooding eggs until ready for hatching), but had a veliger larva, he proposed the genus Algaroda, with L. littorea as type species, for littorinids with a veliger larva.

9. Thus, we have the following genera which can be applied to British littorinids.

Littorina ss. for oviparous species including L. obtusata, L. mariae, and L. aestuarii.

Melaraphe for littorinids with veliger larvae, a reduced or obsolete gill, and certain features of the radula.

Algaroda for littorinids with veliger larvae, normal gill and lacking the radula features seen in Melaraphe, including only L. littorea.

Littorivaga for ovoviviparous littorinids, including L. saxatilis, L. rudis, L. jugosa, L. tenebrosa, L. groenlandica, L. nigrolineata, L. neglecta, L. rudissima, L. patula, L. similis, L. attenuata, L. jugosoides, L. elata, L. tenuis, L. rudissimoides, and L. arcana. Seventeen named forms of between three and five species, the number is not yet settled.

However, it was recently noticed that populations of L. nigrolineata at Rhoscoff, west coast of France, laid eggs; and more recently Hannaford Ellis showed that some sympatric individuals with L. rudis also laid eggs. This has been interpreted as a reversion to a former oviparous condition, and used by some taxonomists (pers. comm.) with more logic than biological sense, as a reason for 'lumping' Littorivaga into synonymy with Littorina. I want to oppose that view.

If one holds that anatomical structures are more important for generic grouping of species than shell morphology then, without doubt, the reproductive organs of littorinids that reproduce - either by veliger larvae, or by laying eggs, or by brooding eggs in the mantle cavity, will all be very different one from another.

The British littorinids do divide clearly into three distinct groups based on these reproductive strategies; and we have seen, above, how the British littorinids can be distributed among the four genera listed above on reproductive differences, and also features of the radula. From this we see that three of our British littorinids are separated by substantial biological gulfs; and these are more profound than those that divide the Platypus from the Prairie Dog for neither of these have larval development. We do not place our two egg-laying monotreme mammals, the Platypus (Ornithorhynchus) and the Echidna (Tachyglossus), in the same genus; yet we continue to call all our littorinids 'Littorina', as if reproductive processes

were only significant among the higher chordates. The purpose of this article is to show that this taxonomic folly is not necessary, for a solution is at hand and has been available since 1918 - Littorivaga.

An objection I have encountered is that we "don't know enough about the species to assign the 'L. saxatilis agg.' group to a genus". If one follows up only one tenth of the 130 odd references in Fretter and Graham 1980, and those rare parts of "Littorinid Tidings" issued by Bill Pettitt from Manchester, one gets the impression that we are overwhelmed with factual information about littorinids - though we still remain confused about 'L. saxatilis agg.' And we also know enough about the coherence of this group to protest very strongly if someone should try to include, say, L. obtusata, or L. littorea under that head. So we do regard them as a natural group; that is, they are genetically very close and, in an evolutionary sense, fairly young.

Since we do regard 'L. saxatilis agg.' as a natural cohesive group containing some seventeen named forms, at least three of which are generally regarded as true species (biospecies), then we do have a genus, that is a group of species united by certain characters of form, habit, habitat and reproduction. Furthermore, we also have a name for this genus Littorivaga, the type species of which rather closely resembles our own L. nigrolineata.

Now to the opening remarks of this polemic, that is my continuing use in isolation of Dall's genus. Read Fretter and Graham 1980 carefully to the last page of the text p. 277, and there, before the references, you will see that the very last word, somewhat shyly introduced, is Littorivaga. Having distributed four littorinids to genera, they assign "- all the others dealt with here in -", that is 'L. saxatilis agg.', to "Littorivaga." So, I am not alone: along with Dall, Wenz, Winckworth, Fretter and Graham, I am in good company.

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- Fretter, V. & A. Graham, 1980. The Prosobranch Molluscs of Britain and Denmark. Supplement 7, Journal of Molluscan Studies.
- Hannaford-Ellis, C., 1979. Morphology of the oviparous rough winkle, Littorina arcana Hannaford-Ellis, 1978, with notes on taxonomy of the L. saxatilis species-complex (Prosobranchia: Littorinidae). Journal of Conchology, 30, 113-121.

Phil' Palmer

JOINT MEETING OF THE CONCHOLOGICAL SOCIETY AND QUATERNARY RESEARCH ASSOCIATION

Workshop on land and freshwater Mollusca in the Quaternary, held in the School of History and Archaeology, University of Wales College of Cardiff, 14th. May 1988.

Summary of papers

1. An application of multivariate analysis to sub-fossil molluscan assemblages.
The molluscan assemblages from a column taken through the sequence of alluvium and blown sand at Gunwalloe III, south Cornwall (Peters 1987), were used to illustrate the potential of multivariate analysis. The de-trended correspondence analysis program DECORANA (Hill 1979) was used firstly to identify the data which was

"noise", due, for example, to contamination in sampling. Subsequently, DECORANA was used to determine the underlying structure of the data. Firstly, a contrast between the Succineidae and Lymnaea truncatula on the one hand, and Discus rotundatus and Vitrea contracta on the other was demonstrated. This is not fully understood ecologically but suggests a contrast between fen and drier vegetation. Secondly, a contrast between Lymnaea peregra, Armiger crista and Anisus leucostoma on the one hand, and Candidula intersecta, Cernuella virgata and Cochlicella acuta on the other was identified, and this is more easily understood as a contrast between pools and grassland respectively.

Hill, M.O., 1979. Decorana. A Fortran program for detrended correspondence analysis and reciprocal averaging. Ecology and Systematics, Cornell University, Ithaca, New York 14850.

Peters, C., 1987. The past environments of Gunwalloe, Cornwall. Unpublished M.Sc. dissertation, University of Bradford.

Annie Milles, School of History and Archaeology, University of Wales College of Cardiff, P.O. Box 909, Cardiff, CF1 3XU

2. The molluscan fauna of the Woodston Beds, Peterborough.

The Woodston Beds outcrop over several square kilometres to the south of Peterborough, Cambridgeshire. The deposits consist of a series of silts, fine sands and gravels which overlie the Jurassic bedrock and are in turn overlain by terrace deposits of the R. Nene. They have been known as a prolific source of molluscan fossils since at least 1861, but no comprehensive evaluation of the fauna has been attempted since that of Kennard and Woodward (1922). The current investigations have centred on three localities in the Woodston area, all of which were originally found by officers of the B.G.S. during a mapping programme in the 1970s. One of the sites, Hick's Pit, was re-sampled in 1986. The others, the "Type" and "L" sections, were sampled for Mollusca by the B.G.S. and this account is a result of an examination of specimens in both the B.G.S. and new collection.

The fauna at Hick's Pit comprises about 80 taxa of Mollusca which indicate an environment of a slow-flowing river with banks under woodland, marsh and grassland. The excellent preservation of many of the terrestrial shells and the large quantity of wood suggest that many of the shells became incorporated by river bank collapse and from fallen trees. Particular taxa in the Hick's Pit samples included Anodonta cygnea, Ancylus fluviatilis, Truncatellina callicratis, T. cylindrica, six species of Vertigo including V. alpestris, Discus rotundatus, D. ruderratus and Perforatella rubiginosa. The extinct helicelline, Candidula crayfordensis, recorded by Kennard and Woodward was also present. At 70 cm. from the base there were three shells of Hydrobia ventrosa, which suggests brackish influence.

The two samples collected by the B.G.S. were similar to those of Hick's Pit in their terrestrial and freshwater components, but in addition there were large numbers of brackish-water taxa. Most numerous as indicators of encroaching marine transgression was Hydrobia ventrosa, but H. ulvae, Pseudamnicola confusa and Scrobicularia plana were also found. Semisalsa stagnorum (recorded by Kennard and Woodward as Paludestrina deani) was also found among the brackish elements.

The Mollusca give no indication of the age of the Woodston Beds, but an associated pollen diagram done for the B.G.S. by Dr. L. Schern suggests an age in Hoxnian zone II. The Woodston Mollusca are unlike those from other major supposed Hoxnian fluvial sites such as Swanscombe with its numbers of extinct taxa (the 'Rhenish' fauna). Although uncertainties of age within the interglacial and the distance between the Thames and Wash may be sufficient explanation for these differences, the possibility of Swanscombe and Woodston representing two different interglacials cannot be ruled out.

Kennard, A.S. and Woodward, B.B., 1922. The post-Pliocene non-marine Mollusca of the east of England. Proc. geol. Ass., Lond. 33, 104-42.

D. H. Keen, Department of Geography, Coventry Polytechnic, Priory Street, Coventry, CV1 5FB

3. The location of refugia for woodland snails during cold stages of the Quaternary.

There is plentiful evidence that the woodland snails of Britain and other parts of northern Europe recolonised these regions at the end of the last (Devensian) cold stage and in the early Flandrian (Holocene). The limited evidence from earlier interglacials shows essentially similar patterns of recolonisation. Each time, the picture is of the arrival and establishment of the first stenotopic woodland snails from about the time birch and pine woodlands become established, with other species arriving later, some not until the mixed-oak forest is established. It is also clear that conditions during the colder stadials of the cold stages (for example 30-15 thousand years ago) were too severe for either forest trees or woodland snails to have survived in Britain (Holyoak 1982; cf. Ant 1969).

Thus there is little doubt that during cold stadials both the forest trees and the woodland snails would have survived only in 'refugia' with milder climates, presumably in southern Europe. Surprisingly little attention has been paid to the extent and location of such refuges. Data on tree pollen (e.g. Huntley and Birks 1983) imply that most of the refugia for forest trees were located around the Mediterranean, in the S. Iberian peninsula, Italy and the Balkans.

Comparable direct evidence for the location of cold-stage refugia for woodland snails is almost lacking. This must in part be due to a general paucity of detailed studies of Quaternary Mollusca in southern Europe. However, it may also relate to small size of refugia and lack of deposits with Mollusca, so palaeontological proof of the locations of many refugia may always be elusive.

It is proposed that a novel source of information on the likely locations of cold-stage refugia for woodland snails is provided by the modern ranges of extremely localised woodland species, that is those known from a single locality or a single small region. It is argued that at least most of these have survived more or less in situ through the last cold stage and subsequently.

The example of Laminifera pauli may be instructive here. This species is now confined to woodland in a small region of the W. Pyrenees, but is known as a Middle Pleistocene interglacial fossil as far north as England. One can reasonably speculate that in Middle Pleistocene interglacial it extended over much of western Europe, whereas in the present interglacial it has not spread much beyond its Devensian refuge.

Thus by mapping ranges of the rarest woodland snails of S. Europe it should be possible to judge likely cold stage refugia for woodland snails in general. As a first step, maps have been prepared for the rare woodland species in some groups of taxa with fairly well known systematics at species level, namely Aciculidae, Clausiliidae and Helicaceae. Considered together, these maps reveal the likelihood of there having been numerous small refugia extending across southern Europe from the Cantabrians in the west to various parts of the Balkans and Caucasus in the east. Refugia are particularly evident around both ends of the Pyrenees, in the SW Alps and around the S. and SE. Alps. There is such scant evidence of woodland refugia north of the Alps that their occurrence there may reasonably be discounted.

The implications of forest refugia around the Pyrenees and southern Alps differ from the patterns shown by Huntley and Birks' pollen data. However, forest areas in montaine valleys may have been too small to produce a regional pollen

record, but large enough to have served as refugia for trees and snails.

Ant, H., 1969. Malacologia 9, 249-50.

Holyoak, D.T., 1982. Malacologia 22, 727-30.

Huntley, B. and Birks, H.J.B., 1983. An atlas of past and present pollen maps for Europe: 0-13,000 years ago. Cambridge: Cambridge University Press.

D. T. Holyoak, School of Geography and Geology, College of St. Paul and St. Mary, Cheltenham, Gloucestershire, GL50 2RH

4. Quaternary molluscs in a core from Wallywash Great Pond, Jamaica.

Wallywash Great Pond is a fault-bound lake, 8 m. above sea level, located between the limestone plateau of the Pedro Plains and a southern extension of the Lower Morass in St. Elizabeth, Jamaica. Springs from the Tertiary White Limestone feed the lake which has Ca-Mg-CO₃-dominated waters. Systematic variations in the Ca/Mg hardness ratio in the lake are caused by biologically induced precipitation of calcium carbonate. Data suggest the lake to be currently close to isotopic equilibrium with the atmosphere.

A 9.23 m. core shows cyclical changes in sediment type from white marl, rich in ostracods and snails, to swamp peats and clays. Laboratory analyses included δ C-13, δ O-18, bulk geochemistry, carbonate content, loss on ignition, magnetic susceptibility, pollen and snails. Dating was by radiocarbon and uranium series methods.

Six deep-lake phases are represented by white marls. Three are Holocene and three occurred between c. 119 and 93 ka BP. Positive δ O-18 values and high magnetic susceptibility characterize the last glacial as a period of aridity. δ C-13 values vary greatly in relation to changes in the dominant carbon source and local hydrology.

Molluscs were picked (by P.H.) selectively from more than 100 levels, mostly 1 cm. thick, and identified by C.R.C.P. 18 freshwater (three possibly new) and several terrestrial species occur throughout the core, although some samples were barren. The freshwater fauna includes 4 prosobranch, 11 pulmonate and 2 bivalve species. High diversity faunas occur at -8.64 to -6.70 m. (c. 120-104 ka BP) and at -4.39 to -1.61 m. (c. 9.5-1.0 ka BP). They may be compound, with two events in the lower and three in the upper levels. Low diversity faunas occur below, between and above these levels and consist of Physa alone or with a small valvatid below -1.62 m. and with the hydrobiid 'Potamopyrgus' coronatus above -1.61 m. The reason for the change at -1.61 m. is unknown. High diversity faunas include the three taxa mentioned, with up to 9 species of planorbids, two freshwater limpets and the bivalves Pisidium and Eupera. Possible new taxa are a sharply keeled planorbid, a bizarre limpet that almost completely seals the aperture, and a small hydrobiid with the outer lip thickened externally. Changes in mollusc diversity do not coincide with changes in lithology, but often with sharp changes in δ C-13 values.

Philip Hales, Department of Geography, Oxford University, Mansfield Park Road, Oxford.

Christopher R. C. Paul, Department of Earth Sciences, The University, P.O. Box 147, Brownlow Street, Liverpool, L69 3BX

5. Late Quaternary Mollusca of Porto Santo, Madeiran Islands.

The molluscan fauna of the Madeiran archipelago is of special interest because of its c. 190 endemic taxa which include Tertiary-relict groups. Presence of extensive fossiliferous deposits offers scope for studying the history of these peculiar faunas. Porto Santo is one of the smallest islands (roughly 10 x 4 km.), but it has the greatest number of endemics in relation to land area. The islands were first colonised by man around 1420 AD when they apparently had an almost

complete forest cover.

Research has concentrated on sediments containing rich assemblages of fossil land snails exposed in cliff and quarry sections. They are composed of calcarenite (partly lithified sands) and sandy colluvium reaching thicknesses of c. 30 m., with interstratified palaeosols locally.

The most detailed record is from nearly 30 m. of blown marine sands on the north coast. These accumulated when sea level was low during the Pleistocene, deriving by deflation especially from an area to the NW. A radiocarbon date of c. 21 ka BP implies a last cold-stage age for the top 3 m. of sands. However, there is no date for the main thickness of the sands, although TL-dating of quartz sand grains may be possible.

The fossil Mollusca in the dated sands are mostly species of dry grassland and sand dune areas today. Similar assemblages occur in the sand facies throughout the section.

Intercalated with the blown sands are three well-defined palaeosols that have assemblages differing from those in the sand facies. There is greater overall diversity of species in the palaeosols than in the sands. Among species represented only in the palaeosols are some now confined to the few remnants of woodland on hill tops, together with Craspedopoma mucronatum which is extinct on the island. These require moist habitats which are usually shaded by trees. Hence the palaeosols represent moist environments during periods of depositional stability, whereas the sand facies represent drier environments in periods of sand accumulation. It is thus possible that the palaeosols correspond to wetter stages of the Pleistocene with higher sea level, perhaps interglacials.

Elsewhere are thick stratified deposits containing endemic species now extinct. The age of these deposits is unknown so the rate of extinction, due to climatic change or human colonisation, cannot be evaluated. Nevertheless, records from surficial colluvium show that some species now restricted to one or two hill-top localities were once widespread. Their reduction may relate to deforestation since the 15th. century, leading to desiccation and slope instability.

Modern shells often show evidence of predation by house mice Mus musculus. Comparable rodent-predated shells are never found in the deposits, so mouse predation may also have been a cause of decline among endemic snails.

Mary B. Seddon, School of Geography and Geology, College of St. Paul and St. Mary, Cheltenham, Gloucestershire, GL50 2RH

6. The Post-glacial colonization of Ireland: new evidence from molluscan biostratigraphy.

In contrast to the wealth of palaeobotanical studies in Ireland, there have been very few comparable studies devoted to Irish faunal history. It has long been known that Ireland has an impoverished vertebrate fauna compared with Britain, and many familiar British animals such as voles, moles and snakes are quite unknown there. Conversely a variety of plants and animals occurs in Ireland which is absent from Britain. This includes the so-called lusitanian element whose modern distribution today extends from Iberia (and parts of the Mediterranean coast) along the western seaboard into Brittany and thence to Ireland. As well as several ericaceous taxa (e.g. Daboecia cantabrica, Erica mackaiana, Arbutus unedo) and a few other plants the group also comprises various animal taxa including the spotted slug Geomalacus maculosus. The problems surrounding the occurrence of these lusitanian elements in Ireland concern, to a lesser extent, the whole of the Irish biota. Three theories emerged to account for their occurrence: (1) per-glacial survival; (2) late-glacial or early Post-glacial entry via a terrestrial route;

(3) accidental human introduction (trans-marine).

The only secure way of testing these hypotheses is by recourse to the fossil record. Shells of non-marine snails rival plant remains in their abundance in a range of Quaternary deposits. Tufa (spring chalk) deposits are particularly valuable from a palaeoecological standpoint since they often contain continuous records of autochthonous molluscan communities for much of the Post-glacial. A detailed investigation of such deposits at Newlands Cross, Co. Dublin, has demonstrated a typical Post-glacial succession with an early open-country fauna, including several arctic-alpine taxa, radiocarbon dated to 9720 ± 300 BP being replaced by woodland communities by 8000 BP. The arrival of several shade-demanding thermophiles, such as Discus rotundatus at 8200 BP suggests that the flooding of the Irish Sea apparently had little retarding effect on the entry of these late immigrants. Some form of passive dispersal is implicated but the exact mechanism(s) remain elusive. This molluscan evidence is a total contrast to Corbet's assessment of the Irish vertebrate fauna as having 'such an erratic composition as to suggest a series of chance introductions rather than an orderly sequence of arctic, followed by more temperate, faunas, until at some stage the supply had suddenly stopped due to severance of the land connexion'.

Corbet, G.B., 1961. Origin of the British insular races of small mammals and of the 'Lusitanian' fauna. *Nature* 191, 1037-1040.
Preece, R.C., Coxon, P. and Robinson, J.E., 1986. New biostratigraphic evidence of the Post-glacial colonization of Ireland and for Mesolithic forest disturbance. *J. Biogeogr.* 13, 487-509.

R. C. Preece, Department of Zoology, Downing Street, University of Cambridge, Cambridge, CB2 3EJ

7. Snails and archaeology in the Wallop valley, Hampshire.

Archaeologists today are less concerned with individual sites than with their landscape, especially how it was settled and utilised. Consequently, sources of archaeological and environmental information have been sought from the areas surrounding known sites. Valley bottom sediments are one such source. The origin of these has generally been attributed to anthropogenic rather than climatic causes, and, as such, they can be integrated with archaeological evidence of settlement and land division.

Excavations of the Iron Age hillfort at Danebury have produced a large amount of environmental information for a mixed farming economy that exploited a wide variety of environmental zones, theoretically between the Rivers Bourne and Test. Aerial survey has shown evidence of settlement in these areas and it is on this basis that an auger survey of the valley floors of the Test, Anton and Wallop was made. Both the Test and the Anton contain peat deposits overlain by alluvium and interspersed by tufa mounds. In the Wallop valley, tufa is replaced downstream by peat and palaeosols.

At Houghton in the Wallop valley, a section through a lynchet down onto the valley floor produced the following sequence, from the base: gravel; silt and clay lenses; peat, grading laterally into organic clay; palaeosol; alluvial silt; colluvium.

Molluscan analysis suggested that during deposition of the gravel, silt and clay lenses, and peat there was the development of increasingly dense woodland. At the same time, decrease in the freshwater Mollusca indicates a changing hydrology from overbank flooding (silt and clay) to a high water table (peat). In the Test valley, peat in a similar stratigraphical position is ascribed to the Boreal/Atlantic transition, and the presence of Discus rotundatus in the silts and clays at Houghton does not contradict this dating.

Soil formation took place during or after the Neolithic period, as indicated by Neolithic axes on the peat surface, and there was contemporaneous woodland clearance as indicated by the open-country molluscan assemblage. The high proportion of intermediate species, equal to that of the open-country species, indicates tall grass, possibly hay meadow. The succeeding alluviation brought about little faunal change, but there was probably an impact on the land use of the flood plain. Increasingly dense vegetation, perhaps of hedges, was succeeded by colluviation during the Iron Age, as dated by pottery. Further clearance and increased sedimentation took place, probably as a result of increased agriculture. This last episode saw the appearance of Cernuella virgata, Candidula intersecta and Helix aspersa.

Diane Williams, School of History and Archaeology, University of Wales College of Cardiff, P.O. Box 909, Cardiff, CF1 3XU

8. Holocene assemblages from the upper Kennett river valley at West Overton, Wiltshire.

A study of river valley deposits and their molluscan assemblages at West Overton is part of a broader investigation into the interaction of past human communities and environment in the upper Kennett.

Early Holocene deposits at the edge of the valley comprised a sequence of (from the base) marl, tufa, clay loam and silt. Above this was a palaeosol, dated by radiocarbon and archaeology to between the Neolithic and later Bronze Age. This was overlain by alluvial silt, probably of the 1st millennium BC, which covered the entire valley bottom.

The fauna from the deposits is a mixed one of freshwater and land components and is thus essentially allochthonous. However, in the environment of a winter-bourne, which the river is today and which it may also have been in the past, and on a floodplain where there is standing water for only a part of the year it is likely that freshwater species and land species lived and bred on the same spot but not at the same times of the year. So that in addition to, or instead of, taphonomic mixing there may be ecological mixing. Interpretation thus requires an understanding of both the taphonomy and the ecology, and these were assessed from the relative proportions of land and freshwater shells, the lithology, the ecological groups and the likely communities.

The following are the main assemblage zones from the base:

- (a) Marl. Armiger crista (with Anisus leucostoma and Lymnaea peregra); permanent water. Allochthonous open-country land assemblage of the early Holocene.
- (b) Tufa and humic clay loam. Lymnaea truncatula and Anisus leucostoma; swamp. Autochthonous shaded woodland assemblage of the middle Holocene. Discus rudatus gives way to Discus rotundatus c. 8000 BP as dated by C-14 of a wild boar tusk.
- (c) Silt. Lymnaea peregra; overbank flooding. Allochthonous open-country land assemblage reflecting Neolithic clearance.
- (d) Palaeosol. No aquatic assemblage. Autochthonous open-country land assemblage.
- (e) Alluvium. Lymnaea peregra; overbank flooding. Sparse land assemblage, probably allochthonous.

The freshwater assemblages are of low diversity throughout the sequence, reflecting, with the exception of the basal Armiger crista assemblage, the winter-bourne nature of the channel or the temporary nature of the floodplain. The implied seasonal presence of water has implications for settlement and especially cattle farming in the area in prehistory.

Rosina Mount, School of History and Archaeology, University of Wales College of Cardiff, P.O. Box 909, Cardiff, CF1 3XU

9. Land Mollusca from archaeological deposits at Freswick, Caithness.

Excavations in an area of blown shell sand at Freswick Bay, Caithness, uncovered structural evidence of Norse occupation and substantial spreads of midden material, underlain in places by traces of cultivation. Bulk samples of midden deposits, cultivation layers, and blown sand were wet-sieved on a 1-mm mesh on site, primarily for the recovery of artefacts, shells of marine Mollusca, and bones. This also produced numerous small assemblages of non-marine Mollusca, and these were identified and quantified with a view to providing some palaeoenvironmental information.

Through the period of Norse occupation, the dune system seems to have borne relatively lush grassland, probably with stands of herbaceous vegetation, and with small freshwater pools and trickles. Samples attributed to 'clean sand' or 'turf lines' typically gave assemblages of low diversity, dominated by Vallonia excentrica and Cochlicopa lubrica, and with a minority component of Clausilia bidentata, Zonitidae and Cepaea sp (p). Only one 'turf line' gave a relatively diverse, apparently fully developed, malacofauna, which differed from less diverse examples chiefly in having a substantial minority component of Vertigo pygmaea and Carychium sp (p).

Where samples were taken in, or close to, the temporary site of a former water body, Lymnaea truncatula and Oxyloma pfeifferi were common. The midden deposits gave very distinctive malacofaunas dominated by Oxychilus alliarius, sometimes to the virtual exclusion of other taxa.

Some midden faunas were more diverse, with Vitreola contracta and Cepaea sp (p) being numerous. It is thought that the samples in which O. alliarius is particularly dominant represent midden layers which were quickly buried and which thus contain only this carnivorous, presumably colonising, species, whilst the more diverse faunas represent midden layers which were uncovered for a greater length of time, allowing secondary colonisation by less opportunistic taxa. The rate at which moulds and fungi formed on and around the bones and shells of the midden deposits must have been a factor in determining the sequence of colonisation of the deposit by Mollusca.

The Freswick samples raise some interesting questions about molluscan species associations in short-lived, man-made habitats, such as midden heaps, and about the development of species-rich 'climax' malacofaunas in stable habitats as against the species-poor malacofaunas seen in unstable habitats such as dune systems. Perhaps such characteristics as colonising ability and rate of population increase would be useful parameters to consider when attempting an interpretation of archaeological terrestrial mollusc assemblages.

T. P. O'Connor, Environmental Archaeology Unit, University of York, York, YO1 5DD

10. Cochlicella acuta (Muller) and Helicella itala (Linné) in northern coastal shell-sand deposits.

Molluscan sequences from shell-sand deposits on the western and northern coasts of Britain and Ireland have shown that Cochlicella acuta and Helicella itala arrive some time after the beginning of sand deposition and then become more abundant than previously numerous species, notably Cochlicopa spp., Pupilla muscorum and Vallonia spp.

Helicella itala was present in Britain in the Devensian Late-glacial. But it was not until later prehistory that it spread into the sand areas, shortly before the appearance of Cochlicella acuta in the same localities (Evans 1977). Dates for the arrival of the two species in such contexts are rare. The earliest is Gwithian, Cornwall, where Spencer (1975) recorded Cochlicella acuta in the Early Bronze Age. At Ardnave, Islay, Evans (1983) found specimens of both species in Early Bronze Age

layers, although these were not from a sequence but from samples processed during excavation. Only two specimens of Cochlicella acuta were recorded.

In a study by the writer at Baleshare, North Uist, Outer Hebrides, the two species were found in Late Bronze Age layers dating to c. 3100 BP (C-14). During the Iron Age (c. 2400 to 2050 BP), Helicella itala became well established but Cochlicella acuta remained rare.

In the same study at Hornish Point, South Uist, both species were present from the Early Iron Age (2500 BP), Helicella itala being already well established. During subsequent Iron Age levels, Cochlicella acuta became more abundant than Helicella itala.

These early occurrences are the beginnings of a framework plotting the arrival and northward spread of Cochlicella acuta and Helicella itala in the west of the British Isles.

Evans, J.G., 1977. The palaeoenvironment of coastal blown sand deposits in western and northern Britain. Scottish Archaeological Forum 9, 16-26.

Evans, J.G., 1983. Appendix 2: Mollusca and other invertebrates from Ardnave, Islay. In G. Ritchie and H. Welfare, Excavations at Ardnave, Islay. Proceedings of the Society of Antiquaries of Scotland 113, 350-58.

Spencer, P.J., 1975. Habitat change in coastal sand-dune areas: the molluscan evidence. In J. G. Evans, S. Limbrey and H. Cleere (eds.), The effect of man on the landscape: the highland zone. London: Council for British Archaeology: 96-103.

Nigel Trew, [REDACTED], Bitterne, Southampton, [REDACTED]

REVIEW

SHELL - a volume in the Eyewitness Guides Series published by Dorling Kindersley in association with the British Museum (Natural History). Author: Alex Arthur. Price: £6.95. Hardback.

If you wanted to give a friend a full answer to the question 'What is a Shell?', you might consider giving him a copy of this book. Within its sixty plus pages Alex Arthur, a member of this Society, sets out to explore the world of shells in its fullest sense. Molluscs are given an authoritative treatment and feature predominantly; crustaceans, echinoderms, marine worms and corals are also included as animals which possess 'shells' of a kind. By the ingenious use of the singular in the title of the book, the reader is not necessarily led to expect a book about 'Shells' in the conventionally accepted sense. Rather, the scene is set for an exploration of the meaning of 'shell'; that is, a hard outer casing that encloses and protects" a variety of things be it a fruit, a baby bird, a snail, a lobster or a turtle.

There are twenty-three headings in the list of Contents with such titles as Living in a Whorl, Homes with Hinges, Shells with ten Legs, and A Pearl is born. Each heading is allocated a modest double page (in some cases 2 double pages per subject). Having been perhaps surprised with the variety of objects that can be called shells, the reader is then informed about their life-histories, structures, modes of growth and habitats. An impressive amount of information is conveyed within the relatively confined space with the aid of concise text and superb illustrations. I particularly like the 'chapter' entitled 'Settlers on the Sands'. Across four pages, the author describes the nature of sand and sandy beaches and gives examples of the wide variety of shelled inhabitants of this habitat.

With regard to nomenclature, Latin names have not been used, the majority of animals illustrated having familiar common names. However, elegant translations of the Latin are used where appropriate. The final section, entitled 'Collecting Shells' deals succinctly and tactfully with the collection and curation of molluscs. An index is provided.

There is one statement in the book I would like to take issue with. On page 19 the author states that the Argonaut, or Paper Nautilus, discards the shell which is her egg-case after her eggs hatch. It would be more correct to state that the female Argonaut only produces one brood after which she dies.

In their publicity material the publishers of SHELL suggest that the Eyewitness Guides will build into a series of 64 titles and as a whole will form a uniquely visual encyclopaedia. I think this is a rather grandiose term for a high quality picture book. In response to my enquiries of young people I gained the impression that they would prefer to consult a more traditional reference book for factual information. Nevertheless I cannot overstate the visual impact of SHELL. The layout is attractive and the book gains full marks for eye-appeal. The illustrations are mainly photographic with some engravings and drawings, arranged across the pages with text interspersed. The quality and colour reproduction are excellent. This is, above all, a 'fun' book which should appeal to young and old, beginner and enthusiast alike.

Jan Light

COLLECTORS IN EAST AFRICA

- 13. F. STUHLMANN (part 3)

ITINERARY

Incomplete itinerary of F. Stuhlmann based mainly on one compiled by J. B. Gillett mainly from enumerations of Stuhlmann's plant collections in various works and Stuhlmann's own books and papers augmented by records from papers by E. von Martens.

One of the most detailed sources of place names current at the time is undoubtedly the map given in Stuhlmann's own book describing his journey with Emin Pascha. This map (Übersichtskarte der Expedition des Dr. Emin Pascha 1890-1892. Gezeichnet von Dr. Richard Kiepert.) gives an enormous number of names. Pilsbry (1919) and Pilsbry and Bequaert (1927) give gazetteers and maps which are essential for interpreting the many different spellings.

There are fairly frequent errors in the literature where either the wrong year has been cited or a wrong month. Several of these probably still remain in this list. Records said to be from Zanzibar, Ms Chaiyu on 12 Jan. 1888 and Msul Bani on 22 Mar. are clearly in error. The first might be 1889 but would then refer to Mozambique; the second is clearly a place in Egypt near Cairo. The locality Matthews which appears on several mollusc labels probably refers to the house of Sir Lloyd Mathews (1850-1901) First Minister in Zanzibar about that time. Stuhlmann used a multitude of different spellings for places, a fact already commented on by Pilsbry. Zanzibar has been kept separate from Tanzania for convenience; in those days it was much the more important place.

1888

23 Feb.

Left Hamburg for Africa

8 Mar.	Egypt	Alexandria Canal
9 Mar.	"	Alexandria, Marint
12 Mar.	"	'in einem Nilarm near Bulale'
22 Mar.	"	Msul Bani (not traced but Bani is a common place name in Egypt)
24 Mar.	"	Cairo, Mukattam
27 Mar.	"	Gipfel das Akatta- Gebirg (? near Suez)
8 Apr.	"	Alexandria; surely an error but given twice
17 Apr.	Zanzibar	arrived in Zanzibar
May	Zanzibar	river near Matthews
17 May	Zanzibar	near the German clubhouse
20 May		Nile Valley - must be error for March
31 May	Zanzibar	
4 June	"	Ugambi to Nasimoja
20 June	"	Zanzibar Town
21-29 June	Tanzania	Bagamoyo
29 June	Tanzania	R. Kingani
July	"	Bagamoyo
12 July	Zanzibar	
17 July	"	Muera R.
17 Aug.-	Tanzania	Usegua and Unguu (see Stuhlmann, 1889)
6 Oct		
Aug.	"	Usaramo, Kikoha to Rosako and near Msere on banks of the R. Wami
18 Aug.	"	Kikoko (?Kikoha)
20 Aug.	"	Rosako Sacurile
22 Aug.	"	Ukwere, Tsurutu's (Tsurutac)
27-28 Aug.	"	Usegua, Rukaguru R., near Mbusina (Mbusine)
3 Sept.	"	banks of R. Wami, near Msere and Mbusina
9 Sept.	"	said to be in Zanzibar but this clashes with above unless he hurried back for some reason
Sept.	"	R. Eban S. of Korogwe
22 Sept.	"	R. Rufu (Ruvu) near Korogwe
20 Oct.	Zanzibar	Matthews
24 Oct.	"	
2 Nov.	"	beach
Nov.	"	in general and R. near Matthews, behind the German colony and Jambiana
10 Nov.	"	Kombeni
15-30 Nov.	"	
28 Nov.	"	Matthews
2 Dec.	"	Tschueni-Bassin (Tschueni-Bani)
9 Dec.	"	Walloso
11-12 Dec.	"	'Brunner' (presumably one of the cave-wells)
12-13 Dec.	"	Kokotoni
(he also collected in Dar es Salaam some time during 1888)		
1889		
2-8 Jan.	Mozambique	Mozambique town
9-31 Jan.	"	Quelimane
2 Feb.	"	Gugurini (?Pugurini), 10 hours N. of Quelimane
6 Feb.	Zanzibar	near Tschukuani and near Tschueni
7 Feb.	"	
10 Feb.	Mozambique	Pugurini, Quelimane and Ujama Ratta
11 Feb.	Zanzibar	(would seem impossible - error)
19 Feb.	Mozambique	Quaqua R. near Mopera not far from Quelimane
25-27 Feb.	"	Quelimane
1 Mar.	"	"
10 Mar.	"	"
16 Mar.	"	" , Njangane (Ujangone)

23 May	Zanzibar	Muera R.
25 May	"	path to Masingini (Messingini)
28 May	"	path to Tschueni
29 May	"	path to Masingini and path to Kisimkasi mdng (mundung, mouth)
11 June	"	
11 July	Mozambique	Quelimane
Aug.	Zanzibar	Kidoti and Kokotoni
15 Aug.	"	Tumbatu I.
30 Aug.	"	Kokotoni
9 Sept.	"	NE. of Kokotoni, Bach Jetenge
12-30 Sept.	"	Kokotoni (Kotoni)
'31' Sept.	"	Kokotoni, Unguu
9 Oct.	"	path to Tschueni
Oct.	"	In Zanzibar for first half collecting mainly at Kokotoni
Nov.	Tanzania	at Pangani during this month
4-5 Dec.	"	Pangani
Dec.	"	he also collected at Ras Muhesa and the Kingani mouth of the Ruvu (Rufu) R. some time in this month
1890		
Jan.	Tanzania	was in Pangani part of this month; wounded
26 Apr.	Tanzania	leaves Bagamoyo having collected there several days
3 May	"	Ukwere, Msua
11 May	"	a report he was in Pangani must be erroneous
18 May	"	Mrogoro (Morogoro)
22 May	"	Ukami to Usagara, Mkatta -Bach and Innern am Mkatta-Bach
May	"	Kimambira (Kimamba) and NNE. of Kilosa, Farhani
27 May	"	leaves Kondoa (near Kilosa, not the better known Kondoa-Irangi
1 June	"	Kidebe (? Kidete)
6 June	"	there must be an error in a report that he collected at Kissemo in Usaramo - probably refers to May
22 June	"	leaves Mwapwa
29 June	"	Ugogo, Ipala and Mgesse (Mssesse)
2 July	"	Ugogo, Mtangisi
4 July	"	Ugogo, Ilindi
7 July	"	Ugogo, Bach Bubu near Mbahi
9 July	"	Ugogo, Bachbett between Unyangwire(a) and Mbiwe
13 July	"	Ugogo to Tabora, Mbare, Gunda Mkali
16 July	"	Lake Tschaia (Tschai, Chaya) and Unyansi, Bibisande
20 July	"	Tura
July	"	Muhala(Mhwala)
23 July	"	Rubugua (Rubugwa)
27 July	"	Unyanyembe, Tabora and Oalla (Oalle) Bach
28 Aug.	"	leaves Tabora
13 Sept.	"	Wembere Steppe, Manjonga (Manyonga) Bach
19 Sept.	"	Ussukuma, Nindo- Ssalaue
20 Sept.	"	30 km. S. of the southern tip of Lake Victoria, Salaue (Salawe, Ssalaue), Ussambiro
22 Sept.	"	southern tip, Kiaffumaqua, Makolo, Uhoka
Sept.	"	Busisi (Bussisi, Bussissi), Bukumbi(Usinja) and Nyakamaja (Njakamaja)
24 Sept.	"	Kwa Muleschi
28 Sept.	"	Smyth Sund, Bussisi
29 Sept.	"	"
1 Oct.	"	" and Kassarasi I. (?error)
5 Oct.	"	Speke Gulf, Massansa, Simin (Simiyu) R.
10 Oct.	"	Emin Pascha Gulf, Bukome
12 Oct.	"	Ussukuma, Unsimbo, 4° 4' S.
13 Oct.	"	A report that he collected in the Wembere Steppe at Mto (R.) Manyonya 30° 54' obviously refers to Sept.

20 Oct.	Tanzania	leaves Busisi
21 Oct.	"	S. shore Lake Victoria, Bukense to Ngoma
23 Oct.	"	Ndukali, Bumbide I. and Ikuru I.
25 Oct.	"	Bumpeko
Oct.	"	Biharomulo District, Ukomo
28 Oct.	"	Kassarasi I.
29 Oct.	"	Busisi (? error for Sept.)
30 Oct.	"	Bukome
31 Oct.	"	"
Oct.	"	Bumbide
2 Nov.	"	Emin Pascha Gulf, Itole
3 Nov.	"	SW. Emin Pascha Gulf, Nyemirembe (Namirembe)
4 Nov.	"	Nyemirembe and Nyamgotso
10 Nov.	"	Bukoba District, Ihangiro
11 Nov.	"	"
12 Nov.	"	"
Nov.	"	Kassesse, Tschamtuara
16 Nov.	"	arrives Bukoba and stays there until 6 Dec.
18 Nov.	"	Kome I.
6 Dec.	"	begins boat trip to Uganda which lasts until 25 Jan. 1891 and takes in the Sese (Sesse) Is.
8 Dec.	Uganda	Buddu, Towalio (Tavalyo)
9 Dec.	"	Buddu, Bare
12 Dec.	"	Sesse Is.
22 Dec.	"	Soweh I. (Ssowe)
26 Dec.	"	Mengo
28 Dec.	"	Mengo; mention of W. Karagwe erroneous ?
1891		
5 Jan.	Uganda	Mengo
10 Jan.	"	Murchison Bay, Uferwald, Manyonyo (Manyongo, Manjonjo, Munyonyo, Menjonjo)
11 Jan.	"	Manyonyo
12 Jan.	"	"
22 Jan.	"	Katerenge
23 Jan.	"	"
25 Jan.	Tanzania	arrives back in Bukoba and stays until 12 Feb.
12 Feb.	"	leaves Bukoba
15 Feb.	"	Lake Ikimba
Feb.	"	Karagwe, Kitangulo
Feb.	"	Bugenua
20 Feb.	"	Kinuni
24 Feb.	"	Karagwe, Kassesse; in Karagwe until about 4 Apr.
5 Mar.	"	" , Ruanyana See near Weranyanye (Weryanye, Weranjanje)
9 Mar.	"	Weranyanye- See
16 Mar.	"	Kafuro
1 Apr.	"	prepares to leave Karagwe
4 Apr.	"	Karagwe, Kagenyi
10 Apr.	"	Kagere R., Kavingo
30 Apr.	Uganda	Butumbi, Mts. above Kantanda
6 May	"	Butumbi, Migere
8 May	Zaire	Butumbi, Iwinsa
9 May	"	S. side of Lake Albert Edward, Iwinsa, subfossils in old lake marl beds also Vitschumbi (Vitshumbi) and Matambuka
10 May	"	SW. Lake Albert Edward, Vitshumbi until 14 May
15 May	"	Kiruwe beach (sometimes erroneously given as 1892)
18 May	"	SW., Rumande
May	"	NW., Kirima
21 May	"	NW., Kissakka (Kishakka)(Lake Edward often called Ngesi)
4 June	"	E. of Issango R., Hauptlings, Karungo, Kigogo (error for July)

6 June	Zaire	Karevia, bamboo forest at 2600m.
8 June	"	begins ascent of Ruwenzori (Runsoro, Runssoro)
9 June	"	bamboo forest, 2600 m.
10 June	"	Hochmoor, 3000 m.
11 June	"	presumably same
12 June	"	2500-3800 m. Camp III at 3100 m.
13 June	"	"
14 June	"	descending mountain
15 June	"	W. foot of Ruwenzori, Karevia (Karewia) at 1175 and 492 m. and around here until 19 June
20 June	"	NW. Ruwenzori, Karevia to Kiviriri
30 June	"	Tararo (error for July)
1 July	"	Issango Ferry
2 July	"	leaves Semliki R., W. Issango to Itiri
3 July	"	Itiri R., Bundeko and E. of Issango, Karungo
4 July	"	Itiri R., Bundeko and Bukende until 6 July
7 July	"	Bukende and Bugundi
21 July	"	Undusuma (Undsuma)
27 July	"	Undusuma, Bach Tararo and around here until 5 Aug.
12 Aug.	"	R. Duki, Buessa
15 Aug.	"	leaves Gungulei in Buessa; W. of S. end of Lake Albert
17 Aug.	"	crosses Duki R.
20 Aug.	"	Ituri R. and in area until 8 Sept.
25 Aug.	"	near ferry
8 Sept.	"	Kibilibissi
10 Sept.	"	W. of Upper Ituri R.
15 Sept.	"	Ituri R. until 20 Sept.
17 Sept.	"	Lendu Plateau
23 Sept.	"	Lendu Plateau, Bach Que and Ssonga
26 Sept.	"	Andebali (furthest point N. reached)
2 Nov.	"	Wabotchi
4 Nov.	"	Ituri R. until 11 Nov.
12 Nov.	"	Undusuma until 14 Nov.
20 Nov.	"	NW. Lendu, Boa Bach (error for Sept.?)
24 Nov.	"	Lake Albert until 1 Dec.
26 Nov.	"	SW., Kassenye
27 Nov.	"	" and NW., Kirima
Nov.	"	Walegga Plateau, Nasso
10 Dec.	"	Undusuma; parts from Emin Pascha
18 Dec.	"	Orani (Oransi) district, Bugindi (Bugundi)
26 Dec.	"	Lake Albert, Kassenye until 28 Dec.; report of collecting on W. Issango R., Andetei District on same day must be incorrect
1892		
25 Jan.	Zaire	S. end of Lake Albert Edward, Kiruve
28 Jan.	Tanzania	Mpororo, Kayonsa Mt. (Kanyonsa)
30 Jan.	"	"
6 Feb.	"	Karagwe, near Kayonsa, Kagera R.
15 Feb.	"	arrives in Bukoba
20 Feb.	"	leaves Bukoba
Feb.	"	Ihangiro
Feb.	"	Kimoani Plateau
Feb.	"	Ganda, Bukome
3 Mar.	"	Kagehi
6 Mar.	"	Usinga, Bugando
7 Mar.	"	E. Usinja, Ngama
11 Mar.	"	leaves Mwanza for Bukoba by boat
13 Mar.	"	Kome I., Bumbire (Bumbide)
17 Mar.	"	arrives in Bukoba
14 May	"	leaves Bukoba for Mwanza, Uera, Usiha

19 May	Tanzania	Maissome I.
24 May	"	Usukuma, Njangusi
27 May	"	leaves Nyunezi near Mwanza for coast
4 June	"	Wembere Steppe until 6 June
5 June	"	SW. Nyaua
June	"	W. of Kondoa Irangi
June	"	Masai Steppe
1 July	"	Mamboya until 4 July
10 July	"	Kivugu
11 July	"	Rosako
12 July	"	arrives in Bagamoyo
13 July	Zanzibar	Hospital for 7 weeks
20 Oct.	Germany	on leave
1893		
Mostly	Tanzania	Dar es Salaam
Sept.	"	S. Lake Manyara, Irangi and Bubu R.
Nov.	"	Umbugwe
1894		
Jan.	"	Bagamoyo; Viansi; Vikindo; Ruvu (Kingani) R.
Feb.	"	Dunda; Kangani; Marui; Bagamoyo; Rukinga; Madimola; Matisi; Dar es Salaam (the Ruvu journey is shown on map 10, Mitt. Deutsch. Schutzgeb. vol. 7 (1894)
17 Feb.	"	Mani
11 Mar.	"	Dar es Salaam
24-26 Mar.	"	"
2-5 Apr.	"	"
24-26 Apr.	"	"
Apr.	"	Various places in Usagara and Usaramo; Manera
9 May	"	Kunduchi
16 May	"	Bagamoyo
1 June	"	Ukani; Ndare
July	"	Ukwera
4 Aug.	"	Dar es Salaam
Sept.	"	Dar es Salaam; leaves on a trip to the Uluguru Mts. (see Engler, Bot. Jahrb. 21:194 (1895) & 28:332 (1900)
Oct.	"	Yegea; NW. Usaramo, Nhonge; Nghweme; Tununguo: Kidai; Ulugurus; on the Ruvu; Moora
1 Oct.	"	Usaramo, Mengwe-Teich
4 Oct.	"	Kissemo-Bach
16 Oct.	"	E. Ulugurus, Msumbisi-Bach
Oct.	"	SE. Ulugurus, Ng'hweme
20 Oct.	"	Kibungo
27 Oct.	"	on the Ruvu
29 Oct.	"	Moora
30 Oct.	"	Tegetoro
Nov.	"	Ulugurus including Mgeta Valley, Lukwangule Plateau, Kihurungu Mt., Mbagalala
6 Nov.	"	'Central Uluguru (Nguru)'
22 Nov.	"	Dundumi-Bach
Dec.	"	remained in Ulugurus at least until 17th.
1895		
3-19 Feb.	"	Survey Expedition at mouth of Rovuma R. on German-Portuguese border
1901		
1 Oct.	"	Dar es Salaam Govt. Garden
1905		
8 Sept.	Kenya	Kiambu District, Kikuyu Escarpment ("Kiknya-Berge bei Nairobi") (he must have been using the Kenya and Uganda Railway)

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Error

In contribution 12 (in the 'Collectors' series) there is an omission at the bottom of p. 373 - after '23, pl. 6, figs. 2-5).' add Lanistes (Leroya) farleri (Craven).

B. Verdcourt

BRITISH MARINE WORKSHOP, 1988

For the second year running the Marine Workshop was held in Godalming, Surrey at the home of one of the organisers. In all, eleven people attended including Dr. Whittaker of the British Museum (Natural History), myself, Jan Light, Phil Palmer, Judith Nelson, John and Joan Llewellyn-Jones, Ian Killeen, Christine Street, Bill Pocock and Ted Phorson.

Dr. Whittaker took charge of the morning session, starting with an interesting talk on the Foraminifera and Ostracoda. This was followed by a pleasant time examining specimens. The Foraminifera are Protozoans whose tests may resemble small mollusc shells. Common on all sorts of substrates, they can be found in most types of salt water habitat. The Ostracoda are small crustaceans with a superficial resemblance to bivalves and are also found in fresh water.

After lunch, we turned our attention to molluscs. Between sorting shellsand, various problem species were looked at. Though mainly microshells, some of the common larger shells were also discussed. The day was rounded off by a talk from Jan Light about her recording work in Sea Area 15. This was supported by very good slides of molluscs, habitats and sites.

It is worth pointing out that Workshops are a good way of ironing out problems and getting to know new groups and species. Beginners especially can obtain many useful practical hints and advice so it is well worth going.

I would finally like to thank, on behalf of those who attended, Dr. Whittaker for coming on his day off, Phil Palmer for much preparatory work and Jan whose house we invaded!

William S. Penrice, [REDACTED], Cupar, Fife, [REDACTED]

FIELD MEETING IN GLAMORGAN, 16 APRIL 1989

Five members and 2 friends were met by Nigel Ajax-Lewis, the Conservation Officer for the Glamorgan Wildlife Trust outside the National Museum of Wales on an overcast, cool, and windy morning. Our first place of call was the Coed-y-Bedw nature reserve (ST 111827) in a steep wooded valley north west of Cardiff. This SSSI is a mixed deciduous wood straddling the geological boundary between the Carboniferous Limestone (in the higher part of the site) and the Millstone Grit (Garth Hill Coal Measures), so that a wide variety of habitats is provided. 28 species were recorded. Molluscs were most numerous in the limestone part of the wood as was to be expected. On the acid soils were such typical species as Zonitoides excavatus and Columella aspera. Dr. Barry Colville found Vertigo substriata among a patch of Golden Saxifrage (Chrysosplenium oppositifolium) by the stream at the bottom of the valley. One slight mystery - no Trichia species were seen.

The next site visited was grazed Carboniferous Limestone grassland, with more acid patches due to secondary leaching, on the east side of Ogmore Down (SS/89-76-). After some hard work this produced a fairly typical fauna including Candidula intersecta, Cernuella virgata, Cepaea nemoralis, a dead shell of Cecilioides acicula, plus (slightly surprisingly?) Ashfordia granulata among damp stones at the base of the slope. Scree patches and the odd rock face had typical rupestral species - Pyramidula rupestris, and Lauria cylindracea, while Vertigo pygmaea and Nesovitrea hammonis were in the short mossy turf, but there was no sign of Vallonia species.

Finally we went to a very attractive valley at SS/91-75- near the Coed-y-Bwl nature reserve. This contained a variety of lime-rich habitats - a disused quarry, mixed deciduous woodland, a stream and a bordering marshy strip. Not surprisingly an hour or so's work produced records for over 40 species, none particularly uncommon, and some 'firsts' for the day like Cepaea hortensis, Columella edentula and Vallonia costata.

Our best thanks are due to the Glamorgan Wildlife Trust, and especially Nigel Ajax-Lewis, for permission to record on their reserves and for guidance round, or to, them on the day.

David Long

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

1012th. (Ordinary) meeting held on 21st January 1989 at B.M.(N.H.)

In the Chair: Mr. D. C. Long with 38 members and friends present.

Deaths: Mr. N. Holme (member since 1962)
Mr. B. Sparks, a former member of the Society

Nominations and elections to Membership: 2 Full Members

Mr. N. P. Gardner, B.Sc., [REDACTED], Riverside, Cardiff, [REDACTED]

Dr. D. Minchin, [REDACTED], Dartry, Dublin 6, Ireland.

1 Family member

Mr. & Mrs. C. D. Knight, [REDACTED], Huclecote, Gloucester, [REDACTED]

Transfer to Full Member

Justin Gerlach, Wadham College, Oxford, OX1 3PN

Lecture of the Day: Dr. J. D. Peacock on 'Late Quaternary Marine Molluscs and Palaeoenvironmental Reconstruction'

Meeting closed 4.58 p.m.

Exhibits

- W. N. Gray - Shells from Lake Malawi
- D. C. Long - Articles and slides on Plio-Pleistocene marine mollusc assemblages
- P. & D. Negus - 'Tellins and Razor shells' an article in Countryside Magazine
- Molluscs on Stamps, Yugoslavia
- T. Pain - Subfossil Placostyla (Bulimidae) from New Caledonia
- P. Palmer - Protoconchs and prodissoconchs of Jurassic molluscs
- A. Rundle - Some Tertiary marine molluscs
- J. Whitehouse - Mesozoic Mollusca from Great Oolite, Minchinhampton
- F. Woodward - Land shells from St. Helena

1013th. (Ordinary) meeting held on 18th February 1989 at B.M.(N.H.)

In the Chair: Mr. D. C. Long with 38 members and friends present.

Nominations and elections to Membership: 4 Full Members

Mr. E. Dumoulin, [REDACTED], 8390 Knokke-Heist, Belgium.

Mr. C. Gillard, [REDACTED], [REDACTED], Taunton, Somerset.

Ms. Wendy Innes, [REDACTED], Talybont, Dyfed, [REDACTED]

Ms. Jenny Mallinson, [REDACTED], [REDACTED], Millbrook, Southampton, [REDACTED]

1 Institutional Member

Museum de Sciences Naturelles, 12 Rue St. Michel, F28000 Chartres, France.

Transfer to Family Member

Mr. M. & Mrs. H. M. Weideli, [REDACTED], Newbury, Berkshire.

Lecture of the Day: Dr. B. J. Smith on 'Recolonisation of Krakatoa'

Meeting closed 4.58 p.m.

Exhibits

- K. Brown - Xenophora neozelanica Suter 1908: a variety of attached materials.
- photographs of shell exhibits in Singapore Aquarium
- J. Chatfield - Water supply and habitats for molluscs: a case history in Alton
- New Books
- D. W. Guntrip - A book which is useful for those interested in Irish Zoogeography
- D. C. Long - Manus Island Camaenids and Camaenid literature
- R. C. Preece - Land Mollusca from the Tristan da Cunha Islands
- C. Street - Some shells found on the island of Alderney, Feb. 1989
- M. J. Willing - Potential Threats to Mollusca: The Water Privatisation Bill

GENERAL NOTES

ROGATE STUDY CENTRE, The Red House, Rogate, Nr. Petersfield, GU31 5HN

Telephone: 0730 80 621. Director: Dr. Mike Llewellyn; Warden: Clive Daws;

Administrator: Anne Finlay.

Identification and Natural History of Snails and Slugs. Friday 10th. November 1989
- Sunday 12th. November 1989.

Tutor: Dr. June Chatfield.

Accommodation, meals and laboratory but excluding travel - £55.00.

EXCHANGES WANTED

Mr. Danila Henrikas, [REDACTED], Klaipeda 235819, Lithuania, U.S.S.R. would like to exchange seashells with British collectors. He has trawled specimens from the E. Atlantic available. Please write.

Mr. Franck Boyer, [REDACTED], 93270 Sevrans, France, is seeking species of Marginellidae - the endemic species of the Southern Atlantic - and hopes British collectors will be able to help.

FOR SALE

The Society has been given some copies of the following publication, which has been out of print for a long time.

H. E. Quick - British Slugs 1960

If you would like a copy please send a cheque for £3.00, payable to E. B. Rands. This covers U.K. postage and Jiffy bag plus a Donation of a £1.00 to the Society.

Overseas members please add an appropriate extra sum to cover postage and conversion costs. State whether you want Airmail or Surface post.

Mrs. E. B. Rands, [REDACTED], Luton, Bedfordshire, [REDACTED]

APPLICATIONS published in the Bulletin of Zoological Nomenclature. The following applications were published on 23 June 1989 in Vol. 46, Part 2 of the Bulletin of Zoological Nomenclature. Comment or advice on these applications is invited for publication in the Bulletin and should be sent to the Executive Secretary, I.C.Z.N., c/o British Museum (Natural History), Cromwell Road, London, SW7 5BD, U.K.

Case 2403 Valanginites Sayn in Kilian, 1910 (Cephalopoda, Ammonoidea): confirmation of the author of the genus, and of Ammonites nucleus Roemer, 1841 as its type species. P. F. Rawson, Dept. of Geological Sciences, University College London, Gower Street, London, WC1E 6BT, U.K.

E. Kemper, Bundesanstalt für Geowissenschaften und Rohstoffe, Postfach 510153, 3000 Hannover 51, Federal Republic of Germany.

Case 2642 Polygyridae Pilsbry, 1894 (Mollusca, Gastropoda): proposed precedence over Mesodontidae Tryon, 1866. K. C. Emberton, Dept. of Malacology, Academy of Natural Sciences, 19th and the Parkway, Philadelphia, PA19103, U.S.A.

The following Opinions were published on 23 June 1989 in Vol. 46, Part 1 of the Bulletin of Zoological Nomenclature.

Opinion 1539 Conus floridanus Gabb, 1869 (Mollusca, Gastropoda): not to be given precedence over Conus anabathrum Crosse, 1865.

Opinion 1540 Avicula gryphaeoides J. de C. Sowerby, 1836 (Mollusca, Bivalvia): specific name conserved.

Printed by: D. C. Armsworth, [REDACTED], Baldock, Herts. [REDACTED]

THE CONCHOLOGISTS' NEWSLETTER

No. 111

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

December 1989

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Market Harborough,
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Produced by THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

SOME OBSERVATIONS ON JUVENILE SHELLS OF RETUSA TRUNCATULA, PHILINE CATENA AND PHILINE PUNCTATA

In an earlier issue of The Conchologists' Newsletter (No. 89, June 1984: 'The Trouble with those Juvenile Delinquents...') I wrote of the difficulties which may be encountered in identifying microshells taken from shell sand. This is particularly the case where juveniles are concerned, especially as juvenile forms are rarely figured in the standard literature and can significantly differ from adults. In the case of bivalves it is sometimes helpful to lay the juvenile on top of the umbo of the adult to see if the configuration and profile of growth lines coincide. This does not always work, however, as - even in fresh adult shells - the umbo area is frequently worn or thickened by subsequent accretion. The situation is much the same with gastropods where the protoconch on an adult shell is often worn or lost or may be buried in the first whorl. More recently, some publications have been more helpful and one may cite as particularly useful the excellent SEM photographs of the protoconchs and sometimes of whole shells of a good number of small gastropod species published by Babirot and Thiriot-Quiévreux in their paper 'Gastéropodes de la Région de Roscoff. Etude particulière de la protoconque'.

A further means of identifying juveniles is to attempt to build up a continuous growth series of specimens in order to bridge the gap between a difficult juvenile on the one hand and the adult which one can identify with confidence on the other. I believe this is best done when a good number of juveniles of a particular species happens to turn up in a single sample of shell sand. It is also important to ensure that with each increment in size of the specimens one can still be confident that there is no discontinuity, no inadvertent shift to a different species. It can be most interesting to build up a collection of growth series, though it may take a long time! A benefit is that such a collection becomes an important research tool for future work with very small shells, not only because it can show what a particular small shell is, but also what it is not.

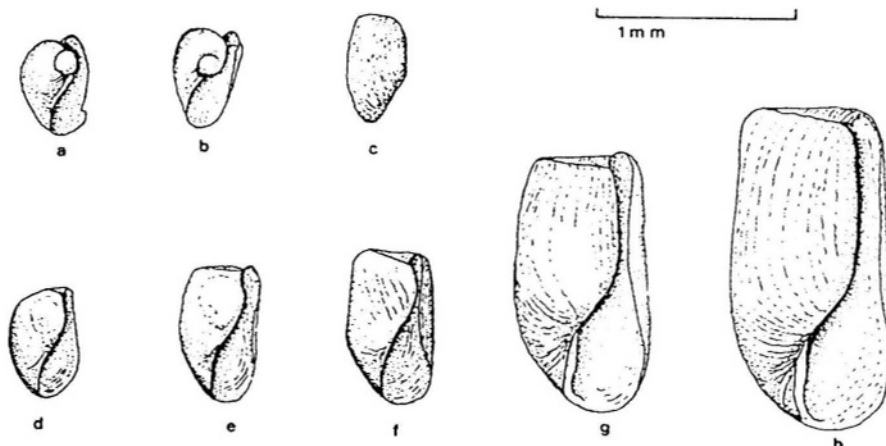


Fig. 1 Retusa truncatula (Bruguière, 1792). A growth series

Some recent samples of shell sand have provided me with interesting growth series of certain species of Bullomorphs. Fig. 1 shows a series of juvenile shells of Retusa truncatula from shell sand taken in Harlyn Bay, N. Cornwall in June 1988. In Fig. 1 a and b it can be seen that the protoconch is in fact sinistral (or perhaps pseudo-sinistral: one would have to know the orientation of the animal in the shell to be sure). When the time comes for the transition to take place from the protoconch to the adult shell, the orientation of the protoconch is altered so that it tips over by more than a right angle: crude measurement suggests this to be about 110° . This is analogous to the early shells of certain Pyramidellids where the axis of coiling of the protoconch lies at approximately right angles to the axis of coiling of the teleoconch. I have tried to illustrate this process in R. truncatula diagrammatically in Fig. 3. Fig. 3a shows a notional protoconch and the arrow shows the probable amount of rotation to set it in the new orientation for growth (shown in 3b). Subsequent shell development then takes place most vigorously from x round the outer periphery to y and this plate-like shell curves round dextrally to envelope the tip of the protoconch. Thus it is really the side of the whorl of the protoconch which is left exposed as the apparent tip of the protoconch. In Fig. 1a the protoconch can be seen to be already tilted over and the new elongated dextral whorl is beginning to develop round it. In 1b the growth has gone a stage further, while in d and e the protoconch is largely enveloped so as to be invisible in side view. As these small specimens are transparent, however, the protoconch can be seen through the side wall to be lying in the tilted-over position. Other, broken specimens (not illustrated here) confirm this. Fig. 1f-h show the subsequent growth towards the recognisable adult shell. This change of orientation after metamorphosis in the protoconch of a Bullomorph is mentioned in respect of Philine denticulata by T. E. Thompson in his Biology of Opisthobranch Molluscs Vol. I (p. 92).

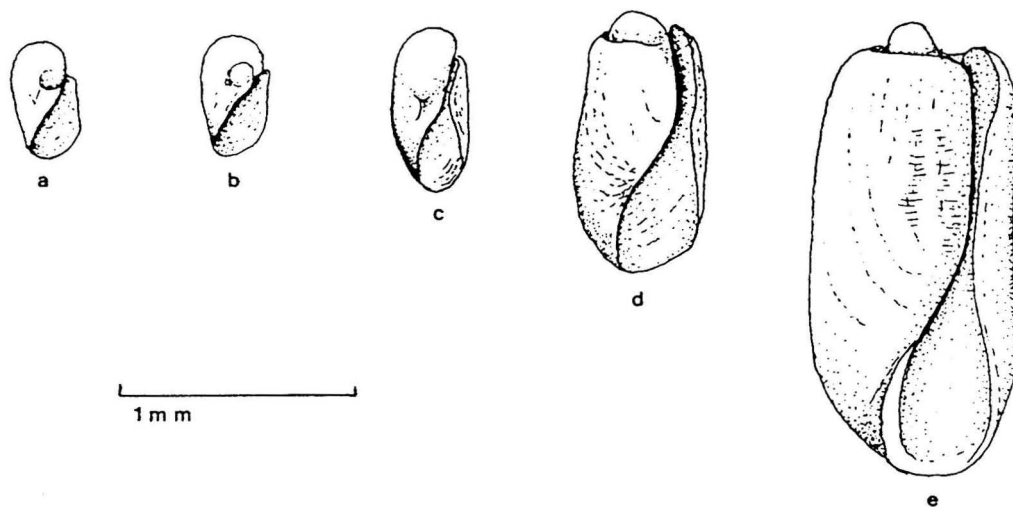


Fig. 2 Retusa truncatula var. mammillata

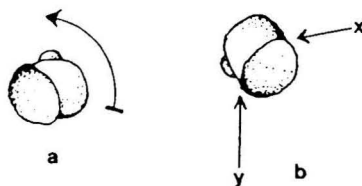


Fig. 3 Notional representation of the change in orientation of the protoconch of R. truncatula at metamorphosis and the site of subsequent shell development.

Retusa truncatula has also a variety mammillata in which the protoconch protrudes substantially from the apical end of the adult shell. The same generous sample of shell sand from Harlyn Bay provided sufficient specimens to show how this can occur and these are illustrated in Fig. 2. After the change in orientation of the protoconch, the developing edge of the shell wraps round at a lower level, still masking the true tip of the protoconch but leaving the swollen side of its whorl exposed and protruding.

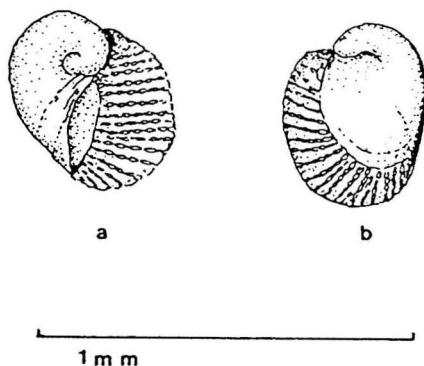


Fig.4 Philine catena (Montagu, 1803). a: apertural view;
b: abapertural view.

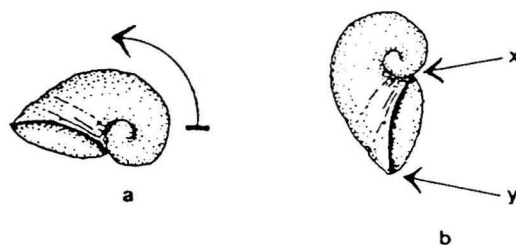


Fig.5 Protoconch of P. catena, showing change in orientation at metamorphosis and the site of subsequent shell development.

A single very small specimen of Philine catena from the same source is the basis of Figs. 4 and 5 which show roughly the same sequence of events occurring with this species. Figs. 5a and 5b were drawn from the same specimen illustrated in Fig. 4 but omitting the characteristic shell growth which occurs after metamorphosis. 5a may be seen as a sinistral (or perhaps pseudo-sinistral) shell which can be considered to change orientation (as shown in the arrow) so as to lie as shown in 5b. Once again, a plate-like shell then develops most vigorously from x to y round the periphery, flaring sideways at y so as to envelop the 'bulb' at the tip of the protoconch. The transition from the smooth, hyaline shell of the protoconch to the characteristic chain-like sculpture of the adult shell is abrupt and this can be seen in Figs. 4a and 4b.

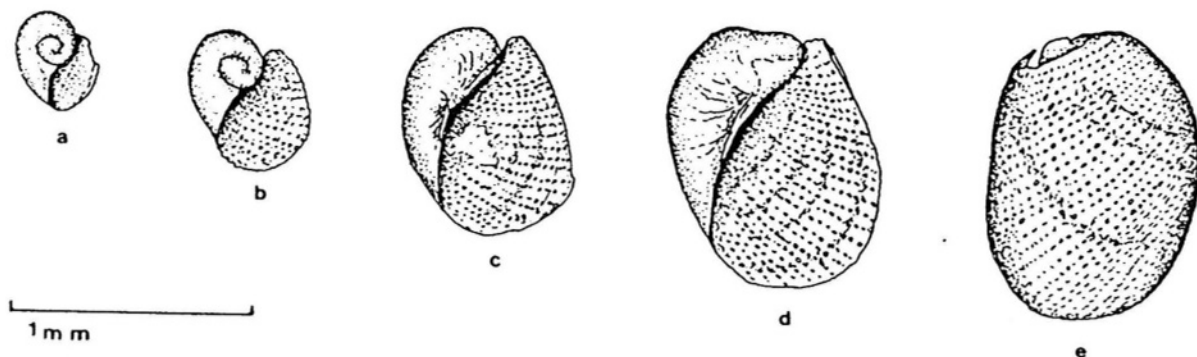


Fig.6 Philine punctata (Adams, 1800). A growth series.

Fig. 6 shows specimens of Philine punctata, a, b and e coming from Low Newton-by-the-Sea in Northumberland (June 1988), c and d from Holy Island (Lindisfarne) a few miles further to the north (May 1988). Here the ontogeny is much the same as for P. catena, though in this case I was able to put together a long growth series of which only the first five specimens are illustrated.

I have described here my attempts to work out the sequence of events subsequent to metamorphosis in certain species and have based this account solely on dead shells. What is certain is that work on a living population in controlled conditions would reveal the process more clearly, and important additional insight would surely come from an examination of the soft parts of the animal. That, however, would be a line of research beyond my resources and competence.

Working with very small shells can be both fascinating and challenging. Opportunities are fortuitous and only occasionally does a sample of shell sand provide a suitably generous supply of 'juvenile delinquents' of a single species. All the illustrations for this article were done from real shells with the help of a binocular microscope and camera lucida attachment with the exception of Fig. 3 which is purely notional.

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J. E. Phorson, [REDACTED], Belmont, Durham, [REDACTED]

January 1989

LAND AND FRESHWATER MOLLUSCS OF THE MONTGOMERY CANAL

The waterway popularly known as the Montgomery Canal runs north-south from a junction with the Llangollen Canal near Ellesmere, Shropshire through Welshpool to

Newtown, Montgomeryshire (Powys). After a breach in the 1930s it was closed to navigation in 1944. The canal is classified as a 'remainder' waterway under the 1968 Transport Act. It has been owned and managed by British Waterways Board (BWB) since 1963. Following much partial restoration during the 1970s and early 80s British Waterways hope to restore the canal as a 'cruising' waterway. The British Waterways Act 1987 provides the powers to carry out this restoration.

Over the period of disuse and partial restoration 23 of the canal's 56 kilometres have been notified by the Nature Conservancy Council as Sites of Special Scientific Interest. This interest centres on unusually diverse aquatic plant and insect communities. Several rare species occur. A joint BWB/Manpower Services Commission project was set up in 1985 to carry out a baseline ecological survey of the canal and establish 'offline' canal reserves to help ensure the conservation of the critical communities. Aquatic molluscs were surveyed in 1985, terrestrial molluscs in 1987.

For sampling purposes the canal was divided into 56 kilometre sections. Sites at each km marker were used in the aquatic survey, sections between the km markers were used in the terrestrial survey. A location map with these divisions is given on page 227.

The aquatic survey was carried out by Andrew Walmsley. Additional sampling was undertaken in 1986-87. Pisidium was not identified to species. The terrestrial survey was carried out by Richard Wistow, Paul Bannister and Justin Lucas. The canal bank, towpath, hedgerow and any stonework were sampled wherever possible.

DATA

24 aquatic species and 36 terrestrial species were recorded. The records for Pyramidula rupestris and Cecilioides acicula are thought to be the first for Montgomeryshire (vc 47).

Canal distributions for most taxa are given below. Numbers refer to kilometre sites or sections 1-56. GA refers to Guilsfield Arm. Data from feeders, weirs etc. are included at the nearest km site. Sites and sections 1-5, 12-17, 54-56 are dry.

Species recorded during the survey but excluded from the distribution table include Sphaerium rivicola, Sphaerium corneum, Anodonta cygnea, Unio tumidus, Dreissena polymorpha.

HISTORICAL DATA

Mollusc records for the Montgomery Canal date back to the late 19th. century when Vize (1882) and Morgan (1887, 1888, 1891) published papers in Montgomeryshire Collections. In 1936 Boycott and Oldham published a study of the Shropshire canal system that included the Montgomery. More recent records include Chatfield (1974a, b), Harris (1978-83), Palmer (1982), and Twigg (1959).

By collating data from these sources it is possible to roughly compare past and present distributions of aquatic species. Some are strikingly similar to those of 1985. These include Bithynia leachii (km 1-27 in 1985, 1-30 previously), Hippeutis complanatus (km 1-41 in 1985, 1-33 previously), and Physa fontinalis (km 9 onwards in 1985, km 9 onwards previously). Other species (e.g. Viviparus viviparus, Lymnaea auricularia, L. peregra) show wider ranges in the old records. Still others show extended ranges in the 1985 data. These include Potamopyrgus jenkinsii, Valvata piscinalis, and Acroloxus lacustris. The comparisons are not strictly accurate because of differences in sampling regimes, sites, etc..

	I---SHROPSHIRE---	I-----MONTGOMERYSHIRE-----I	
Km site or section GA = Guilsfield Arm	111111111122222222223333333333444444444455555555	G	A
	12345678901234567890123456789012345678901234567890123456		
Carychium tridentatum	X X XXX XXX X XXXX XXX XX X X		
Succinea putris	XXX XXX XXXX X XXXX X X X X XXXX X X X		
Oxyloma pfeifferi		X	
Azeca goodalli	XXXX	X X	XX XXXXXXX
Cochlicopa lubrica/lubrice)	XXXXXXXXXXXXXXXXXXXX XXXXXXX XXXXXXXXXXXXXXXXXXXXXXX		X
Pyramidula rupestris		X	
Columella edentula		X	
Vertigo pygmaea	X X		
Lauria cylindracea	X XXX XX XXX X X XXX		XXXXX X X
Vallonia costata	X XXX XX X XX		X
Vallonia excentrica	XX X X X XX		X
Acanthinula aculeata	X X		X
Ena obscura	XX X X XX X X X X		X X X X X
Punctum pygmaeum	X	X X	
Discus rotundatus	XX		X
Vitrina pellucida	XXXXXXXXXX X XXXX XXXXXXX XXXX XXXXXXX X XXXX XX X		
Vitreola crystallina	XX XXXX X X XX XXX XXXX X XX XX X		
Nesovitrea hammonis	X X XX X X X X		XX X X
Aegopinella pura	X XX XX X X XX X X XX		X X XX X X
Aegopinella nitidula	XXXXXXXXXXXX XXX		
Oxychilus cellarius	XX		XXXX XXX
Oxychilus helveticus	XXXX XXXXXXXX X XXXX XX XXXXXXXX XXXXXXXXXX		
Eutonulus fulvus	XX X X		X X X X X
Cecilioides acicula		X X	
Clausilia bidentata	XXXXXX XXXXXXX XXXX		XX X X XXX XX X XX X
Candidula intersecta	XX		
Ashfordia granulata	XX		X XX X
Zenobiella subrufescens			XX
Trichia hispida	XX		X
Trichia striolata	X X XX XXXX		X X X X
Arianta arbustorum		X XX	X
Cepaea nemoralis	XX		X
Cepaea hortensis	X X XXX	X X	X XX XX XXX
Helix aspersa	X X X XXXX	X XX X	X X
Viviparus viviparus	X X XX X		
Valvata piscinalis			X X
Bithynia leachii	X X X X X XX		X
Bithynia tentaculata	XXX XX X X XXXX XXXXXXXXXXXX X X		XX X
Potamopyrgus jenkinsi	X X X X		X X
Acroloxus lacustris	X XX		X
Ancylus fluviatilis	X		X
Lymnaea peregra	XXXXXX XX XX XXXX XX XX XX XXXXXXXXXXXXXXX		X
Lymnaea auricularia	X X XX		
Lymnaea trunculata	XX		
Lymnaea stagnalis	XXXXXX XXX XXXX X X XX X XXXXXXX XXX		
Hippeutis complanatus	XX X X XX X X X X X X		X
Planorbis barbus corneus	X		XXXXX XX X X
Armiger crista		X	
Planorbis carinatus	XXXXXX XX XXXX XX X XX X XXXXXXX X		X
Anisus vortex	XX XXXX XXXX XXX X X XX X X X		X
Gyraulus albus	X XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		X XXX X
Physa fontinalis	XX X XXXXX XX X XXXXX X XXX XX		X
Sphaerium spp.	XXXX X X XX XX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		X
S.transversum	X X X X		X
Pisidium spp.	X X X XXXXXXX XX XXXXXXXXXXXXXXX XXXXXXXXXXXXXXX		

Boycott and Oldham (1936) and Chatfield (1974a, b) identified Pisidium to species. The 1936 list included P. amnicum, P. henslowanum, P. hibernicum, P. milium, P. moitessierianum, P. nitidum, P. subtruncatum. The 1974 list re-found P. amnicum, P. henslowanum, P. hibernicum, P. milium, P. nitidum, P. subtruncatum and added P. casertanum, and P. pulchellum to the list. Both P. moitessierianum and P. pulchellum are 'notable' species recorded from less than 100 10km squares in Britain.

Terrestrial species listed for the canal in Chatfield (1974a) but not recorded in the present survey are Oxychilus alliarius (similar to O. helveticus) and the local Trichia plebia. Other than some 19th. century records there are no records for slugs, Chatfield lists none on the canal itself and the present survey did not cover them.

DISCUSSION

TERRESTRIAL SPECIES. Species widespread along the canal included Discus rotundatus, Cochlicopa lubrica, Vitrea pellucida, Vitrea crystallina, Aegopinella pura, Aegopinella nitidula, Oxychilus cellarius, Oxychilus helveticus, Trichia hispida and Cepaea nemoralis. All of these are typical of damp hedgerows, grassy banks and ditches, habitats common along the towpath.

Other species were more restricted in their distributions. Those typical of bridges and walls were fairly frequent (e.g. Clausilia bidentata and Lauria cylindracea) but the characteristic wall species Pyramidula rupestris was restricted to one site. Helix aspersa was largely confined to sites with stonework or gardens. Dry grassland species (e.g. Vallonia costata, Vallonia excentrica, Vertigo pygmaea) were largely restricted to the northernmost kilometres where much of the canal is dry and/or grazed.

The limestone of Llanymynech Hill may be a factor in the distribution of many species. The km sections closest to the hill (km 15, 16) had the highest species counts (21 species each). Candidula intersecta was restricted to these sites and Ashfordia granulata and Trichia striolata were particularly abundant. Cecilioides acicula, a tiny subterranean snail of dry soils was only recorded at km sections 26 and 37.

Succinea putris, a species of emergent vegetation, was found throughout the watered sections. The similar Oxyloma pfeifferi was only confidently recorded from one section but may have been confused with Succinea at many sites.

AQUATIC SPECIES. Most of the gastropods were evenly distributed though some were absent from the Shropshire length. These were Viviparus viviparus, Acroloxus lacustris, Ancylus fluviatilis and Armiger crista. Sites south of km 40 were poorer in species, which may reflect lower calcium levels in this section.

Among the bivalves Sphaerium species were found throughout most of the canal. Sphaerium transversum was widely distributed but local, good numbers were found in the Guilsfield Arm. Pisidium species were common except for the Shropshire length. Mussels were not sampled but were frequently seen in dredged material. Anodonta cygnea, Unio tumidus and Dreissena polymorpha were found in fresh dredgings at Aston (km 8) in 1988. Several of the species recorded are usually associated with hard water habitats but no direct relationship between species numbers and hardness was found. The relatively hard water of the Shropshire lengths actually yielded less species. Boycott and Oldham (1936) suggested the canal was acting as a corridor down which hard water species were acclimatising.

VALUE AND CONSERVATION OF THE MOLLUSC FAUNA

The terrestrial species include no rarities but the two new vice-county records indicate how under-recorded this part of Britain is. Doubtless further survey work could reveal additional species.

The aquatic species include several taxa which are local in their distribution. Some of these may owe their presence to the canal acting as a wildlife corridor, enabling species to move into areas where they are normally absent or rare. Such species may include Bithynia leachii, Sphaerium transversum and Sphaerium rivicola. Sphaerium transversum was first recorded in the Montgomery canal at Newtown around 1880 (Vize 1882) and later in the Guilsfield Arm (Morgan 1891). It is now locally distributed in the canal and the Guilsfield Arm. The canal appears to be the only Welsh locality for this species. The present status of the notable Pisidium species recorded in the past is not known.

Restoration of the canal for pleasure cruising will reduce the aquatic plant and invertebrate diversity in the main canal. Seventeen non-boated aquatic reserves are being created as part of the restoration project. Many of these should support good mollusc populations. The whole of the Guilsfield Arm, known for its mollusc fauna since the 1880s, is one such reserve.

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ACKNOWLEDGMENTS

The Montgomery Canal Survey is a joint British Waterways/Manpower Services Commission Project administered by Community Task Force North Wales. Thanks are due to Dr. J. H. Blackburn, Dr. M. P. Kerney and Dr. J. Chatfield for help with identifications and previous records.

Jonathan Briggs*, Andrew Walmsley and Richard Wistow
(*Conservation Officer, British Waterways Board, Llanymynech, Powys, SY22 6EA)

After reading the second article on "Juvenile Delinquents" in the Conchologists' Newsletter No. 101, it occurred to me that one might argue from the Merchant of Venice that, if it is a wise father who knows his own child, it is an even wiser malacologist who knows the child of a mollusc. J. E. Phorson (1) certainly started something with his article on juvenile molluscs, for I have since been obsessively assembling growth-series of British marine molluscs whenever material becomes available.

While heartily endorsing Jan Light's complaint (2) at the lack of published information on the shape of juvenile molluscs, this contribution is offered in the hope that it will help reduce the problem. At the same time, since I was one of the hapless victims of her Mercenaria-quiz, the opportunity is seized for a gentle revenge.

In the penultimate paragraph she claims "Some molluscs grow up with no problems; a scallop is recognisable from the smallest shell". Owning a fine collection of world Pectinacea may have generated this view, but, if it is true of foreign scallops it is not true of some British species. The accompanying illustrations show that development is not so straightforward for Pecten maximus, Chlamys varia, Chlamys opercularis and Hinnites distorta.

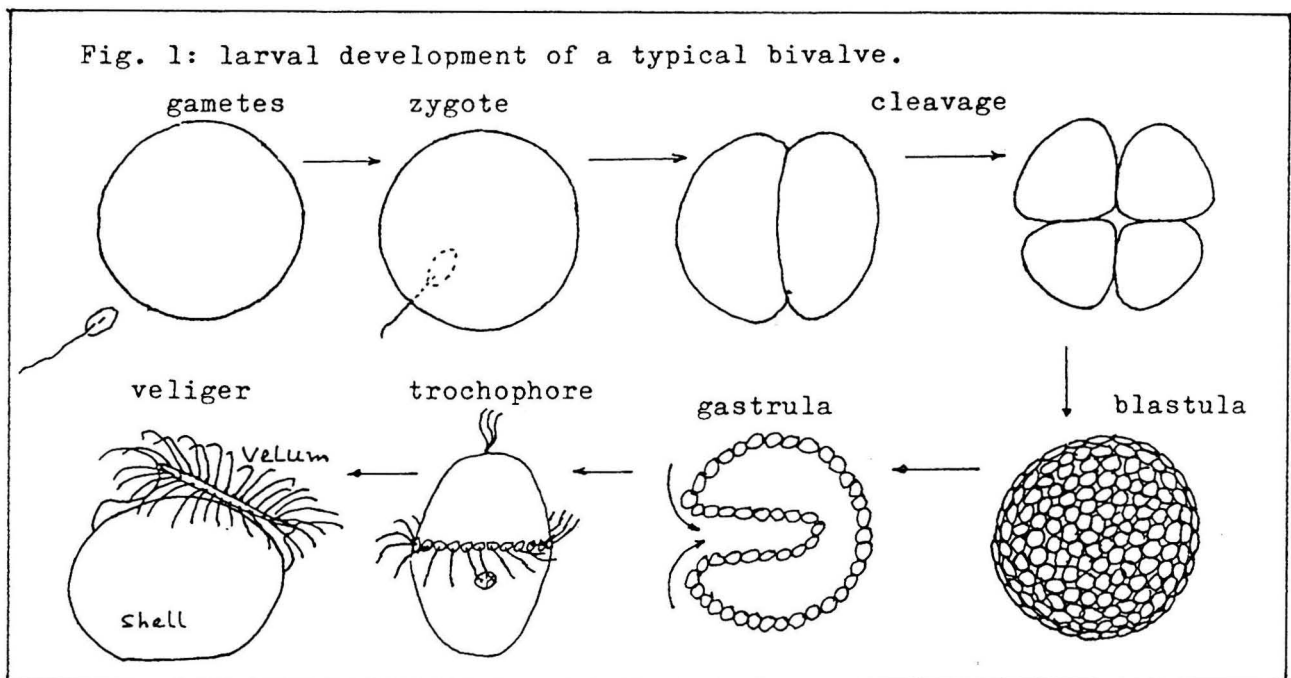


Fig. 1 shows diagrammatically the larval development of a generalised bivalve mollusc from fertilised egg to metamorphosis. The progression is gradual but certain stages are recognised and named. A glossary of terms is appended at the end of this article: if we are going into the ontogeny business a lot of words can be saved if we use the conventional jargon. All stages in Fig. 1 are planktonic, but only the veliger feeds and produces a shell, a round, featureless, shiny dome between 0.2 and 0.4 mm. Since this is a bivalved shell the term protoconch, on the 'univalved' gastropods and scaphopods, is not suitable, so it is distinguished as a prodissoconch. Most juveniles up to 10 mm carry a small shiny dome right at the

Fig. 2: Pecten maximus (Linne 1758)

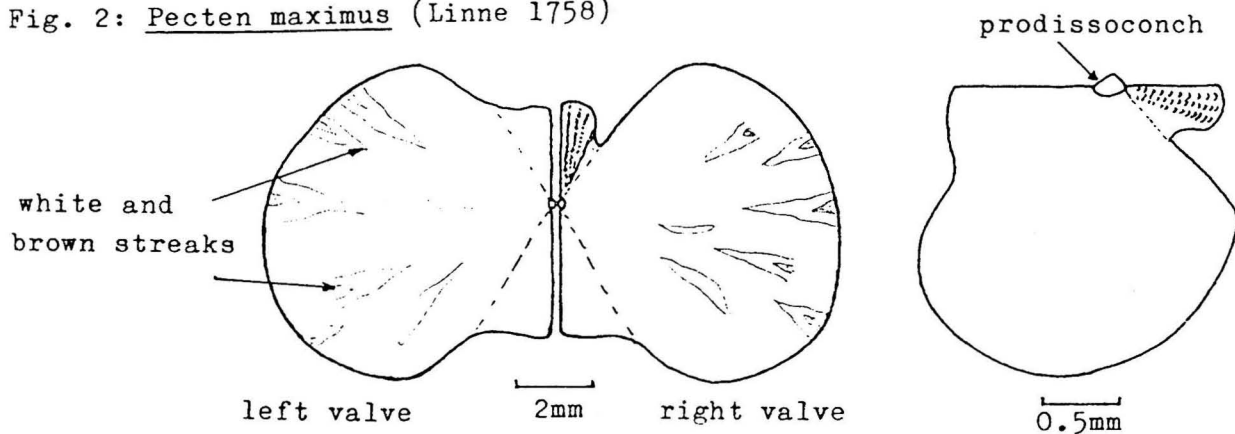


Fig. 3: Chlamys varia (Linne 1758)

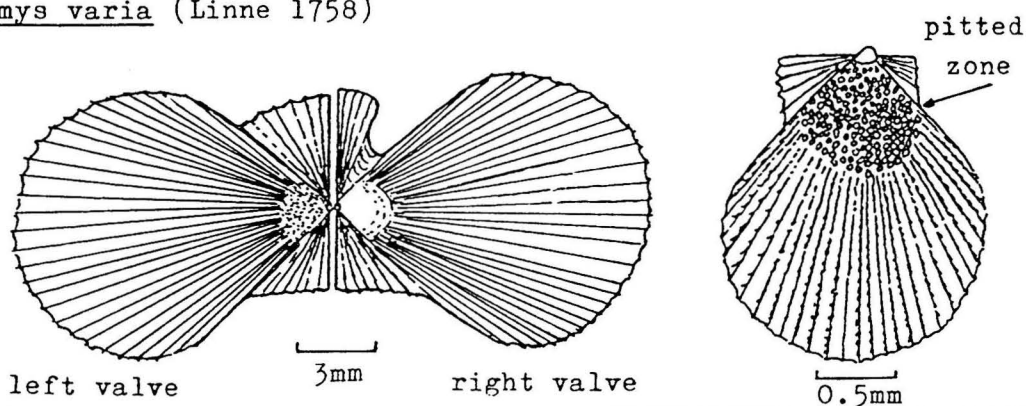


Fig. 4: Aequipecten opercularis (Linne 1758)

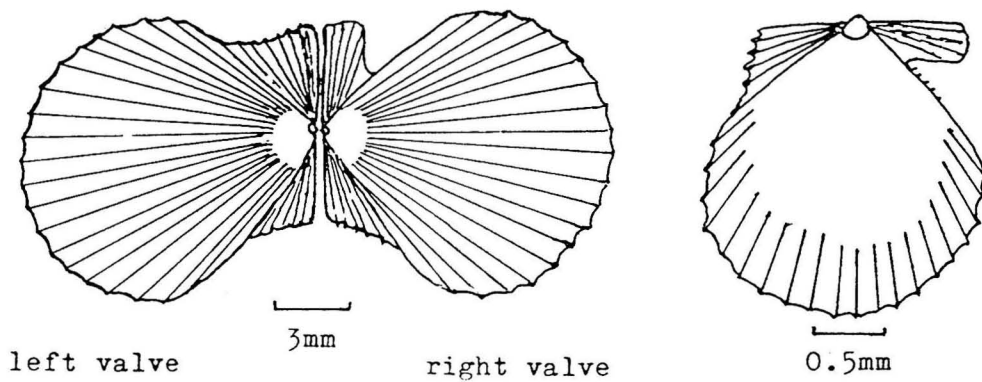
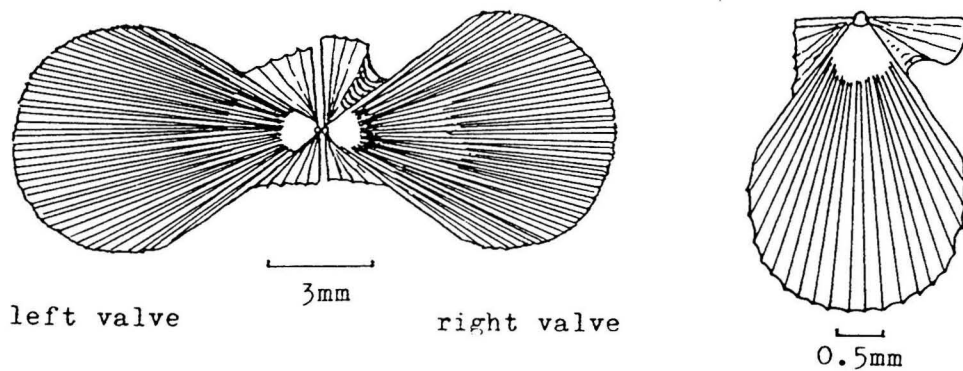


Fig. 5: Hinnites distorta (da Costa 1778)



apex of the shell: this is the prodissoconch which, with growth and development, is eventually rubbed off. The rest of the shell, beyond the prodissoconch, is distinguished as the dissoconch; while the boundary between the two is always sharp and distinct and coincides with settlement and metamorphosis - a profound change in the anatomical organisation and way of life of the animal.

Fig. 2 shows the juvenile shell of Pecten maximus at around 7.5 mm height. There clearly are no ribs, only radiating colour streaks and random blotches of white and pink. Between 8 and 10 mm the first sign of ribbing appears, but only as faint radiating undulations seen best against oblique light. Usually the appearance of ribs is gradual at around 10 mm; but an encounter with a marauding crab could result in shell breakage and a growth halt, so that ribs appear rather suddenly at the growth halt edge when growth continues. When this happens the ribs on the auricles of the left valve also start at the edge of the growth halt; but, on the right anterior auricle ribs appear right at the beginning of dissoconch growth, close up to the prodissoconch.

The shell of Pecten maximus up to 8 mm looks nothing like the big handsome adult shell with strong radiating ribs and so markedly inequivalve. The first juvenile I found, off Hastings, led me to believe that it was Similipecten similis: it was about the right size and shape, but there were ribs on the right anterior auricle. It was a long time before the idea of a smooth pectinid was cleared from my head and I looked at our familiar Pecten maximus. The trouble with the 'ash-tray-shell' is its familiarity, it is so familiar that no one looks at it seriously: but it is interesting, particularly the 'flat' valve which is not flat at all. From the beginning of dissoconch growth the left flat valve, up to 4-5 mm, is moderately convex, more convex than the right which is the reverse of the adult condition. From 5 mm to around 25 mm the left valve is concave, then it changes again so that the rest of the valve shows a very slight concavity against a straight edge, Fig. 2.

The rest of the illustrations need no explanation: they all show a smooth zone at the beginning of dissoconch growth. Only Chlamys varia attracts some comment since the left valve of that species, up to 11 mm, has a ribless zone covered with pits as in Fig. 3. What could one make of that if one didn't know? A palaeontologist might think of the Mesozoic Camptonectes with its radiating lines of pits, which I confess I did. It was, again, a while before an assembled growth series showed it to be no more than Chlamys varia. Fig. 4 is Chlamys opercularis, Fig. 5 Hinnites distorta: both have a smooth zone at the beginning of dissoconch growth, and all gave me a great deal of trouble.

Measurements given are the mean of several measurements and should be taken in the musical rubato sense, for no two molluscs seem to do exactly the same thing - sometimes not even approximately. But all the British pectinaceans I have looked at and here figured, do show a ribless zone extending from the prodissoconch for a distance between 6 and 10 mm before adult ribbing appears. I have no quarrel with Jan's claim that "- a scallop is recognisable from the smallest shell": it is, but only as a scallop. Running it down to a species is not so straightforward.

Both J. E. Phorson (1) and Jan Light (2) are right: we do need to get to grips with juveniles and their ontogeny. In fact, if every member of the Conch. Soc. undertook to study the development of just one British mollusc we would have Jan's "Benjamin Spock for Molluscs". But we should stop calling them "juvenile delinquents" for they are just juveniles while we are the delinquents for remaining in ignorance about an important part of molluscan studies.

The following glossary of development terms was one of the handouts given to those attending the 1986 Marine Workshop in Northampton. It may prove a useful aid-memoire to those who haven't needed to use such terms since they were students.

GLOSSARY OF SOME DEVELOPMENT TERMS IN THE MOLLUSCA

ONTOGENY:	development of the individual from fertilized egg to maturity.
GONAD:	place where gametes are generated by meiosis.
MEIOSIS:	cell division resulting in daughter cells which are haploid.
HAPLOID:	having half the correct number of chromosomes.
CHROMOSOMES:	bodies in nuclei of cells reacting strongly to stains; these carry the material of inheritance. Chromo-some = colour-body.
OVUM:	unfertilized, non-motile, haploid single cell.
SPERM:	motile, haploid single cell.
GAMETE:	collective name for products of gonad - ova and sperm.
ZYGOTE:	a fertilized ovum which is now diploid and begins mitotic cell division.
DIPLOID:	having the correct number of chromosomes.
MITOSIS:	cell division of growth and development in which daughter cells are diploid.
RADIAL CLEAVAGE:	mitotic cell division in which daughter cells move outwards in a radial direction - Echinoderms and Chordates.
SPIRAL CLEAVAGE:	mitotic cell division in which cell movement has both radial and a lateral component.
BLASTULA:	a hollow ball of undifferentiated cells resulting from mitotic cell division of a fertilized ovum.
GASTRULA:	a blastula in which part of the external cell layer becomes invaginated to form the first primitive alimentary track.
TROCHOPHORE:	a gastrula in which there is a mouth, blind-ended gut, encircling ring of cilia and an apical tuft of cilia. Cell differentiation has now reached an advanced stage.
VELIGER:	development from trochophore in which the gut is open at both ends, a bi- or multilobed velum is the swimming organ, and it feeds in the plankton while developing a primary larval shell.
LARVA:	dispersal stage of organism, unlike the adult in form.
TORSION:	larval process in prosobranch gastropods in which the posterior mantle cavity is rotated through 180° and comes to rest above the head.
PROTOCONCH:	larval shell of gastropods and scaphopods, produced by the veliger.
TELOCONCH:	post-larval shell of gastropod to maturity.
PRODISSOCONCH:	larval shell of bivalves which is two-valved.
DISSOCONCH:	post-larval shell of bivalves to maturity.
GLOCHIDIUM:	shelled larval stage of fresh water unionid bivalves which attach and encyst into the gills of fish, preventing larvae being swept downstream into the sea.
PLANKTOTROPHIC:	larval stage feeding and developing in the plankton.
LECITHOTROPHIC:	feeding and developing within a heavily yolked egg until released as either a veliger or a crawling juvenile.
METAMORPHOSIS:	settlement of larva, loss of velum and beginning of growth of teloconch (gastropods) and dissoconch (bivalves): a critical stage in the ontogeny of molluscs.
OVIPARY:	laying eggs which develop outside parent's body. Embryos may be retained in egg capsule through blastula and gastrula to trochophore stages and released as veligers; or retained through the veliger stage to be released as crawling juveniles.
OVOVIVIPARY:	retaining fertilized eggs within a brood pouch in the mantle cavity through all larval stages until crawling juveniles are released.
VIVIPARY:	retaining fertilized eggs within a womb, attached to parent by means of a placenta. So-called 'viviparous' snails are strictly ovoviviparous.

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C. P. Palmer

SHELLS IN STRANGE PLACES

Sometimes shells turn up in strange places and during a bit of wandering I have come across several of these cases.

In the Desert Dust

Once with three friends I was travelling from Tucson, Arizona to Nogales in Mexico. We decided to get off the main road and took a winding, rather risky road through the mountains, through the mining village of Ruby and the small town of Arivaca where we stopped for petrol and coffee. Lying in the dirt road was an unexpected sight, a piece of a large Dentalium. It had been cut to make an Indian bead and must have been traded with coastal Indians from some 150 miles away on the Gulf of California or even further north on the Pacific Coast.

A Stranger from the Past

The second shell was collected in Holland, from shell banks which had accumulated in fairly recent times (Holocene) in the estuary of the River Schelde. There were Eocene, Miocene and Pliocene shells scoured from the river bed mixed with thousands of cockles and other recent shells. These used to be dredged from the estuary off Ellewoutsdijk and burnt to make lime or ground up for chicken and dove grit. Dutch conchologists have taken great interest in these shell faunas washed up on the beaches and found in the estuaries. During excavations for new buildings at the Sloe inlet, near Vlissingen, these shell beds were exposed and among the many fossil shells I collected was an example of Cypraea moneta, thousands of miles from its home in the Indian Ocean or Pacific. In fact a number of these have been collected from the shell banks and they came from an old Dutch trading ship which sank in the treacherous sandbanks of the estuary, carrying with it in its hold many of the money cowries. The shell gets its name from its use as a primitive money and 16th. century ships would have carried a store.

Elevated Shells

While serving with the R.A.F. in Aden I got a name as a bit of an eccentric among my friends for stopping to pick up shells on the way to work. The airfield at Khormaksar was built on a sandy isthmus connecting the ancient (Miocene) volcano of Shamsen with the coastal plain and the sands were filled with fossil shells, corals, etc.. Over a year I was able to collect many of these, mostly species still living in the local seas as well as a series of modern shells from the rocks and beaches and by diving in the bays. One day a helicopter pilot mentioned seeing similar shells high up on the side of Shamsen. There was a fairly large flat space on the side of the lava peak and this was used as a training site for helicopters to practice landings. I was offered a lift and dropped off there while the helicopter continued a training flight, on the agreement that if it was called away on a real mission I'd have to find my own way down somehow or wait to be rescued! It was too good a chance to miss. And there they were, shells and pieces of coral. The shelly sands and bits of concrete-like accretions on the sides of the headlands

were raised beaches no more than 15 feet above the present sea level while these were nearer 600 feet. The species were those still living in the blue sea shimmering in the heat below. The answer was that the whole of Arabia is tilting slowly, the Red Sea coast rising and the Persian Gulf dipping down, and in the last half million years or so this little shelf had risen from sea level.

Panther Hunting!

Finally in Aden there was the search for Cypraea pantherina. The species is recorded from there and it is found with that locality in old collections (I think including the British Museum). We searched diligently for cowries under stones in the bays, in rock pools, in wave buffeted crevices on the headlands, washed up on the beaches and in the Raised Beach sands, and many species came to light. We dived to about twenty-five feet but not a single specimen of pantherina. Were we looking in the right places? Well we seemed to have tried everywhere. Finally, not long before leaving, I tracked down some of this elusive species in a dusty drawer. Talking to an Arab trader in his shop, now packed with Japanese cameras, German toys and Russian watches, we mentioned collecting shells and he looked in the drawer and produced a few shells - all pantherina - and explained how, in less sophisticated times, he had sold these to passengers from ships refuelling in the harbour. We bought a few specimens and asked where they had come from and he explained they were formerly brought in by trading dhows from the Red Sea. Of course they were sold to tourists and ships' crews as shells from Aden. One wonders how many examples of this species are in collections labelled "Aden" because they were bought there!

P. Cambridge, April 1989

LIST OF PUBLICATIONS BY B. VERDCOURT ON EUROPEAN MOLLUSCA

A list of my publications on African Mollusca has been given in Achatina 1;5-15 (1970) with supplements in 4:85 (1973), 6:128 (1976), 7:140-1 (1979), 13:270-1 (1985). I have now compiled a list of papers and notes concerning European molluscs. Reviews, most incidental records and plates and extracts in the work of others are omitted.

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WINTER STRANGLINES IN SOUTH WALES (DYFED)

Christmas 1988 was, as usual, spent with the family in Dyfed. As usual we had several walks on the shore, Granny (myself) amply supplied with poly bags as everybody down to the youngest (aged 2+) collected shells which this year were strewn around in profusion. Most were the common species of that coast and unremarkable.

At Broadhaven [51°36.5'N 04°55.2'W] where we went on 31 December 1988, there were few large shells but small patches of shellsand of which I brought home a handful, no more, for careful examination. Much of this material was grains of coal, always a good sign, as little shells seem to have similar characteristics for floating in on the tide. The shells averaged 2mm in size, and although some were rather worn, many were fresh and in all 63 species were obtained. Of these, a number were freshly dead and containing animal remains, including the Littorina spp, Otina ovata, Mytilus edulis, Lasaea rubra and Kellia suborbicularis. Most of the pyramidellids had several examples, usually somewhat worn, but Jordaniella nivosa was very fresh. Unfortunately Jordaniella truncatula, for which there are few if any records this century, was rather worn, but definitely not fossil. Rhomboidella prideauxi, Mysella bidentata and Epilepton clarkiae were fresh closed shells.

<u>Diodora graeca</u> (L., 1758)	<u>Lamellaria latens</u> (Müller, 1776)
<u>Patella ulyssiponensis</u> (Gmelin, 1791)	<u>Trivia</u> sp (juvenile)
<u>Patella vulgata</u> L., 1758	<u>Nucella lapillus</u> (L., 1758)
<u>Helcion pellucidum</u> (L., 1758)	<u>Ocenebra erinacea</u> (L., 1758)
<u>Gibbula cineraria</u> (L., 1758)	<u>Hinia incrassata</u> (Ström, 1768)
<u>Tricolia pullus</u> (L., 1758)	<u>Philine punctata</u> (J. Adams, 1800)
<u>Lacuna pallidula</u> (da Costa, 1778)	<u>Retusa truncatula</u> (Bruguère, 1792)
<u>Lacuna vineta</u> (Montagu, 1803)	<u>Limacina retroversa</u> (Fleming, 1823)
<u>Littorina littorea</u> (L., 1758)	<u>Otina ovata</u> (Brown, 1827)
<u>Littorina neritoides</u> (L., 1758)	<u>Nucula nucleus</u> (L., 1758)
<u>Littorina mariaae</u> Sacchi & Rastelli, 1966	<u>Mytilus edulis</u> L., 1758
<u>Littorina obtusata</u> (L., 1758)	<u>Rhomboidella prideauxi</u> (Leach, 1815)
<u>Littorina neglecta</u> Bean in Thorpe, 1844	<u>Musculus discors</u> (L., 1767)
<u>Littorina saxatilis</u> (Olivi, 1792)	<u>Modiolus modiolus</u> (L., 1758)
<u>Rissoa interrupta</u> (Kanmacher, 1798)	<u>Modiolula phaseolina</u> (Philippi, 1844)
<u>Rissoa parva</u> (da Costa, 1778)	<u>Chlamys distorta</u> (da Costa, 1778)
<u>Alvania cancellata</u> (da Costa, 1778)	<u>Aequipecten opercularis</u> (L., 1758)
<u>Alvania punctura</u> (Montagu, 1803)	<u>Pecten maximus</u> (L., 1758)
<u>Alvania semistriata</u> (Montagu, 1808)	<u>Lasaea rubra</u> (Montagu, 1803)
<u>Manzonina crassa</u> (Kanmacher, 1798)	<u>Kellia suborbicularis</u> (Montagu, 1803)
<u>Onoba semicostata</u> (Montagu, 1803)	<u>Mysella bidentata</u> (Montagu, 1803)
<u>Skeneopsis planorbis</u> (Fabricius, 1780)	<u>Tellinomya ferruginosa</u> (Montagu, 1803)
<u>Chrysallida indistincta</u> (Montagu, 1808)	<u>Epilepton clarkiae</u> (Clark, 1852)
<u>Chrysallida obtusa</u> (Brown, 1827)	<u>Parvicardium scabrum</u> (Philippi, 1844)
<u>Partulida spiralis</u> (Montagu, 1803)	<u>Spisula solida</u> (L., 1758)
<u>Ondina obliqua</u> (Alder, 1844)	<u>Angulus tenuis</u> (da Costa, 1778)
<u>Ondina warreni</u> (Thompson, 1845)	<u>Donax vittatus</u> (da Costa, 1778)
<u>Brachystomia eulimoides</u> (Hanley, 1844)	<u>Abra alba</u> (W. Wood, 1802)
<u>Brachystomia rissoides</u> (Hanley, 1844)	<u>Hiatella arctica</u> (L., 1758)
<u>Jordaniella nivosa</u> (Montagu, 1803)	
<u>Jordaniella truncatula</u> (Jeffreys, 1850)	

Odostomia plicata (Montagu, 1803)
Odostomia turrita Hanley, 1844
Odostomia unidentata (Montagu, 1803)

On another walk on the shore at Tenby [$51^{\circ}40.0'N$ $04^{\circ}42.0'W$] on 30 January 1989, where my daughter commented that she had seldom seen as many shells, we added the following to the list (all dead shells).

<u>Gibbula tumida</u> (Montagu, 1803)	<u>Acanthocardia echinata</u> (L., 1758)
<u>Hydrobia ulvae</u> (Pennant, 1777)	<u>Parvicardium exiguum</u> (Gmelin, 1791)
* <u>Rissoa lilacina</u> Récluz, 1843	* <u>Parvicardium ovale</u> (Sowerby, 1840)
<u>Pusillina inconspicua</u> (Alder, 1844)	<u>Cerastoderma edule</u> (L., 1758)
<u>Hyala vitrea</u> (Montagu, 1803)	<u>Ensis ensis</u> (L., 1758)
<u>Bittium reticulatum</u> (da Costa, 1778)	<u>Ensis siliqua</u> (L., 1758)
<u>Brachystomia albella</u> (Lovén, 1846)	<u>Angulus squalidus</u> (Pulteney, 1799)
<u>Ondina divisa</u> (J. Adams, 1797)	<u>Fabulina fabula</u> (Gmelin, 1791)
<u>Odostomia acuta</u> Jeffreys, 1848	<u>Macoma balthica</u> (L., 1758)
<u>Turbonilla lactea</u> (L., 1758)	<u>Gari fervensis</u> (Gmelin, 1791)
<u>Calyptraea chinensis</u> (L., 1758)	<u>Scrobicularia plana</u> (da Costa, 1778)
<u>Buccinum undatum</u> L. 1758	<u>Mactra stultorum</u> (L., 1758)
<u>Mangelia brachystoma</u> (Philippi, 1844)	<u>Spisula solida</u> (L., 1758)
<u>Mangelia nebula</u> (Montagu, 1803)	<u>Lutraria lutraria</u> (L., 1758)
<u>Oenopota rufa</u> (Montagu, 1803)	<u>Circomphalus casina</u> (L., 1758)
<u>Retusa obtusa</u> (Montagu, 1803)	<u>Venerupis senegalensis</u> (Gmelin, 1791)
<u>Antalis entalis</u> (L., 1758)	<u>Chamelea gallina</u> (L., 1758)
<u>Ostrea edulis</u> L., 1758	<u>Clausinella fasciata</u> (da Costa, 1778)
<u>Pododesmus patelliformis</u> (L., 1771)	<u>Mya truncata</u> L., 1758
<u>Pododesmus squamula</u> (L., 1758)	<u>Mya arenaria</u> L., 1758
<u>Lucinoma borealis</u> (L., 1758)	<u>Corbula gibba</u> (Olivi, 1792)
* <u>Rissoa membranacea</u> (J. Adams, 1800)	* <u>Laevicardium crassum</u> (Gmelin, 1791)

In February 1989 the gales did not bring a great deal of interest up, but a shell wreck at Pendine [$51^{\circ}44.4'N$ $04^{\circ}33.4'W$] found on 20 February contained many cast-up live Euspira catena and E. poliana, together with Lasaea rubra, Mysella bidentata, Ensis siliqua, Angulus tenuis, Fabulina fabula, Donax vittatus, Abra alba, Pharus legumen, Mactra stultorum and Chamelea gallina. Additional dead shells from here included Mysia undata (Pennant, 1777) and Barnea candida (L., 1758).

The shores at Saundersfoot [$51^{\circ}42.4'N$ $04^{\circ}42.5'W$], 10 and 20 February, yielded live Euspira poliana, Hinia reticulata, Philine aperta (burrowing in the sand at mid-tide level), Nucula nucleus (L., 1758) and Thracia phaseolina (Lamarck, 1818), and of course the omnipresent Angulus tenuis, Fabulina fabula, Donax vittatus, Abra alba, Chamelea gallina, with few dead shells of interest apart from Hyala vitrea (Montagu, 1803), Tornus subcarinatus (Montagu, 1803), Ondina warreni, Retusa umbilicata (Montagu, 1803) (fresh but broken), Thyasira flexuosa (Montagu, 1803) and some broken bones of Sepia officinalis L., 1758. Another wreck at Amroth [$51^{\circ}43.7'N$ $04^{\circ}39.4'W$], 11 February contained most of the commoner shells listed above and live Acteon tornatilis (L., 1758). This has been found there previously.

Of the Broadhaven records, Dennis Seaward has informed me that the old record from Area 21 of Jordanilla nivosa goes back to Jeffreys (1867) (Ilfracombe) and has also been recorded by Marshall (1899) from the Tenby area. Jordanilla truncatula was also an old record, now upgraded. Odostomia turrita (I have also found it at Manorbier [$51^{\circ}38.4'N$ $04^{\circ}48.3'W$] on 24 September 1987) has also been recorded, living, by Julia Nunn. Rhomboidella prideauxi is a New Record for Area 21.

Amongst the records from Tenby, Odostomia acuta was previously recorded by Marshall (1899), as was Mangelia brachystoma (Marshall, 1913). Oenopota rufa has

been recorded from the Severn estuary but Rissoa lilacina and Antalis entalis appear to be new to Area 21. From Saundersfoot, Retusa umbilicata is also new.

Nomenclature after Smith in Howson (1987).

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Shelagh Smith

MONACHA CANTIANA IN THE DIET OF THE PHEASANT, PHASIANUS COLCHICUS

Mienis (1985) refers to the occurrence of Monacha cantiana (Montagu, 1803) in the diet of the Song Thrush, Turdus philomelos. My own observations suggest that the Pheasant, Phasianus colchicus may also be a predator of M. cantiana.

On 29th. December 1988 I received the mollusc shells which had been recovered from the crop of one hen Pheasant. The bird had been picked up dead on 28th. December near Cuffley, Hertfordshire. The cause of the bird's demise is unclear, although it could have been a road casualty. The shells were identified by myself as all being M. cantiana, and they represented at least 128 individuals, that being the number of apices present. Some shells were entire, and the majority were only partially broken. They all appeared to be sub-adult. Many shells contained snail bodies only partially digested, which suggests that they had been ingested not long before the death of the Pheasant. I have retained the shells preserved in 70% ethyl alcohol.

Tegetmeier (1911) comments in his chapter on Pheasants for Coverts and Aviaries "They also occasionally eat molluscous animals. Mr. John Bishop, of Llandoverly, killed a pheasant on the coast of Islay whose crop was filled with the coloured snail's shells abounding on the bents or grass stems on the coast. At the meeting of the British Ornithologists' Club, October 21, 1896, I exhibited some snail shells (Helix nemoralis) of full size, no fewer than forty-eight of which I had taken out of the crop of a pheasant."

Maxwell (1913) also refers to small molluscs in the diet of Pheasants and quotes on page 64 "Full of coloured snails from the bents (Island of Islay)". This is presumably the same record as that cited by Tegetmeier (1911).

Cramp (1980) also makes reference to various molluscs in the diet of Pheasants. However none of these authors makes mention of M. cantiana. As it is a relatively common species, and where it does occur it is often found in good numbers, one might expect it to be found in the diet of Pheasants more frequently than the records suggest.

I would be interested to learn of any other records of M. cantiana in the diet of Pheasants.

ACKNOWLEDGMENTS

I wish to thank Michael Clark and Melvin Bedford for supplying the shells obtained

from the crop of the Pheasant.

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Pryce Buckle, [REDACTED], Boxmoor, Herts., [REDACTED]

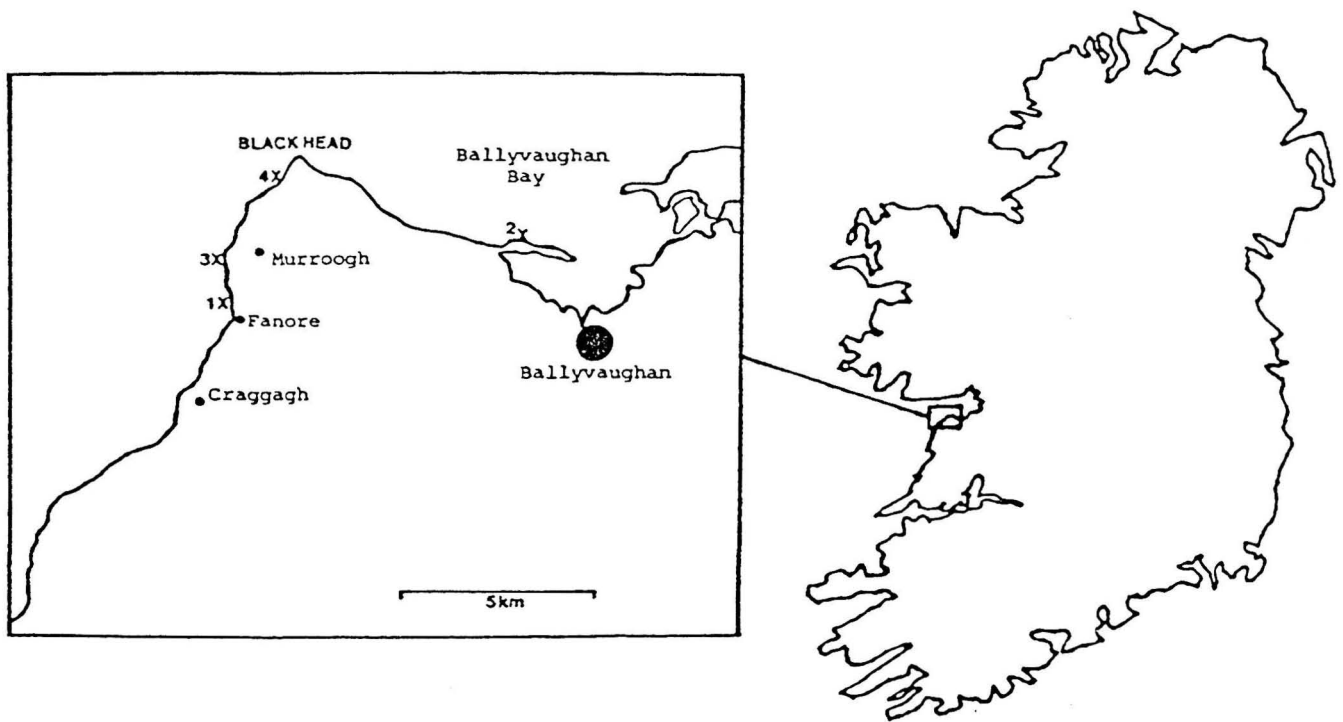
MARINE RECORDING ON THE BURREN

The area known as the Burren in Co. Clare, Ireland has long been recognised as a site of international botanical importance. It is a meeting place of species of very varied types of distribution, and there is nowhere in Europe where Mediterranean and arctic-alpine plants grow together in a similar way. Approximately 375 square miles in area, the Burren is a gently sloping Carboniferous Limestone landscape bounded by Galway Bay to the north and the Atlantic coast to the west. The Burren has also received attention from conchologists, and the non-marine fauna is well known. On the marine front, a considerable amount of littoral and benthic work was done in the 1970's and continues to date. Much of this work has been published (Keegan 1974a, 1974b, Konnecker 1973, Ryland and Nelson-Smith 1975). The Area Recorder, David McGrath, continues to work in the area and ongoing survey work is carried out by University College Galway in S36. Since the publication of the Sea Area Atlas (Seaward, 1982) however, this Society's recording scheme has not been significantly added to and there is evidently scope for further updating of records.

Whilst travelling to the Field Meeting in Donegal (1 to 4 June) we spent time on the Burren mainly to study the flora but we also took the opportunity to examine the marine Mollusca of the area. Four sites with differing shores were visited:

1. Fanore Bay, (Irish Grid Ref.) M136085, 53°06.8'N, 09°16.8'W. Sandy bay backed by dunes, flat ledges at northern end colonised by Fucus spp., pools with Corallina officinalis, etc.
2. The Rine, Ballyvaughan Bay, M212100, 53°07.6'N, 09°10.1'W. Seaward side of sand bar with rocky outcrops creating sheltered pools at mid to low water level.
3. Murroogh, M134098, 53°07.5'N, 09°17.0'W. A shore where the limestone pavement runs into the sea. Richly colonised with a diversity of weeds. Large pools with rocks.
4. 1 km SW of Black Head, M147116, 53°08.4'N, 09°08.4'W. A steeply shelving shore with few loose rocks or pools. Low diversity of weeds mainly Fucus, Gigartina and Laminaria.

The Burren coast stretches for some 40 kilometres yet Fanore Bay is the only significant stretch of sandy shore. It is, therefore, an accretionary point for the numerous dead shells that are washed in. Four litres of shell sand were taken from fresh strandlines and are being sorted at leisure. 94 species have so far been gleaned from these samples. Amongst the more exciting finds were Circulus striatus, Aclis minor, Eulima glabra, E. bilineata, Epitonium clathratulum, Diaphana minuta, Evalea divisa, E. warreni, Ebala nitidissima, Retusa umbilicata and Montacuta ferruginosa. A selection of small weeds was gathered for washing. The molluscs recorded from this sample yielded the lowest species diversity of the



four Burren sites visited, but it was pleasing to find a live specimen of Graphis albida.

The Rine, Ballyvaughan Bay is reached via a track running through limestone pavement covered with scrubby hazel woodland. The immediate shore is estuarine in character, the muddy shore bearing the signs of much trampling by donkeys who made their presence known upon our arrival. Crossing the sand and pebble ridge of a long spit which curves eastwards and slightly inland, a seaward shore of mixed sand and rock was reached. There were, however, large shallow pools raised on the rock platform which had been isolated by the tide at an early stage in its recession. These pools yielded an interesting variety of essentially low-littoral species such as Berthella plumula, Lamellaria perspicua, Retusa truncatula, Diodora graeca, Modiolus barbatus and Chlamys varia. A sample of weeds was collected for washing and from which a further 20 species were recorded from this site.

Murroogh, North of Fanore is a stretch of coast where the limestone pavement slopes gently down from the coastal road to merge into a narrow rocky shore. The transition from the typical floral assemblage of the Burren ending in a band of Saxifraga spp. and Armeria maritima to a weed-strewn upper shore of rocks colonised by Littorina neritoides and saxatilis and Monodonta lineata occurs in a space of 5 metres. Continuing this trend the boundaries between the zones on the shore are closely spaced. Again, large sheltered pools were a feature of this site and notable finds were Calliostoma zizyphinum in abundance, the nudibranchs Limacia clavigera and Palio nothus and the sacoglossans Runcina, Elysia, Limapontia and Aplysia.

The last site we visited was a shore south of Black Head. This was an impromptu foray which resulted from our curiosity about the steeply sloping face of the eroded rocks which dropped into the sea. Although precipitous in places it was possible to clamber across the narrow littoral band just a few metres away from the walls of the coast road. Here we found small but relatively deep pools in the rock which were full of the urchin Paracentrotus lividus. Patches of barnacles and Mytilus covered the rock surfaces but very little Fucus growth was evident. This

was obviously an exposed stretch of 'shore' but nevertheless from a sample of Laminaria holdfasts collected just further south where the shore was less steep, 26 species were recorded in addition to those molluscs evident in situ.

The following table lists species recorded alive at all four sites:-

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>Lepidochitona cinereus</u>	x	x	x		<u>Triphora adversa</u>				x
<u>Acanthochitona crinitus</u>		x		x	<u>Cerith. tubercularis</u>				x
<u>Diodora graeca</u>		x			<u>Odostomia plicata</u>		x	x	
<u>Patella depressa</u>	x		x		<u>O. turrita</u>		x		x
<u>P. aspersa</u>				x	<u>O. unidentata</u>			x	
<u>P. vulgata</u>	x	x	x	x	<u>Brachystomia rissoides</u>			x	x
<u>Helcion pellucidum</u>	x	x	x	x	<u>Graphis albida</u>	x			
<u>Monodonta lineata</u>			x	x	<u>Vitreolina philippi</u>			x	
<u>Gibbula cineraria</u>	x	x	x	x	<u>Lamellaria perspicua</u>		x		
<u>G. umbilicalis</u>	x	x	x	x	<u>Nucella lapillus</u>	x	x	x	x
<u>Calliostoma zizyphinum</u>			x		<u>Hinia incrassata</u>		x	x	x
<u>Skenea serpuloides</u>			x	x	<u>H. reticulata</u>		x	x	
<u>Tricolia pullus</u>	x	x	x	x	<u>Philine punctata</u>		x	x	x
<u>Lacuna pallidula</u>			x	x	<u>Retusa truncatula</u>		x	x	x
<u>L. parva</u>			x		<u>Runcina coronata</u>			x	
<u>L. vincta</u>	x	x	x	x	<u>Elysia viridis</u>		x	x	
<u>Littorina littorea</u>	x	x	x	x	<u>Limapontia capitata</u>		x	x	
<u>L. obtusata agg</u>	x	x	x		<u>Aplysia punctata</u>	x		x	
<u>L. saxatilis</u>	x	x	x	x	<u>Berthella plumula</u>		x		
<u>L. neritoides</u>	x			x	<u>Limacia clavigera</u>			x	
<u>Rissoa parva</u>	x	x	x	x	<u>Palio nothus</u>			x	
<u>R. parva interrupta</u>	x	x	x	x	<u>Mytilus edulis</u>	x	x	x	x
<u>R. sarsi</u>			x		<u>Musculus marmoratus</u>		x	x	x
<u>Alvania punctura</u>	x			x	<u>Modiolus barbatus</u>		x	x	x
<u>A. semistriata</u>			x	x	<u>Heteranomia squamula</u>	x	x	x	x
<u>Onoba semicostata</u>	x	x	x	x	<u>Lasaea rubra</u>	x		x	
<u>Barleeia unifasciata</u>			x		<u>Kellia suborbicularis</u>			x	x
<u>Skeneopsis planorbis</u>		x	x		<u>Mysella bidentata</u>		x		
<u>Omalogyra atomus</u>		x	x		<u>Irus irus</u>	x	x	x	
<u>Rissoella diaphana</u>	x	x	x		<u>Turtonia minuta</u>		x	x	x
<u>Bittium reticulatum</u>	x	x	x		<u>Hiatella arctica</u>	x	x	x	x

Of these finds, certain species merit further comment. Philine punctata occurred at three of the sites. This small translucent animal (maximum length 5mm, with the shell under half that) is not easily detected in a dish of wet weed washings but would appear to be a typical inhabitant of small weeds and kelp holdfasts along this stretch of coast. Live collected pyramidellid species are particularly pleasing. These shells are often gleaned from shell sand, are not always straightforward to identify, however, fresh animals in quantity from a weed sample containing the known food source represent valuable reference material. A feature of these shores is the presence of traditionally sub-littoral species occurring intertidally. This feature known as sub-tidal emergence phenomenon, was apparent in many animal groups. Of the molluscs, Skenea serpuloides, Graphis albida, Vitreolina philippi and Irus irus are examples.

We should also point out that our records for Patella depressa, Pennant, 1777, might be considered to be controversial. P. depressa has been generally regarded as absent from Ireland (Crisp & Southward, 1953) though it was reported from the Mullet Peninsula, Co. Mayo (Wigham, 1969, Graham, 1971). Our identification of the species at sites 1 and 3 is based on the characters of a distinctively black foot (quite different from the sometimes quite grey foot of P. vulgata), chalk white

marginal tentacles on the mantle skirt and broad conspicuous pigmented rays on the internal surface of the shell with yellow colouring at the apex, as described in Graham (1988). However, Ryland and Nelson-Smith (1975) cite W.J. Ballantine (pers. comm.) as recommending separation on radula ratio (radula length/shell length). The aforementioned Mullet Peninsula specimens registered a value of about 1.06 which is well below the accepted range for P. depressa (1.6 - 2.2). Since Ryland and Nelson-Smith worked along the same shores as ourselves it seems reasonable to suppose that they found specimens similar to those seen by us but rejected them as P. depressa because they regarded "the evidence as insufficient to establish that P. intermedia (P. depressa) is present." Since the animals found by ourselves on the Clare coast accord so closely with those regularly found at various sites in Sea Area 15 and which we believe to be P. depressa, we have chosen to call them P. depressa also.

The results of the small amount of work carried out by us testify to the richness of the marine malacofauna of this part of Ireland and it is to be hoped that further investigations may be carried out to clarify the position regarding the presence of Patella depressa in Ireland.

Acknowledgement

We would like to thank David McGrath for his assistance in the preparation of this account.

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Ian Killeen and Jan Light

GENERAL NOTES

CAT CARRYING A SLUG, ?slug dispersal.

In response to Brian Eversham's note "Animals as vectors of slugs" (Conchologists'

Newsletter No. 109, p. 197, 1989). One of my cats, a fat and fluffy spayed female, came bustling in for breakfast this morning - 11 July 1989 - with an Arion distinctus adhering to her chest. It was quite difficult to disentangle the slug from the cat's fur. My Cheshire garden is c. 1,000 sq. yards and pleasantly wild so slugs proliferate (at least ten species are present).

(from Mrs. N. F. McMillan)

HYGROMIA CINCTELLA (DRAP.) IN SURREY

Whilst staying in my sister's house in Cleves Avenue near Nonesuch Park, Ewell, Surrey in May 1989 I was surprised to find in a very ordinary virtually sterile flower bed some quite recent young shells of Hygromia cinctella together with Candidula intersecta and Aegopinella nitidula. The Hygromia could not, I think, have been dead more than a year and must have been introduced from some outside source. From whence is likely to remain a mystery since my sister knows of no plants or soil which had been introduced from any place likely to harbour H. cinctella (Drap.). I am grateful to Dr. Michael Kerney for correcting my original identification of H. limbata. He adds that it is a new record for Surrey and "It is now everywhere in South Devon, and we have it in Dorset (Weymouth), Sussex (garden at Haywards Heath), and Gloucester West (Blaise Castle, Bristol)." It will probably spread quite rapidly now.

Bernard Verdcourt

GOLDNEY GROTTO

Readers may care to know that R. J. G. Savage has published a very extensive and erudite account of Goldney Garden Grotto, Clifton, Bristol in *Garden History* 17(1): 1-40, 19 figs. (1989). It gives lists of molluscs and minerals besides a detailed history of the Goldneys and the garden.

Bernard Verdcourt

CALL FOR NOMINATIONS FOR NEW MEMBERS OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

The following members of the Commission reach the end of their terms of service at the close of the XXIV General Assembly of the International Union of Biological Sciences to be held in Amsterdam, in July 1991: Dr. H. G. Cogger (Australia, Herpetology); Prof. Dr. O. Kraus (Fed. Rep. Germany, Arachnology); Dr. M. Mroczkowski (Poland, Coleoptera); Dr. W. D. L. Ride (Australia, Mammalia). A further vacancy arises from the resignation of Dr. G. C. Gruchy (Canada, Ichthyology).

The addresses and specialist fields of the present members of the Commission may be found in the *Bulletin of Zoological Nomenclature*, 46(1)(March 1989). Under Article 3b of the Commission's Constitution a member whose term of service has terminated is not eligible for immediate re-election unless the Council of the Commission has decided to the contrary.

The Commission now invites nominations, by any person or institution, of candidates for membership. Article 2b of the Constitution prescribes that:

'The members of the Commission shall be eminent scientists, irrespective of nationality, with a distinguished record in any branch of zoology, who are known to have an interest in zoological nomenclature'.

(It should be noted that 'zoology' here includes the applied biological sciences [medicine, agriculture, etc.] which use zoological names).

Nominations made since September 1987 will be reconsidered automatically and need

not be repeated. Additional nominations, giving the date of birth, nationality and qualifications (by the criteria mentioned above) of each candidate should be sent by 15 June 1990 to: The Executive Secretary, International Commission on Zoological Nomenclature, c/o. British Museum (Natural History), Cromwell Road, London, SW7 5BD, U.K.

APPLICATIONS PUBLISHED IN THE BULLETIN OF ZOOLOGICAL NOMENCLATURE

The following applications were published on 29 September 1989 in Vol. 46, Part 3 of the Bulletin of Zoological Nomenclature. Comment or advice on these applications is invited for publication in the Bulletin and should be sent to the Executive Secretary, ICZN, British Museum (Natural History), Cromwell Road, London, SW7 5BD, U.K.

- Case 2652 Choristidae Verrill, 1882 (Mollusca, Gastropoda) and Choristidae Esben-Petersen, 1915 (Insecta, Mecoptera): a proposal to remove the homonymy. Alan R. Kabat, Department of Mollusks, Museum of Comparative Zoology, Harvard University, Cambridge MA 02138, U.S.A.
Abstract. The purpose of this application is to remove the homonymy between two family-group names: Choristidae Verrill, 1882, is in limited use for a restricted genus (Choristes) of gastropods of doubtful taxonomic position, and it is proposed that it be emended to Choristeidae Verrill, 1882 in order to remove the homonymy with Choristidae Esben-Petersen, 1915 (based on the Australian scorpion fly genus Chorista Klug, 1836), which has been used widely and repeatedly.
- Case 2682 Fryeria Gray, 1853 and F. rueppelii Bergh, 1869 (Mollusca, Gastropoda): proposed conservation.
D. J. Brunckhorst, Zoology Department, University of Queensland, St. Lucia, Queensland, Australia, 4067.
W. B. Rudman, The Australian Museum, P.O. Box A285, Sydney South, New South Wales, Australia, 2000.
R. C. Willan, Zoology Department, University of Queensland, St. Lucia, Queensland, Australia, 4067.
Abstract. The purpose of this application is to conserve the generic name Fryeria Gray, 1853 and the specific name rueppelii Bergh, 1869 as the name of its type species, for a nudibranch gastropod, by suppression of the unused senior synonym Fryeria pustulosa Gray, 1853.

SHELLS FOR SALE

Collection of shells for sale, singly or in lots. Including Nautilus, Lambis, Cypraeidae, Conus, Olividae and many others. Contact Mrs. E. Fordham, [REDACTED], Longnor, nr. Shrewsbury, [REDACTED]. Telephone: [REDACTED].

CHRISTMAS 1989

The Newsletter Editor sends seasonal greetings and good wishes for the New Year to every reader.

YOUR NEWSLETTER IN 1990

Firstly, my thanks to all of you who submitted contributions during the past year. There is sometimes some delay in publishing these due to pressure on space and the inevitable financial considerations. However, I look forward to receiving more articles - short, medium or long - field meeting reports and notes of general interest as well as queries or comments. So, all of you, please keep up the good work!

P. E. Negus

NEW SUBSCRIPTION RATES - 1990

After three years during which the present subscription rates have remained unchanged, increasing costs have now unfortunately presented the need to increase them in 1990, and Council has approved the following new subscription rates from 1st. January 1990:-

Ordinary Members	£16
Family Members	£18
Student Members	£10
Institutional Members	£25

It is hoped that these new rates can be maintained without further increases for some time to come.

The special concession to Ordinary, Family, and Student Members of a discount of £1 if their subscriptions are paid in full before the 31st. March each year will continue to be allowed as before.

May I urgently appeal to all Members who pay their subscriptions by Bankers Order to alter their Orders in line with the new rates noted above before the end of the current year please. Action taken before subscriptions are due in 1990 will save considerable trouble, time, and expense later. Thank you.

Hon. Treasurer

THE CONCHOLOGISTS' NEWSLETTER

No. 112

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

March 1990

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Market Harborough,
Leicestershire,

Produced by THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

THE TIGER COWRY, CYPRAEA TIGRIS L. 1758, ITS HABITS, HABITAT AND LIFE HISTORY

Cowry shells are familiar to almost everyone for one reason or another, to those who are professional conchologists and malacologists, to those who are simply shell collectors and to the layman who sees them for sale in any seaside resort shell or souvenir shop as well as on second-hand and antique stalls. Almost all cowries are renowned for their beauty, unsurpassable polish and attractive shape and feel. In fact there are so many cowry enthusiasts that a special magazine, the "Cowry" is published for them.

Cowry shells belong to the Superfamily Cypraeacea, which is classified into the larger group of gastropods known as the Mesogastropoda, which, among others, also includes such well-known superfamilies as the Strombs and Conchs (Strombacea) the tun and frog shells (Tonnacea) and the winkles (Littorinacea). The superfamily Cypraeacea is further divided into three families: the Ovulidae, which includes the egg shells, with genera such as Ovulum, Simnia and Cyphoma; the Eratoidae, which includes the well-known genus Trivia; and thirdly the Cypraeidae, or true cowries. The cowry's scientific name, so we are told by Perry, probably originates from the circumstances of a shell of this family having been presented to the temple of Aphrodite in Cyprus. The Greeks on the other hand preferred a myth to fact and so they believed that Aphrodite, goddess of fertility and love, was born from the froth of the sea and was then carried safely within a cowry shell to her island home of Cyprus and so she gave it the name 'Cypraea', 'Giver of Life'. The old English name was 'Gowrie' from which the words 'Cowry', 'Cowrie' or 'Cowrey' were obviously derived, although the name 'Cowry' is supposed to have been adopted from the Hindu and Urdu names used in India. It was also known as porcus or porcubus by the Romans and 'pucelage' or 'pou-de-mer' by the French. Other names are 'Koyasugai' meaning 'easy-delivery' shell by the Japanese and 'porcelains' meaning 'little pigs' by western traders of the Middle Ages and was a term familiar to and used by Marco Polo on his travels in 1275 across the Yunnan Province of China.

The tiger cowry, Cypraea tigris L. also a member of the Cypraeidae must be one of the best known examples of the cowry shell family. The shell grows to a length of about 10 cms and is one of the most beautiful in spite of its being one of the commonest of all molluscs, and was an invariable choice of the eighteenth and nineteenth century souvenir makers and still is the choice today. The colour of the smooth, glossy, oval shell with no periostracum is very variable but usually has a white or light background with dark brown spots and a sinuous orange or brown line along the length of the dorsal surface where the edges of the mantle, when fully extended, meet, figure 1. The mantle both covers the shell protecting it from encrusting organisms which would normally settle on it as well as re-surfacing and polishing it if damaged. Joyce Allen, a Curator of Mollusca in Sydney's Australian Museum, in her book 'Cowry Shells of the World Seas' describes the bilobed almost transparent mottled mantle as the most striking feature of the animal. It is blotched yellow and brown corresponding to the spots on the shell and has longitud-



Figure 2.

The living animal extended. The mantle is partly covering the shell.



Figure 4.

Note that the apex is still visible.

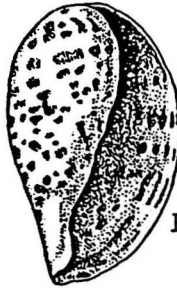


Figure 5.

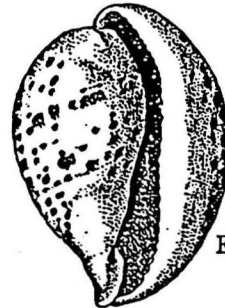


Figure 6.

The outer lip has curved over and is beginning to thicken.

Growth stages of *Cypraea tigris* Linné.

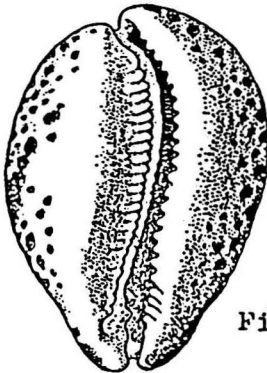
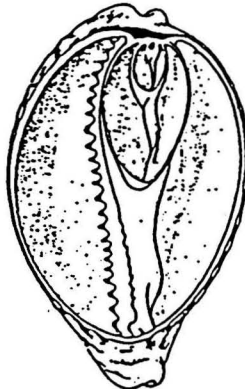


Figure 7.

The underside of the adult shell showing aperture and teeth.

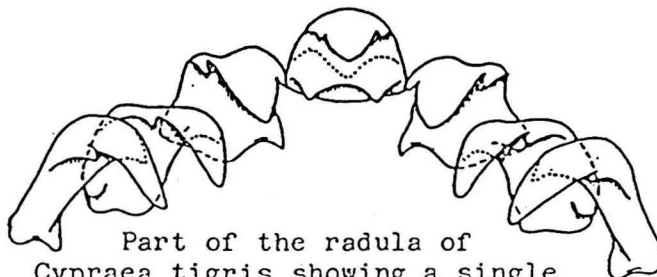


Interior of lower half of the shell showing characteristic structure of gastropod columella.



Figure 1.

Adult shell upperside showing shiny spotted surface.



Part of the radula of *Cypraea tigris* showing a single row of teeth.

Figure 3.

inal grey and yellow stripes. This mantle, figure 2, bears fleshy tentacle-like filaments with white tips and which continually wave around in the water, the longest being around the base of the shell. The function of these papillae is unknown; they may be sensory, and some people have suggested they may be concerned with respiration. The outer surface of the mantle is protected by glands which produce sulphuric acid within the exposed tissue when the animal is disturbed.

The siphon, through which water is drawn for respiration, protrudes from the anterior end of the shell and below it is the proboscis, which is concerned with feeding; on either side of it are two tentacles which bear well developed eyes.

The other important feature of the head is the presence of a mouth and within it a typically and uniquely molluscan structure, the lingual ribbon or radula. This horny tooth-bearing ribbon protrudes from the mouth scraping off food particles from the rocks and, like a conveyor belt, pulls them back into the mouth. The radula teeth in the Mesogastropoda have been reduced from the 17 in Chitons to 7 in each row, two marginals and a lateral on either side of a central tooth, figure 3. This is known as a taenioglossan or ribbon-like radula. Cowries tend to be carnivorous each rigidly confined to a particular sedentary animal, a sea squirt or a soft coral on which they feed and lay eggs. And it is probably this abundance of suitable food organisms, especially on and around coral reefs, that accounts for the great abundance of cowries in the tropics. This carnivorous feeding also means that the radula teeth are not worn away so fast as those of the herbivores such as limpets which rasp plant material off the rock surfaces. So in cowries the teeth are only replaced by one or two rows a day, the worn teeth from the anterior end of the radula being swallowed and passed out in the faeces. The foot is broad and extensible. C. M. Burgess in his 'The Living Cowries' states that "the large majority of the cowries are known to be herbivorous and feed on algae", a comment not born out by other researchers.

The sexes of *C. tigris* are separate, the males injecting sperm into a special sac in the female where they wait until eggs are ready to be fertilised. The female lays her eggs in a single mass (from about 100 to more than 1500) each capsule measuring approx. 2 to 4 mm. in length. The female then sits on the eggs, not to incubate them but to protect them from being eaten by crabs and worms. As a general rule they hatch in one or two weeks and the larvae are deposited into the surrounding waters where they go through a free-swimming larval stage. At its conclusion, the juveniles then settle in a suitable area and wander very little from this spot, living amongst seaweed, coral and sand. After the juveniles have settled, the young specimens are difficult to identify as they have a thin shell with a spire and a wide aperture which resembles that of an olive shell, figure 4. The colour of this shell described by Mary Roberts in "Popular History of the Mollusca" 1851, is of a uniform chestnut brown breaking up into bands of close-set blotches of a richer colour. The growth of cowries has mystified naturalists from the earliest times basically because the young cowry shell wasn't recognised as the same species of animal. The problem as far as the adult was concerned was that it couldn't grow any larger in the conventional gastropod manner. One theory was that the soft cowry animal deserted its shell, puffed itself up larger and then created a new shell, a process used by the Crustacea. This theory was described by Lt. J. B. Hankey in Reeve's Conchologica Iconica Vol. III. The answer was found when the thin, elongate, young shell, known as the bulla, of the miniature cowry was recognised as such. The bulla is shaped like an ordinary gastropod shell, so that it can add to its size in the normal way at the edge of the outer lip. As the animal grows and becomes sexually mature therefore, the body whorl becomes swollen and slowly covers the spire, figure 5. The outer lip turning inwards narrowing the aperture to a mere slit at the same time laying down teeth to protect the entrance, figure 6. When this process is complete the shell doesn't grow any more but simply becomes thicker and heavier, figure 7. The final size of the shell depends on the size it attained when the animal became sexually mature and the environmental cond-

itions, especially food supply, around it at the time.

The cowries first evolved about 140 million years ago and there are today about 190 species which live throughout the world's seas with the Indian Ocean and the Central-Western Pacific Ocean as the centre of their distribution. Around the Japanese Archipelago, about seventy-five species are known. They are quite rare in Atlantic waters, with no species off the eastern coast of South America, eight in the North Atlantic, five in the Mediterranean and six off Western Africa. Some are found in ocean deeps several hundred metres down but most of them inhabit tropical coral reefs in shallow water. There are several recognised varieties or races of Cypraea tigris L.: paradalis Shaw 1795; lyncichroa Melvill, 1885; volai Stead. and Cott., 1943; amboolee Stead. and Cott., 1943; fuscoapicata Coen, 1949; flavidus Dautzenberg, 1893; nigricans Dautzenberg, 1923; flavonitens Melvill, 1888; rossiteri Dautzenberg, 1903; schilderiana C. Cate, 1961; incana Sullioti, 1924 as well as pure white and pure black forms. The largest forms come from Oahu Island, Hawaii and can reach 150 mm. in length. The shell also varies in form with respect to weight. I have a specimen that is 100 mm. in length and weighs approx. 120 gms while another specimen is 75 mm. in length but also weighs approx. 120 gms. There is a closely related species which looks very similar to C. tigris and that is Cypraea pantherina L. but is usually smaller with a less well mottled and blotched shell.

Cowries are omnivorous, epifaunal and largely nocturnal in habit. Robert Cameron described Cypraea tigris L. as a shy creature which crawls slowly, browsing on encrusting organisms but are seldom seen in the day-time for they usually remain concealed under rocks or hidden away in crevices amongst the coral with their bodies completely withdrawn inside the shell. It is at night, he says, that they come out to feed and he suggests that one should carry a light of some form when hunting them, for the animal is even more striking in appearance than the shell they live in. Cameron who researched on the Great Barrier reef also noticed that if you find one cowry crawling over the bottom then one should always look for a second nearby as they seemed to go about in pairs. For all its shyness C. tigris L. is not only one of the commonest species of cowry but also one of the most used by man.

In the second article on Cypraea tigris L. the many and varied uses of this attractive and well-known mollusc will be discussed.

J. Llewellyn-Jones

Diagram references

Internal shell after Living Marine Molluscs
Young bulla after The Shell Collector's Guide
Intermediate stages after Sea Treasures
Radula after Die Kaurischnecke
Living animal and adult shell after Van Norstrand

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THE GENERA OF EUROPEAN LITTORINIDAE: A REPLY TO P. PALMER

The article "A case for Littorivaga Dall, 1918" in the September 1989 number of this Newsletter (Palmer, 1989) brought to mind that it might be desirable to look at the subject discussed therein from some different angles, as so much work of relevance to the generic subdivisions of British Littorinidae and on the nomenclatural status of the supraspecific names had been done in the past two decades; also some errors in the article should be corrected lest they be perpetuated in good faith.

The type species of Littorina Férussac, 1822 (date according to Kennard, 1942) is Turbo littoreus Linnaeus, 1758, fixed by Opinion 1159 (1980). Férussac introduced the genus name in such haphazard a way that several different interpretations of the nomenclatural content of his publication were made, see the discussion by Kadolsky, 1970, Rosewater, 1970, Heppell, 1970 and 1971, Cernohorsky, 1971 and Holthuis, 1971. The decision of the International Commission on Zoological Nomenclature removes all previously existing ambiguity about the availability of the name as from Férussac, 1822 and its type species. Thus Algaroda Dall, 1918 becomes an objective synonym of Littorina Férussac, 1822.

Melarhappe Menke, 1828: The original spelling has to be maintained; Melaraphe is an often used emendation. The genus name was introduced as "Melarhappe glabrata Mhlfld." [= Mühlfeld] in synonymy of Paludina glabrata C. Pfeiffer, 1828, by Menke, 1828. Names published in synonymy are available from that publication, if they have prior to 1961 been treated as available (Art. 11e IRZN). This is the case with Melarhappe, as was shown by Rosewater, 1966. There has never been really a "mix-up" of type species, as Melarhappe was associated with only one species, Paludina glabrata, whose synonymy with what today is known as Melarhappe neritoides was instantly recognised: Menke himself, ignoring the law of priority, gives "Turbo" coerulescens Lamarck, 1822 (under which name neritoides was known best at the time) as a synonym of Paludina glabrata. The only erroneous type species quotation for Melarhappe seems to be that of Suter, 1913, who cites "Helix" scabra Linnaeus, 1758. The quotation of Mühlfeld as author of Melarhappe glabrata almost certainly means that he was considered to be the author of the new combination Melarhappe glabrata of C. Pfeiffer's Paludina glabrata. This custom was widespread during the 19th. century and is a source of confusion to the present day. According to Art. 50c and 671 of the IRZN, name, authorship, date and type species are to be cited as: Melarhappe Menke, 1828; type species by monotypy: Paludina glabrata C. Pfeiffer, 1828 [= Turbo neritoides Linnaeus, 1758].

Neritoides Brown, 1827 has a type species Nerita littoralis Linnaeus, 1758 by monotypy. Brown applies the name to what is today known as the obtusata+ mariae group; however, the identity of Linné's species is still doubtful and can in the absence of unequivocal syntypes only be resolved by the selection of a neotype. Dodge, 1959, discussed the evidence provided by Linné's description, references and collection and was unable to arrive at a conclusion as to the identity of Nerita littoralis Linnaeus, 1758. Nonetheless most students interpreted littoralis as a form or synonym of Turbo obtusatus. Only occasionally it was included in Theodoxus fluviatilis (Linnaeus, 1758), so by Récluz, 1850 and, more significantly, by Fretter & Graham, 1978, though without any discussion. The latter accept

littoralis as the name for a sub-species of Theodoxus fluviatilis living in the Baltic Sea, a claim which needs further elaboration. As far as Littorinidae are concerned, this raises the possibility of a misidentified type species for Neritoides Brown, in which case the ICZN would have to be invoked (Art. 70b). Only the fact that Neritoides Brown, 1827 is not available due to homonymy with Neritoides Meuschen, 1779, renders such action unnecessary. The availability of Neritoides Meuschen is in itself not straightforward, as Meuschen used proper zoological names only for genera and vernacular names for species. However, Art. 11(c)(i) should apply in this case and the name has been accepted as available by Kadolsky, 1971 and Reid, 1989. Neritoides Brown, 1827 (not Meuschen, 1779) has to be replaced by Neritrema Récluz, 1869; type species designated by Dall, 1909: Turbo obtusatus Linnaeus, 1758.

Littorivaga Dall, 1918: the name of the type species is spelled sitkana, Philippi, 1846. Algaroda Dall, 1918 is an objective synonym of Littorina, as already mentioned. Dall did not give any explanation for the new generic names, and made no mention of the reproductive habits of the type species. In fact (contrary to Palmer's comments) the type species of Littorivaga, Littorina sitkana, lays benthic egg masses similar to those of the L. obtusata group (Buckland-Nicks et al., 1973).

Concerning the classification of West European Littorinidae, it is obvious on conchological grounds that the British species fall into the four groups suggested by Palmer. A different question is, whether this means these groups have to be considered as different genera or subgenera. Study of the relationships of all known species should result in a more comprehensive understanding of this subject than study of the very small number of the species of the Littorinidae, which happen to live in Western Europe. Such comprehensive study has been published recently (Reid, 1989) and the following generic assignments of the European species proposed; for completeness' sake all European Littorinidae are included in the list:

Family Littorinidae Anonymous, 1834

Subfamily Lacuninae Gray, 1857

Genus Lacuna Turton, 1827

Subgenus Lacuna (Lacuna) Turton, 1827

Lacuna (Lacuna) crassior (Montagu, 1803)

Lacuna (Lacuna) pallidula (da Costa, 1778)

Lacuna (Lacuna) parva (da Costa, 1778)

Subgenus Lacuna (Epheria) Leach in Gray, 1847

Lacuna (Epheria) vineta (Montagu, 1803)

Subfamily Littorininae Anonymous, 1834

Genus Melarhaphe Menke, 1828

Melarhaphe neritoides (Linnaeus, 1758)

Genus Nodilittorina von Martens, 1897

Subgenus Echinolittorina Habe, 1956

Nodilittorina (Echinolittorina) punctata (Gmelin, 1791)

Genus Littorina Férussac, 1822

Subgenus Liralittorina Rosewater, 1981

Littorina (Liralittorina) striata King & Broderip, 1832

Subgenus Littorina Férussac, 1822

Littorina (Littorina) littorea (Linnaeus, 1758)

Subgenus Neritrema Récluz, 1869

Littorina (Neritrema) arcana Hannaford-Ellis, 1978

Littorina (Neritrema) mariae Sacchi & Rastelli, 1966

Littorina (Neritrema) neglecta (Bean, 1844)

Littorina (Neritrema) nigrolineata Gray, 1839

Littorina (Neritrema) obtusata (Linnaeus, 1758)

Littorina (Neritrema) saxatilis (Olivi, 1792).

This classification is based on cladistic analysis of a plethora of new observations on shell and anatomy, to which the reader is referred. A very similar classification of the Littorininae, though based on much fewer anatomical information and more shell characters, and not applying cladistic principles, had been proposed earlier by Kadolsky in Bandel & K., 1982. We are therefore convinced that the present classification appropriately groups the species of the Littorininae according to their true relationships.

Only at first glance it may seem strange to place species of such different appearances as *obtusata* and *saxatilis* agg. in the same subgenus. If shells are considered, there are high-spired forms of *Littorina obtusata*, which look no longer very dissimilar to the *saxatilis* group, except for their obsolete spiral sculpture. Reduction of spiral sculpture alone is however not a characteristic of genera. Palmer invokes differences in the reproductive mode to justify a generic separation of "*Littorina*" (i.e. *Neritrema* s.str.) and *Littorivaga*, but destroys his argument (quite correctly) with the observation that *nigrolineata* and "some sympatric individuals with *L. rudis*" also laid eggs. Furthermore, as pointed out above, the name *Littorivaga* would still not be appropriate for the ovoviviparous species, since its type species lays eggs. It should have been said at this point that the egg-laying individuals of "*L. rudis*" have been interpreted as a separate species, *Littorina arcana*; such interpretation is in line with Palmer's point that the reproductive mode is important in taxonomy. However, it is not relevant to give examples of mammal classification in support of this argument. The variety of reproductive modes in Littorinidae, as well as in other Prosobranchs, suggests that changes of that mode occurred frequently and, while this character should be used in generic classification, it has to be used in conjunction with others and cannot automatically be used to separate otherwise closely related species into separate genera.

Reid (1989) defines the genus *Littorina* as a monophyletic group, of which all members share derived features of the sperm nurse cells and female reproductive tract. The oviduct of the female is differentiated into three principal glands, the albumen, capsule and jelly glands. In the more primitive species of *Littorina*, such as *L. littorea*, the capsule gland is large and produces the pelagic egg capsule. In species laying egg masses the capsule gland is reduced and the jelly gland enlarged; the latter produces the gelatinous matrix of the egg mass. In the most highly derived species, such as *L. saxatilis*, the eggs are retained within the jelly gland until they hatch, and this section of the oviduct therefore acts as a brood chamber. The evolutionary sequence of reproductive types has therefore led from ancestors with pelagic capsules, through species laying attached egg masses, to species which are ovoviviparous. Most importantly, these changes in reproductive type have been accomplished by very minor modifications of the anatomy of the oviduct, involving no more than differences in size of its constituent parts. The anatomical evidence is thus contrary to Palmer's assertion that 'the reproductive organs ... will all be very different one from another'. In contrast, the anatomy of the oviduct (and of other structures) of *Melarhaphe neritoides* is very different from that of *Littorina littorea*, despite the similarity in their reproductive habits. *Melarhaphe* is therefore accorded the status of a full genus.

Littorina obtusata agg. and *L. saxatilis* agg. might of course be placed in different genera, if genus splitting is applied to a high degree. To arrive at a consistent classification throughout the family, the present number of genera would then have to be multiplied. Such action is, at least in the author's opinion, no longer warranted at the present state of advanced understanding of the taxonomic relationships between the species: to group species of strikingly different appearance in the same subgenus, tells more about the perceived relationships than separating them.

Of course, there is no such thing as the last word in littorinid classification. The anatomy and biology is not known from numerous species. New species may

be found in remote areas, or may have been overlooked amongst well-known species closer by. New disciplines, such as biochemistry, and gene research, may shed new light on the relationships of species. The European Littorinidae are amongst the better known species. Their classification, as presented above, has at the present state of knowledge to be considered as realistically reflecting their relationships, without splitting them in unduly small supraspecific taxa.

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Dietrich Kadolsky,
 [REDACTED],
 [REDACTED],
 Sutton,
 Surrey, [REDACTED]

David G. Reid,
 Department of Zoology,
 British Museum (Natural History),
 Cromwell Road,
 London, SW7 5BD

PHILINE ANGULATA JEFFREYS, 1867 IN NORTH WEST SCOTLAND

The very small opisthobranch *Philine angulata* Jeffreys, 1867 is rather elusive and recent records appear to be infrequent. Shell sand taken in June 1989 at two locations in the far north-west of Scotland has provided me with a number of specimens of this species. Figs. 1 and 2 show two specimens out of four (the other two are damaged) found in a sample of shell sand taken at Achmelvich, about three miles north-west of Lochinver (map ref. NC 057253). Conditions on the day seem to have been particularly favourable for small, fragile specimens as the shell sand also contained some hundreds of undamaged shells of the delicate pteropod *Limacina retroversa*.

The measurements of the specimen in Fig. 1 are: 1.00mm x 0.79mm; of that in Fig. 2: 0.79mm x 0.63mm. The shells are colourless, transparent and quite without sculpture, the only marks on the surface being faint growth lines. The sharp angle at the posterior margin of the outer lip does not appear to be a broken corner, an observation which is supported by the presence of a faint growth line running close to, and parallel with, the angulated edge of both of these specimens (Figs. 1a and 2a). The markedly angulated 'shoulder' in the whorl shown below the sutures in Figs. 1b and 2b is present in all four specimens from this source. Comparison of these shells with very small juveniles of *P. punctata* and *P. catena* show that in the case of these latter species their characteristic sculpture begins abruptly at the transition from the protoconch to the teleoconch, that is to say at a very much smaller size than that of the present specimens.

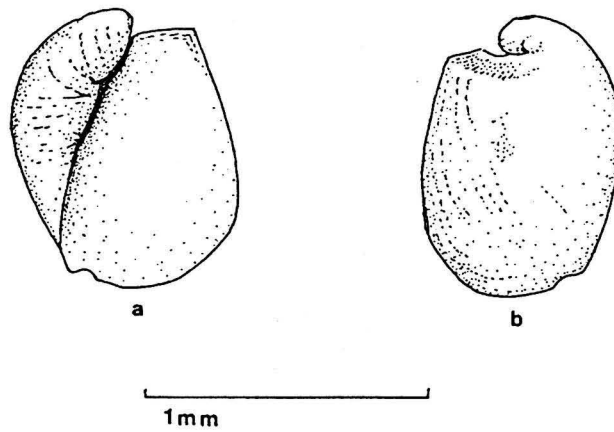


Fig.1 Philine angulata Jeffreys, 1867. Ht. 1.00mm, W. 0.79mm.
Achmelvich Bay, N.W. Scotland

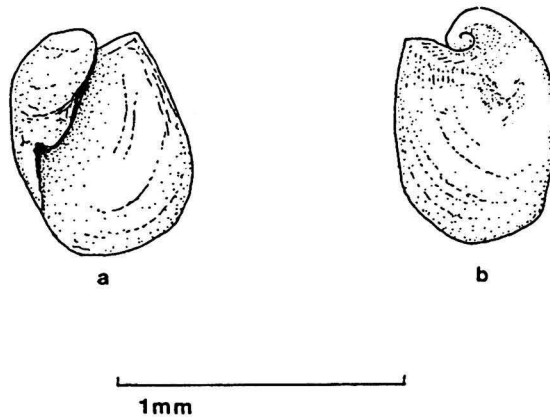


Fig. 2 P. angulata. Ht. 0.79mm, W. 0.63mm. Achmelvich Bay

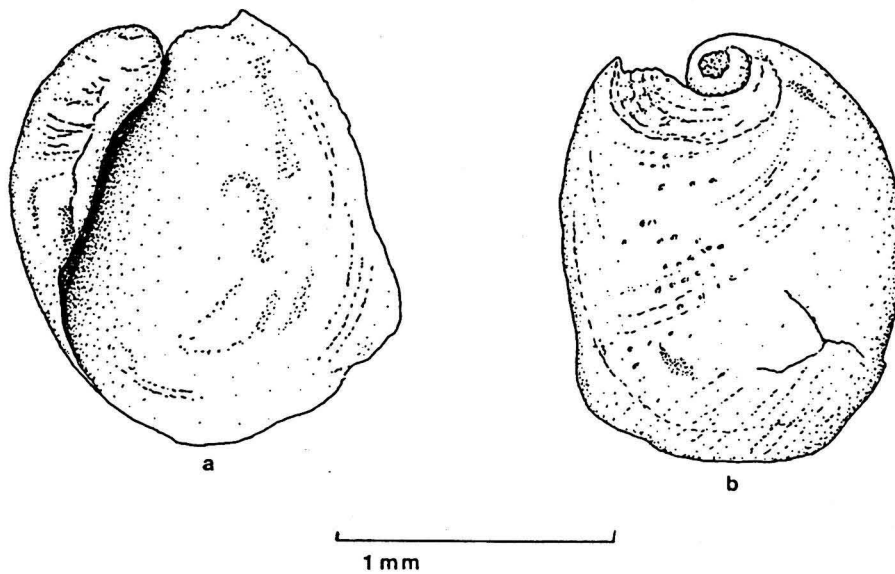


Fig.3 P. angulata. Ht. 1.57mm, W. 1.35mm. Balnakeil Bay, Nr. Durness,
N.W. Scotland

Fig. 3 shows a larger specimen from shell sand taken at Balnakeil Bay, near Durness (map ref. NC 386706). Its measurements are: 1.57mm x 1.35mm. Whereas the smaller shells are transparent, this specimen is of a more opaque white, possibly the result of its being longer dead. Very slight spiral striae have begun to develop as the whorl has become larger, and there are a few scattered and very faint puncta which appear (where present at all) to follow the alignment of the striae. These are elusive, however, and can appear and disappear as the light source of the microscope is shifted. The angulated 'shoulder' of the whorl viewed abaperturally (Fig. 3b) is very marked. The outer margin of the aperture is slightly damaged (Fig. 3a) and though the posterior, angulated point appears intact it is not entirely certain that this is so. All the specimens are fragile and would doubtless not have survived long in coarse sand or rough sea conditions.

The illustrations were done using a binocular microscope with camera lucida attachment.

I am very grateful to Dr. T. E. Thompson who has seen all the specimens and has confirmed my tentative identification of them as P. angulata.

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J. E. Phorson, [REDACTED], Belmont, Durham, [REDACTED] August 1989

UNITAS MALACOLOGICA

TENTH INTERNATIONAL MALACOLOGICAL CONGRESS - TUBINGEN 1989

The 10th. International Malacological Congress was held in the university town of Tübingen from 27 August to 2 September 1989. Tübingen is situated in the heart of Schwaben on the River Neckar about 40 kilometres south of Stuttgart.

The University was founded by Count Eberhard im Bart in 1477 and it has had a lasting influence on the character of the town. In 1477 some 300 students were registered and the University flourished thanks to the presence of some of the Western world's foremost scholars: the theologians Biel and Summenhart, the humanists Vergenhans and Reuchlin, the astronomer and mathematician Stöffler, the jurist Prenninger and the young Magister Melanchthon. Today there are more than 22,000 students registered, including 9,000 women. With more than 7,000 employees the University is the largest employer in the town.

Evolutionary conchology was prominent in Tübingen in the nineteenth century. Franz Hilgendorf (1839-1904), a student of the great palaeontologist Quenstedt, went to Tübingen in 1863 for one year to elaborate his dissertation "Evolution of freshwater gastropods (Gyraulus, Planorbidae) in tertiary crater lake Steinheim". The oldest known phylogenetic tree was rediscovered in his collection in 1983 where he had glued "varieties" of shells on to card forming a phylogenetic tree only four years after the publication of Darwin's "Origin of Species". This tree was exhibited in the hall where posters were presented.

The first woman to enrol at Tübingen was Countess Maria von Linden (1869-1938) in 1892. She presented her thesis in 1895 "Evolution of sculpture and colour patterns on marine gastropod shells". In her work she discussed evolutionary

trends, which lead to convergent features, in shell patterns and concluded laws of pattern formation depending on "internal limitations" what we would call today "channeling of the epigenetic system". The Countess left Tübingen for a better paying position in Bonn where she became the first female professor in Prussia in 1910, applying experimental physiology to pattern formation.

Forty-six countries were represented at the Congress with the largest contingent from the Federal Republic of Germany (80), followed by Great Britain (39), and U.S.A. (35). Participants were housed in a range of accommodation both in and out of town including hotels, youth hostel and camp site. In theory there was a shuttle bus service for those staying outside the town but its route did not include everyone and some had considerable walks morning and evening. It was fortunate that the weather was dry except for two days - the first and the last.

Congress meetings were held in the congress building of the University, the "Kupferbau", near the centre. Midday meals were taken in the nearby "Mensa" with a service that fed thousands daily. There was a choice of joining one of two lines. In one line you had a set meal for the day and in the other you could select a menu and pay for that taken in excess of ticket value.

The Scientific programme was the largest to date with some 234 papers delivered over 45 sessions. With the large number of papers it was necessary to select one's own programme each day but even so one inevitably missed out where clashes of like interests occurred. The plenary lecture was given by Prof. K. Simkiss (Reading), jointly with K. M. Wilbur, on "Molluscan shell and other mineralisation systems". Other papers were delivered in a wide range of sessions: Biology and evolution of Toxoglossan Gastropods; Economic Malacology; Evolutionary processes; Freshwater ecology; Functional morphology; General malacology and methodology; Genetics and population genetics; Helioid phylogeny; History of malacology; Marine ecology; Marine molluscan systematics; Metabolism; Metabolism and parasitization; Medical malacology; Marine biogeography; Non-marine biogeography; Non-marine systematics; Palaeontology; Prosobranch phylogeny; Reproduction, ontogenesis, growth; Terrestrial Ecology; Toxicology and biomonitoring; and Quaternary.

In addition to the lectures there was an excellent display of some 80 posters. Great care had been taken by participants in the design and execution of the posters which proved a popular venue between lectures. Workshops were also held on Unionidae; Hydrobioid phylogeny; and the European Invertebrate Survey. A meeting also took place to discuss a European Marine Molluscan Checklist. The Italian Society have a manuscript almost ready which covers the Mediterranean and there was some feeling that this might form the basis for the European list. A working party has been set up with Mrs. Elizabeth Platts as the British co-ordinator.

Wednesday was set aside for excursions. Excursion A (Lautertal) looked mainly at terrestrial gastropods and included lunch at Brauereigaststätte with a visit to a Baroque Church. Excursion B (Rhine River Plain) visited Kaiserstuhl, the warmest region in Germany, whose backwaters are home to a number of rare species. Excursion C (Bodensee) visited the shores of the largest German lake and collected shell materials on the shore. Excursion D (Steinheim) visited the Miocene crater lake of Steinheim with its famous evolutionary lineages of planorbid gastropods. Excursion E (Culture) visited Baroque churches in Steinhausen and Zwiefalten. Excursion F (Stuttgart) was a sightseeing tour of the capital of Baden-Württemberg including visits to a Fine Arts Museum and Natural History Museum.

The Accompanying Persons Programme included a tour of Tübingen and its castle, a trip on a pole-driven barge on the Neckar, and a tour of the Monastery and Castle at Bebenhausen.

The Social Programme was full with receptions on the first three days. On

Sunday there was an informal reception given by the German malacological societies. Monday's reception was given by the President of Eberhard-Karls-Universität, Tübingen. Tuesday's reception was in the Town Hall ("Rathaus") of Tübingen which was restricted to about 100 participants because of the capacity of the old reception hall. On Thursday there was a concert at Bebenhausen given by the Tübingen Streichquartett who played Bach's "Die Kunst der Fuge": Contrapunctus I (Grundfuge) and IV (Umkehrungsfuge), Mozart's "Eine kleine Nachtmusik" KV 525, and Schubert's Streichquartett Es-Dur op.125/1. The Congress Banquet was held in the Museum and there was entertainment from a trio who played Irish folk songs. The President later sat at the grand piano and led the singing of some German folk songs.

At the General Assembly of Unitas Malacologia Dr. Folco Guisti di Massa of Siena, Italy was elected President for the period 1 September 1989 to 31 August 1992. The new President will organise the next Congress in Siena. During the Assembly there was a surprise resolution from non-English speaking countries that English should be the official language of the Congress. English, French and German were until this time the official languages. The resolution was carried so that English now becomes the official Congress language.

A. Bebbington

AN UNDESCRIBED SNAIL FROM TANZANIA

There are numerous undescribed plants and animals in private collections known only from imperfect material apart from the thousands in national collections. Often, eventually, further material turns up and description is possible although with the ever increasing destruction of habitats large numbers are doubtless extinct and will remain undescribed. One such taxon has been in my possession for over 25 years; an immature specimen, it was collected in the Sao Hill area in the Southern Highlands Province of Tanzania by W. Wilkinson (a worker on termites) at Kigogo Arboretum on the lowest branch of a Pinus species (cultivated of course) at 6400', 80-84" rainfall on 1st. March 1963. Unfortunately it was thrown into spirit without previous drowning and the animal is contracted in the shell. It is clearly a Urocyliidae of some sort close to Trochonanina but probably a species of Zingis or closely allied. Rough sketches and a brief description are given here which should enable it to be recognised. The locality is on the main road and quite well known so further material should be obtainable but none has ever been sent to me even if it has been re-found. I had in fact forgotten about it until Dr. A. C. Van Bruggen sent a few snails from Malawi to me for suggestions as to their identity. One rang a bell immediately and set me searching for the Wilkinson shell which I had never passed on to a museum. I managed to find it and compare it with the shell from Malawi; they proved different but probably related. All in all about half a dozen species are mentioned in the literature which seem to be related; only one apparently has ever been re-collected and only one dissected. I have written these notes in the hope that some zoologist in Tanzania will look for these species.

The Sao Hill species is described first. Shell depressed helicoid with body whorl sharply keeled, pale horn coloured but probably much altered by so long in spirit. Whorls $3\frac{1}{2}$ in juvenile state. Apical sculpture probably of fine spiral lines but the periostracum has worn away. The rest of the sculpture on the upper surface is so complicated that an SEM examination would be necessary to unravel it. It is at fairly low magnifications best described as a fine incised moirée decussate pattern but the spiral and transverse striae are obscured. Essentially there are elongate nodules between the spiral striae. This sculpture does not quite extend to the suture nor over the keel but is otherwise all over the upper surface save for the apical whorls; beneath there is very obscure ribbing and fine spiral striae. Umbilicus very narrow. Caudal tail of animal quite marked.

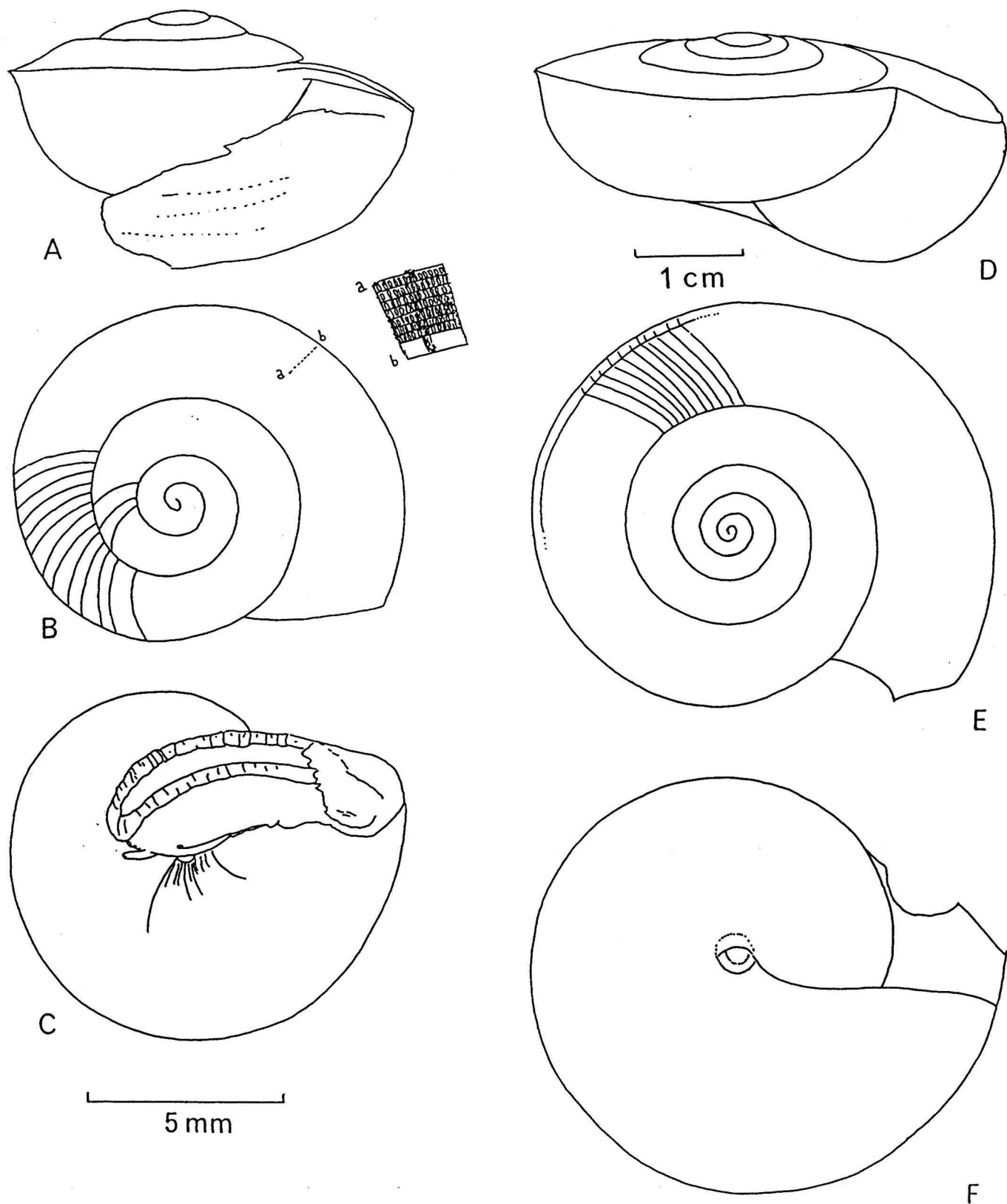


Fig. 1. A, B, C. *Zingis* sp., Tanzania, Sao Hill;
D, E, F. *Zingis depressa* (Germain), Tanzania, Kipatimu

One possibility had been that the Sao Hill shell was Helix (Nanina?) nyassana Smith (1881) described from a single shell collected by Joseph Thomson between Lake Nyasa* (i.e. Lake Malawi) and the east coast. Since Thomson was on both sides of the Rovuma R. it is not possible to say if it were collected in Tanzania or Mozambique. Many of his plants bear the same vague locality. The type preserved in the BM (NH) (1880, 12.20.58) is in good condition. The apical whorls bear ± 13 widely spaced clearly incised spiral striae and the rest have much more numerous close spirals but none of the complicated transverse sculpture of the Sao Hill species and the shell is, moreover, of a much deeper brown-horn colour. The shape, however, is similar in both.

Another possibility was that it could be a juvenile of Trochonanina (Martensia) germaini Boettger var. depressa⁺ Germain (1916) described from Tanzania, Kilwa District, Kipatimu (8° 33'S., 38° 54'E.) where it was ?collected by Naegele in 1913. I know nothing of G. Naegele other than that he lived at Waltersweier near Offenburg and sent material to C. R. Boettger. Whether he obtained material from some collector in East Africa or collected there himself I do not know. At that time of course it was a German colony and he might have been an official of some sort. Boettger who described (1913) a number of Naegele's specimens does not help, merely stating "Mr. G. Naegele has kindly sent me" or "I received this from Mr. G. Naegele" but in one case he does state "are due to the zeal of Mr. G. Naegele". Perhaps some German reader could investigate this person. Germain on his label wrote 'Naegele legit' but I doubt if he knew for sure. It has always puzzled me that a Kilwa shell could be merely a variety of one known from the totally diverse area of Harar in Ethiopia; few if any species are common to the two areas. T. (M.) germaini was described by Boettger in the 1913 paper mentioned based on a shell sent to him by Mr. Stahlberg of Schwerin. Boettger mentions that he sent this specimen to Germain for examination before describing it so it is all the more incomprehensible that Germain should have described the Tanzanian shell as a variety. The two certainly have nothing in common. I examined Germain's variety in the 1950s but despite detailed notes could not be sure whether it had anything to do with the Sao Hill species. Through the kindness of Dr. S. Tillier I borrowed a syntype in order to make more detailed studies. Compared with the Ethiopian shell described by Boettger and well figured on plate 15, figs. 1-3 the lateral view shows that the basal curve below the suture is quite dissimilar from that in var. depressa and, moreover, the sculpture on the upper surface is different. The Ethiopian shell is, I am sure, a true Trochonanina whereas the Tanzanian one is related to Helix nyassana Smith and is probably nearest to Zingis. The syntype I borrowed was probably more or less adult despite its broken lip and a handsome species never to my knowledge re-collected. It is highly characteristic, dark horn-coloured and very sharply keeled, the keel high on the body whorl; the spire is very slightly raised in the centre but the base of the shell is deep and very strongly convex; the horn colour extends over the pinched keel for about 4 mm. of the base but thereafter is paler; whorls $5\frac{1}{2}$, the apical $2\frac{1}{2}$ with very fine spiral striae and rest with scattered irregular transverse striae but overall an excessively fine moirée or beaded "microdecussate" sculpture not evidently made up of crossing transverse and spiral lines; umbilicus minute; major diameter 26.5, minor diameter 23, height 11.5 mm. A series of excellent colour prints produced by my colleague G. P. Lewis will be deposited in the BM (NH) and National Museum of Wales. These will obviate the necessity for the type to be borrowed again. The rough drawings given here, derived from these coloured prints may serve workers to recognise the species when re-found. My comparison of the Sao Hill species with Germain's type indicates they are related but probably distinct. The disparity in

*Actually a tautonym since nyasa means lake as also does nyanza.

⁺Wrongly reported by me (1983) as inflata due to a silly error.

condition and stage of development makes it difficult to assess the significance of the differences. The two sculptures are not the same; the Sao Hill species has more elongate nodules between the spiral striae whereas the other has smaller rounded elements. The two localities Sao Hill and Kipatimu are separated by 270 miles but more importantly over 1800 m. in altitude with quite different vegetation so it would be unlikely if the two were the same. It seems strange that no further material has come to light of so striking a shell.

Other species remain to be mentioned since I suspect all are related if not congeneric. Dr. A. C. van Bruggen sent me a strongly keeled thin shell collected in the Ruo Gorge, Mt. Mulanje, Malawi. It is undoubtedly similar to the Sao Hill species and possibly congeneric but definitely not the same species. There is probably much more chance of getting good additional material from Mulanje (formerly Mlanji or Mlange) than from Tanzania and hopefully this species will be elucidated.

Von Martens (1900a) described Helix (Phasis) sesquicincta from material collected in bamboo thicket on the crater of Ngosi volcano (now Ngozi Mt., 8° 59'S., 33° 33'E.) 'near Lake Rukwa', Tanzania by Fülleborn. Ngozi Volcano is actually at Rungwe and not very near to Lake Rukwa. I examined syntypes of this material in Berlin (see Verdcourt, 1969) and established that it was not a Helicid. The shell is yellow with two brown peripheral bands and has a fineshagreened moirée pattern; the apical whorls are spirally striate; major diameter 22; height 13.5 mm. Later von Martens (1900b) described Helix binaria from Bulongwa, Ukinga Mts., Tanzania (in Njombe District at 9° 20' S., 34° 03' E.) also collected by Fülleborn, suggesting it had affinity with Phasis and was allied to H. sesquicincta. After comparing the types I am certain binaria is merely a juvenile of sesquicincta; the colour pattern and sculpture are the same in both. For this species some anatomical evidence is available; working with material collected along the Upper Kiwira R. by the British Museum Lake Rukwa Expedition at Marupindi (BMNH 1953, 8.15.590-595) Van Mol (in litt.) has shown that it is congeneric with Zingis morrumbalensis.

Also in his later 1900b paper von Martens described a Macrochlamys aureofusca. It also was collected from Bulongwa by Fülleborn at 2000-2300 m. (Fülleborn was a medical man; a short biographical note will appear in my collectors series). It is so evidently congeneric with Helix sesquicincta that I am at a loss to understand how von Martens missed the relationship. The shell is uniformly golden brown with the same moirée pattern above but, whereas in H. sesquicincta the pattern is all over the shell, in aureofusca the shell is smoother and more shining beneath with only transverse growth lines. An oxygnathous jaw is stuck on a card accompanying the type specimen.

There is yet another specimen at Berlin clearly belonging to this group which was collected by the botanist Goetze who made an excellent collection of plants in S.E. Tanzania between 1898 and 1899 but unfortunately died of blackwater fever on the shore of Lake Malawi on the 12 December 1899. The specimen was collected at Ubena, a vague locality consisting of the highland area around Njombe at about 9°15'S., 35°20'E. I am not aware that he collected any other mollusca but possibly there are others at Berlin. My notes state the shell is chestnut with a moirée pattern all over; apical whorls smooth, the rest with obscure plicae above, smoother and shinier beneath; periphery sharply keeled. Von Martens had noted 'close to nyassanus Smith' and had given it the MS name goetzei. I have been unable to re-examine the specimen.

There is thus a number of very poorly known species all best referred to Zingis but this still has not been proved since Z. radiolata von Martens (= Peltates polystephes Tomlin) has still never been re-collected alive (see Verdcourt (1960, 1961) and Van Bruggen & Verdcourt [1968]).

Summary of the species discussed:

- Zingis aureofusca (von Martens) (Macrochlamys aureofusca von Martens).
S. Tanzania, Bulongwa
Zingis depressa (Germain) (Trochonanina (Martensia) germaini Boettger var. depressa
Germain). Tanzania, Kilwa, Kipatimu
Zingis nyassana (Smith) (Helix (Nanina?) nyassana Smith). Either extreme S. of
Tanzania or N. of Mozambique
Zingis sesquicincta (von Martens) (Helix (Phasis) sesquicincta von Martens; Helix
binaria von Martens). Tanzania, Ngozi Mt., Bulongwa and Upper Kiwira R.
Zingis sp. (goetzei von Martens MS). Tanzania, Ubena
Zingis sp. (as yet unnamed). Malawi, Mt. Mulanje, Ruo Gorge)
Zingis sp. (as yet unnamed). Tanzania, Sao Hill, Kigogo Arboretum

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B. Verdcourt

FIELD MEETING REPORT - SOUTH-EAST SUFFOLK: LEADER: IAN KILLEEN. OCTOBER 8TH. 1988

On a cold grey but dry start to Saturday October 8th. a group of 14 members of the CSGBI, namely Ian Killeen, Beryl and Derek Rands, Christine and Stephen Street, Jan Light, Adrian Rundle, Bill Pocock, David Guntrip, Keith Erskine, Malcolm Symonds, Judith Nelson, Jerry Bowdrey and myself, met at Ipswich Station, Suffolk, at 10.30 a.m. We intended to look at a variety of interesting sites and habitats in an unspoilt part of Suffolk including what is called the Bucanay Farm Pit at Alderton for Red Crag fossils and land snails followed by a visit to Shingle Street to collect some of the specialised brackish water molluscan fauna to be found there.

After what seemed miles of tortuous narrow lanes surrounded on both sides by hedges still thick with dead elms and held together by a tangle of brambles and

nettles, we arrived at Bucanay, parking in the farm yard and walking to the pit which was well hidden in the middle of a field but with easy access from the road. Ian, our leader, then explained clearly the fact that most of the sand pits in the area are no longer used and were therefore becoming overgrown or had been filled in with rubbish and then covered over. The Bucanay pit, therefore, which is still used by the farmer for sand, is not only unusual but also a good site for collecting Pleistocene Red Crag fossils. The group spent a very enjoyable hour or two carefully extracting fossils from the strata which were very well defined. At midday we took a break from collecting and over sandwiches and hot drinks discussed our finds in the first rain of the day. Several members had spent some time during the morning searching for modern terrestrial and freshwater molluscs, both the lists for the fossils and these are at the end of the report. Both Ian Killeen and all members present would like to express our thanks to Mr. Peter Mann of Bucanay Farm for allowing us to collect in the Pit.

After lunch, again through narrow high-hedged lanes, we drove down to Shingle Street which is one of those places that could be at the end of the world. A desolate shingle bank, whipped by a slicing, cutting wind, soaked by a thin seablow spray, the skies filled with grey scudding clouds and the constant rolling and clatter of millions of pebbles rattling over one another like dead dry bones as they wash up and down the bank as one wave takes over from another. The bank is part of 'The Suffolk Heritage Coast' and most of it is SSSI status. It is private but people are not discouraged from walking along the enormous bank or the beach in front. Behind these two natural sea defences there are a number of natural lagoons surrounded by grassy areas and a man-made sea wall protecting the unkempt fields and road. The lagoons are fed by rain water and saltwater from a spring running under the shingle bank from the sea. The mixture produces a very interesting and very sheltered brackish water habitat in which we started to search. The most exciting find for the author was Onoba aculea because of the fact that it has so far only been found in any numbers in the north of the country around the Scottish Coasts. The list of species found at Shingle Street follows the other two lists.

The author, both for himself and for those with him, would like to thank Ian for organising and leading this very successful field trip.

J. E. Llewellyn-Jones

List of Recent molluscs from Bucanay Farm Pit:

<u>Vallonia costata</u> (Müller)	<u>Candidula gigaxii</u> (L. Pfeiffer)
<u>Aegopinella nitidula</u> (Draparnaud)	<u>Ceruella virgata</u> (da Costa)
<u>Oxychilus cellarius</u> (Müller)	<u>Monacha cartusiana</u> (Müller)
<u>Deroceras reticulatum</u> (Müller)	<u>Trichia hispida</u> (Linnaeus)
(Lymnaea peregra (Müller) also found in pond)	

List of Red Crag fossils from Bucanay Farm Pit:

MOLLUSCS:

<u>Acmaea virginea</u> (Müller)	<u>Cerastoderma angustatum</u> (J. Sowerby)
<u>Capulus ungaricus</u> (Linnaeus)	<u>Cerastoderma edule</u> (Linnaeus)
<u>Buccinum undatum</u> Linnaeus	<u>Cerastoderma parkinsoni</u> (J. Sowerby)
<u>Scaphella lamberti</u> (J. Sowerby)	<u>Spisula arcuata</u> (J. Sowerby)
<u>Acila cobboldiae</u> (J. Sowerby)	<u>Spisula elliptica</u> (Brown)
<u>Glycymeris glycymeris</u> (Linnaeus)	<u>Ensis</u> sp. (fragments)
<u>Mytilus edulis</u> Linnaeus	<u>Macoma obliqua</u> (J. Sowerby)
<u>Pecten maximus</u> (Linnaeus)	<u>Macoma praetenuis</u> (Woodward)
<u>Chlamys varia</u> (Linnaeus)	<u>Scrobicularia plana</u> (da Costa)
<u>Chlamys opercularis</u> (Linnaeus)	<u>Arctica islandica</u> (Linnaeus) (fragments)
<u>Ostrea edulis</u> Linnaeus (fragments)	<u>Dosinia exoleta</u> (Linnaeus) (several hinges)

Lucinoma borealis (Linnaeus)
Divaricella sp.
Cardita senilis (Lamarck)
Cyclocardia scalaris (J. Sowerby)
Pteromeris corbis (Philippi)
Astarte obliquata J. Sowerby
Astarte omalii de la Jonkai

Tapetiniid (fragments)
Mya arenaria Linnaeus
Mya truncata Linnaeus
Corbula gibba (Olivi)
Panopea sp. (hinge fragments)
Zirphaea crispata (Linnaeus) (fragments)

OTHER GROUPS:

Boring sponges: Clione sp. in thicker shell fragments
 Coral: Sphenotrochus sp.
 Worm: Diffraga sp (tubes)
 Sea-mats (Bryozoa): several species
 Shrimps: various burrows
 Barnacles: Balanus sp(p).
 Regular echinoids: spines and test fragments

DERIVED FOSSILS FROM THE LONDON CLAY:

Sand shark: Eugomphodus hopei (Agassiz) (one tooth)
 Eagle Rays: Aetobatis sp. (one tooth) and Myliobatis sp. (several teeth)

List of Recent molluscs from Shingle Street - Lagoon 6:

<u>Lepidochitona cinereus</u> (Linnaeus)	<u>Leucophytia bidentata</u> (Montagu)
<u>Hydrobia neglecta</u> Muus	<u>Cerastoderma glaucum</u> (Bruguiere)
<u>Hydrobia ulvae</u> (Pennant)	
<u>Hydrobia ventrosa</u> (Montagu)	In litter:
<u>Onoba aculea</u> (Gould)	<u>Pupilla muscorum</u> (Linnaeus)
<u>Ovatella myosotis</u> (Draparnaud)	<u>Vallonia excentrica</u> Sterki

List of Recent molluscs from Shingle Street - Lagoon 7:

<u>Hydrobia neglecta</u> Muus	<u>Leucophytia bidentata</u> (Montagu)
<u>Hydrobia ventrosa</u> (Montagu)	<u>Cerastoderma glaucum</u> (Bruguiere)
<u>Littorina saxatilis</u> (Olivi) agg.	<u>Abra tenuis</u> (Montagu)
<u>Ovatella myosotis</u> (Draparnaud)	

I would like to thank Dr. A. Rundle for help over the identification of a large number of the fossils and Ian Killeen for the naming of the terrestrial and freshwater/estuarine species.

SWISS HOLIDAY

A family holiday in July 1988 in SW Switzerland gave me an opportunity to see something of the land mollusca of Canton Valais. Les Marecottes, where we stayed, is a small village now a relatively undeveloped all-seasons resort about 5Km west of Martigny. It lies between 1000 and 1100 metres above sea level in a steep-sided valley formed by a tributary of the River Trient, which in turn joins the Rhone in its flat-bottomed valley just west of Martigny. The slopes around Les Marecottes are dominated by forests on rocky soils; these are mixed, mainly Norway Spruce (Picea abies) and Beech (Fagus sylvatica) at lower altitudes with the deciduous trees becoming fewer higher up. There are several hay-cum-grazing meadows near the village which include some plants we associate with lime in this country such as Hoary Plantain (Plantago media L.). The local rocks are predominantly metamorphic and igneous which, in general, produce acid soils. A few kilometres northwest of Les Marecottes there is a major change in the geology with a band of Mesozoic lime-stones and shales running from southwest to northeast to the Rhone valley near

St. Maurice. This has an important effect on mollusc distribution.

Most of my time looking for molluscs was spent in the vicinity of Les Marecottes, either before breakfast or in the evening. Perhaps the commonest species was a member of the Arion ater complex with a dark brown body and black head; the slugs were conspicuous in cooler, moister conditions on road verges, in a small reed bed, and occasionally on tracks within the forest. For a relatively acid area there were one or two surprises for anyone only familiar with land mollusc distribution in Britain. Helix pomatia was frequent on road verges, the sides of cuttings, and waste places in or just outside Les Marecottes. It also occurred on a boulder slope under scattered European Larch (Larix decidua) at about 1400m. at Van d'en Haut, 3 kilometres or so north of Les Marecottes, which might have lime enrichment from the nearby Mesozoic rocks. Helicigona lapicida was common on walls and rock surfaces; a few were seen, in rain, on scattered old Beech trees in the forest, and one was found under a spruce log. Dry grassy road verges just north of Les Marecottes had a thriving colony of Helicella obvia; this looks like H. itala but the body whorl does not descend in the last $\frac{1}{4}$ whorl and the umbilicus is relatively smaller; specimens from Les Marecottes were not conspicuously white compared with H. itala from the Cotswolds.

A small reed bed at Les Marecottes, formed where the local railway had interrupted a stream, had numbers of a small form of Succinea putris, Bradybaena fruticum, Cepaea nemoralis, Arianta arbustorum, a Trichia (probably hispida), Arion ater, Deroceras reticulatum and D. laeve but, apparently, no small molluscs. North of Les Marecottes, at Les Granges, about two kilometres away, a small wet flush at about 1000m. produced Aegopinella nitens and one Carychium minimum, the only Carychium seen.

The woodland, which had road cuttings, rock outcrops, and a ground flora often dominated by Bilberry (Vaccinium myrtillus L.), contained few, but interesting species. Near Les Marecottes station juveniles of Limax tenellus were seen twice and other slugs noted were Limax marginatus and Arion subfuscus. Two dead shells of Ena montana were found in leaf litter in a rock cutting, and leaf litter also produced Euconulus fulvus, a dead Vitrina pellucida, an as yet unidentified Oxychilus and a small Zonitid resembling Aegopinella pura, but apparently without its characteristic spiral microsculpture. Woodland north of Les Marecottes towards Les Granges also contained few molluscs: Discus rotundatus, Ena obscura, Helicigona lapicida (again), Vitreola contracta, Nesovitrea hammonis and ?Aegopinella sp in litter on the rocks of road cuttings; Limax marginatus and a single shell of Isochnomostoma holosericum among overgrown boulders under large Beech trees.

Some 5Km. and about 2 hours walk northwest of Les Marecottes an alp in a valley is used for the summer pasturing of cattle; it lies at an altitude of 1700 to 2150m. Most of the valley has been cut out of acid gneiss and the walk there only produced Deroceras laeve by a wet flush at about 1800m. At the valley head is the major geological boundary, which I mentioned earlier, with a rock wall about 800m. high culminating in Les Pointes d'Aboillon. Limestone boulders and fragments form scree cones and hummocky masses of moraine which are being redistributed by meltwater streams from the local snow patches; pieces of limestone, mingled with gneiss boulders can be found for at least a kilometre down from the valley head. Snails live under the limestone rocks and, in mid-July a few were aestivating in the open. Most numerous was Cepaea sylvatica. At least two species of Vitrinidae were present, but the adults had recently died off so only shells with dried animal remains and a live juvenile were seen; these were most probably Vitrina pellucida and Euobresia nivalis. One relatively dry stone had six Pyramidula rupestris beneath it. Stones on a scree slope sheltered Abida secale, Cochlicopa lubricella and Euconulus fulvus. Finally a debris cone with a small stream at the foot of the rock wall produced, from a brief search among damp grass a single dead shell each of Columella columella and Arianta arbustorum.

Having got slightly tired of having either a four hour plus round trip to find molluscs or a success rate of 5 specimens in 30 minutes in acid woodland, I made an afternoon visit to a small wooded limestone gorge at an altitude of about 500m. near Les Cases south of St. Maurice. This had exposed cliffs, mixed deciduous woodland with boulders and a small area of grassland, all at a point where a small stream, Le Mauvoisin, descends the west side of the Rhone valley. In contrast to Les Marecottes molluscs were many and varied. Cochlostoma septemspirale was abundant amongst leaf litter, on Ash (Fraxinus excelsior) trunks, rocks, and under Ivy (Hedera helix) on a wall. Rocks, stones and wall tops harboured numbers of a large form of Abida secale, an occasional Chondrina avenacea, Pyramidula rupestris and one dead Vallonia costata. An Ash trunk produced Cochlodina laminata - also found under litter on a rock - and Macrogastera plicatula. Helicodonta obvoluta was very common. Clausilia parvula occurred on a litter-covered rock outcrop and under Ivy on a wall with Pupilla triplicata. Some species had also been seen at Les Marecottes - Discus rotundatus, Vitrina pellucida, Helix pomatia, Helicigona lapicida, Ena montana, E. obscura, Euconulus fulvus, and an Arion of the ater complex. The small area of grassland produced dead shells of Zebrina detrita, Euomphalia strigella, and Oxychilus glaber. Moist moss and litter on and among boulders shaded by Ash trees had Acanthinula aculeata, and numerous zonitids - Vitrea subrimata, Oxychilus depressus, Aegopinella nitens, and the A. pura-like zonitid seen at Les Marecottes.

Did I learn anything from this holiday? Yes: patience, not to assume identifications from quick examination in the field, and not to assume that habitat preferences for a species are those we are familiar with in Britain.

David Long

LETTER FROM A MEMBER

I found "The Future of Conchology" in the Conchologists' Newsletter No. 108 a most interesting article, and offer the following comments for further consideration.

A vast amount of work has been accomplished with regard to non-marine molluscs and in line with the general move towards all things European in our daily lives, and much greater co-operation throughout all walks of life, then the idea, as suggested, of a European atlas, becomes a very real possibility.

Much more difficult, however, has been the work put into marine molluscs; quite simply the terrain and weather conditions either make or break many attempts at finding out what may lie in store, even before we consider the need for boating, diving and, at all times, the extra restraints regarding safety.

Following talks with Dennis Seaward, Marine Recorder, some six years ago, I found great interest and possibilities with regard to an 'Irish Sea Atlas' or, taken a stage further, 'Mollusca Report'. At the time I contacted all representatives covering the Irish Sea areas concerned and most were also interested, but it was not then possible to proceed further.

The Irish Sea is a very important and, today, quite often controversial expanse of water with four countries, together with the Isle of Man, having a very real interest and so, if we then consider 'the future', is it now time to proceed in earnest with this exercise? I shall be pleased to have the up-to-date views of all Marine representatives covering the area.

A far more open area of water, offering superb possibilities is the North Sea.

Here again this has changed drastically during the past two decades in terms of access and use, and now within a European context we should form much closer co-operation towards a whole range of North Sea Flora and Fauna of which a North Sea Atlas of Marine Molluscs would be a good start. Much excellent work has been and is being undertaken covering Scottish coastal waters, however the Bristol Estuary, the English Channel, St. George's Channel, and waters around the Irish Sea western coasts are waiting for the willing.

On the scientific side we should look back and see how badly the conservation movement as a whole has behaved over the past few decades. Almost all principal research has been undertaken due to specific threats: i.e. the proposed new London airport and Maplin Sands, various estuarine barrages i.e. the Dee, Morecambe Bay, and the Solway Firth; or on behalf of industry with a specific bias to illustrate that the wastes of those industries either do not or will not affect the environment!!

Much of conchology is based upon pleasure and personal interest and this is fine, however, I do feel that we should also play a more active part in conservation and should be more involved with research in the interests of conservation. We should be more involved in having positive data which would be readily available to fight environmental encroachments before issues arise, instead of afterwards!!

More nationwide information is required on the effects of silage and farm slurry on terrestrial and aquatic molluscs. What is happening to our marine molluscs due to the many regular and frequent chemical cocktails released by water authorities and industries around our coastline? Has the nuclear industry affected our marine molluscs to any extent? I personally think not, but could I be right/wrong?

In recent years much has been made of the expression 'acid rain', an expression which I am not too happy about, however we have heard and seen a considerable amount of comment regarding the effects of 'acid rain' on trees, but what effect has this had in either marine or terrestrial molluscs? Anyone who has read the excellent "The Ecology of Rocky Shores" by J. R. Lewis must look at their own coastline and wonder where it all goes wrong. This publication, as a 'bible' for many, is based upon the traditional acceptance of 'sea water' being just that, but today much of our coastline is far from sea water, rather a chemical cocktail of sewage and industrial effluent that swills up and down the coast and littoral area until a favourable wind breaks it all up and sweeps it out to sea.

In the past two decades our coastal areas have been subject to a constant bombardment of new lethal pollutants ensuring that marine molluscs are living in an environment far removed from 'sea water'. Much research is required on populations and effects on species.

For the active field worker much more progress needs to be made towards better presented keys for identification and, for the person with but a general interest, the conchological movement as a whole should be more represented among the many excellent programmes offered to the general public today via the media, notably television. Most of the programmes relate, in the first place to birds, and then animals, but very very few have devoted time to the considerable interest and indeed beauty that 'shells' can offer.

Whilst the national trend today is looking towards European co-operation, I feel, at field level, closer co-operation must be aimed at. Sharing information on an equal basis and co-operation with regard to field work to avoid duplication of effort must become the norm. Once we have considered the beauty and diversity of molluscs, and the relaxation and companionship resulting from even a few enthusiasts, let alone an organisation as the C.S.G.B. & I., we must face facts that

conchology, as all other aspects of life, is affected by more and more varied and dangerous pollutants, conchology must move closer to and co-operate with other avenues within a much better conservation movement - not political but having an ability to be factual.

I trust the above will help further "The Future of Conchology" and wish you well for the future.

Norman Hammond, [REDACTED], Aspatria, Carlisle, Cumbria, [REDACTED]

FIELD MEETING TO THE NORTH DEVON COAST, OCTOBER 1989

This weekend meeting, which had been arranged by Jan Light and Ian Killeen, was centred on the hamlet of Porlock Weir on the north Somerset coast. The approach to the village from the southwest is dramatic; a rapid descent from the high ground of Exmoor along a narrow lane which plunges into dense woodland to emerge at the "Weir" - a shingle bar which forms a natural harbour, overlooked by the house which was our accommodation.

The first trip was to view specimens collected earlier that Friday and now residing in a soup tureen on the kitchen table. As we looked at the molluscs, Ocenebra erinacea and Raphitoma purpurea, each of us expressed our approval of the specimens. "My word!" "Good heavens!" "I've not seen that before!" Would we be so fortunate on Sunday when we were to visit the same site?

The two shores examined during the weekend - Croyde Bay, north of Barnstaple, on Saturday and Higher Rowden, northwest of Fairy Cross, on Sunday - presented somewhat different aspects.

At Croyde Bay the rocks, which form the eastern side of the bay, have almost vertical bedding. The result is a series of parallel ridges with the western faces exposed, the eastern sheltered. The most exposed face, the first of the ridges, was smothered with Mytilus edulis, so tightly packed that none had been able to grow more than an inch or so in length. The mussels were accompanied by their predator the dog whelk, Nucella lapillus. In contrast, the sheltered faces, and in particular sheltered crevices, harboured a much wider range of creatures; anemones, sponges, bryozoans. Particularly striking were the colonies of the star ascidian, Botryllus schosseri. It was pleasing to find its predator, the cowrie, Trivia monacha, low on the shore. New to me was the limpet, Patella aspera. When I last studied marine molluscs the two limpets P. vulgata and P. aspera were hardly recognised as different species, at least in the "popular literature". After an expert lesson from Jan Light I could distinguish the species at a glance! The Laminaria zone yielded two other interesting species, Diodora apertura and Callichiton achatinus. The Blue-rayed limpet, Patina pellucida was particularly common on the Laminaria fronds and stipes. In the holdfasts the larger form of this limpet occurred with small specimens of the "boring" mollusc, Hiatella arctica.

At Higher Rowden the rocks form a nearly horizontal platform which is eroded into gulleys. This shore seemed to be less exposed than that at Croyde Bay and this was reflected in the scarcity of common mussels and Patella aspera. However, Patella vulgata was common and on the upper shore, where it was accompanied by abundant Monodonta lineata, it came in an attractive variety of purples and greens. As expected, it was the gulleys low down on the shore which yielded the greatest variety of molluscs. Searching here in the late autumn sun was a pleasure. I rediscovered the habitats of several species. Calliostoma zizyphinum and Ocenebra erinacea on the sides of the gulleys, Nassarius pygmaeus and several species of rissoid in sand under stones. Both of the British cowries (T. monacha and T.

cantiana) were found here and, as at Croyde Bay, a single specimen of Callichiton achatinus. However, we were not fortunate enough to find Raphitoma purpurea again.

Our attention was soon brought to the crabs which lived in the gulleys. The commonest was the porcelain crab (Porcellana platycheles) with the somewhat larger crab Pilumnus hirtellus as a close second. The shore crab appeared to be absent from this shore but small specimens of the edible crab (Cancer pagurus) and the velvet swimming crab (Portunus puber) were common. It was also nice to see the small squat lobster. Apparently its larger namesake could be found here if you were diligent enough in your search.

During the weekend we also visited the Braunton Burrows National Nature Reserve. The Reserve is one of the two English sites for Catinella arenaria. The snail was not easy to find, perhaps due to the season and the dry summer, and not helped by poor light late in the day. Eventually we discovered them in an area of small sedges growing on damp sand. Here, they seemed to prefer an unusual habitat. Pieces of damp moss had become detached and lay on the ground like pieces of loose turf. Turn over one of these and there they were, on the moss!

I am grateful to Jan Light and Ian Killeen who put so much effort into this meeting.

Brian Coles

GENERAL NOTES

APPLICATIONS PUBLISHED IN THE BULLETIN OF ZOOLOGICAL NOMENCLATURE

The following application was published on 19 December 1989 in Vol. 46, Part 4 of the Bulletin of Zoological Nomenclature. Comment or advice on this application is invited for publication in the Bulletin and should be sent to the Executive Secretary, I.C.Z.N., c/o. The Natural History Museum, Cromwell Road, London, SW7 5BD, U.K.

Case 2683 Gryphaea pitcheri Morton, 1834 (currently Texigryphaea pitcheri; Mollusca, Bivalvia): proposed conservation

Barry S. Kues, Department of Geology, University of New Mexico, Albuquerque, New Mexico 87131, U.S.A.

Spencer G. Lucas, New Mexico Museum of Natural History, P.O. Box 7010, Albuquerque, New Mexico, U.S.A.

Abstract. The purpose of this application is to conserve the specific name Gryphaea pitcheri Morton, 1834 for a Lower Cretaceous bivalve by suppression of the possible senior synonym Gryphaea corrugata Say, 1823.

COURSES IN 1990

EAST HAMPSHIRE FURTHER EDUCATION AT ALTON

Sat. 24 March: Snail trail - a day course based at Alton, Hampshire looking at snails of woodland and marsh. 9.30 - 4.00. Course fee of £8.50 includes ploughman's lunch and refreshments. Details from East Hants. Further Education, Alton College, Old Odiham Road, Alton, Hampshire, GU34 2LX

FIELD STUDIES COUNCIL

22-29 August: Life in leaf-litter and lower foliage. Tutors: June Chatfield and Cynthia Merrett. Includes slugs, snails and other invertebrates. £185. At The Leonard Wills Field Centre, Nettlecombe Court, Williton, Taunton, Somerset, TA4 4HT

28-30 September: June Chatfield's mollusc course - a weekend based around Box Hill in Surrey which is a classic area on chalk with a good range of species. £70.
Juniper Hall Field Centre, Dorking, Surrey, RH5 6DA

ROGATE STUDY CENTRE, WEST SUSSEX

3-5 August: A weekend course on woodlice and leaf-litter animals (includes molluscs).
Tutor: June Chatfield. Residential £61 (£4 single room supplement), non-residential £38. At The Rogate Study Centre, The Red House, Rogate, near Petersfield, Hampshire, GU31 5HN

ACHATINA SP. BEING FARMED

Achatina sp. is being farmed in both Cheshire and Cornwall according to the South Wirral Herald and Post of Oct. 25th. 1989. Barleyfield Snails in Wirral (Cheshire) began farming the "African Achatina" a year ago, stock having been obtained from St. Austell, Cornwall. The snails are described as being five inches long and weighing 80 grammes.

I had no idea that snail-farming was so widespread. There is also a snail farm in Tarporley and two or three in Liverpool according to the local paper already quoted, but the names of the species farmed are not given.

from Nora McMillan

NOT MANY PAPERS ABOUT MOLLUSCS have been published in botanical journals but I very recently noticed the following - Isolation of functional chloroplasts from the sacoglossan mollusc Elysia viridis Montague by M. L. Williams and A. H. Cobb. New Phytologist 113: 153-160 (1989).

The material for the studies came from rock pools at Bembridge in the Isle of Wight.

Bernard Verdcourt

WILLIAM SWAINSON, F.R.S., F.L.S.

The following book just published will interest all conchologists interested in the history of their subject.

William Swainson, F.R.S., F.L.S. Naturalist and Artist. Diaries 1808-1818. Sicily, Malta, Greece, Italy and Brazil. Transcribed, Edited and Published by Geoffrey M. Swainson, [REDACTED], Palmerston North.
Autographed edition of 300 only. 48\$ NZ.

Bernard Verdcourt

EXCHANGES WANTED

Fritz Seidl, [REDACTED], A-5280 Braunau am Inn, Austria, wishes to exchange recent shells with members. He has shells from Austria, Germany, S.E. Europe and W. Africa to offer in exchange for world-wide shells. Please write.

Jean-Paul Kreps, [REDACTED], 8300 Knokke-Heist, Belgium, wishes to obtain many species of British, Arctic or Mediterranean marine shells (list with Newsletter Editor). He has a collection of 1600 European marine shells with a lot

available for exchange. Please make contact.

BACK NUMBERS OF THE NEWSLETTER

In future, the price of back numbers of the Conchologists' Newsletter will be £1 including postage. (£1.30 to non-members)

REVIEW Schiotte, T., 1989. Marine mollusca from Jorgen Bronlund Fjord, North Greenland, including the description of Diaphana vedelsbyae n.sp. Meddelelser om Gronland, Bioscience, no. 28, 1989, pp. 1-24.

This paper reports on biological surveys made by the Danish Peary Land Expeditions during the 1960's to the early 1980's. Tom Schiotte brings together all previous mollusc records for this fiord. This material is particularly important because it is a sample of a hitherto inaccessible habitat. Inaccessible because most fiords in Greenland are covered in ice all year. Access to the Jorgen Bronlund fiord is limited to the first half of July to early September, when new ice begins to form. These favourable conditions are due to the wind tunnel effect of the valley Wandel Dal to the west of Jorgen Bronlund Fjord.

Seventy six bottom-living and pelagic species of molluscs are listed with an indication of abundance. Additional information about twenty nine species is given where their appearance or other circumstances deserve comment. For example, eight species were new to east Greenland. Diaphana vedelsbyae is fully described and illustrated. Comparisons are made with similar or closely related species. Species illustrated: Skenia laevigata (Friele); Margarites groenlandicus (Gmelin); Cingula ?arenaria Mighels & Adams; Cingula moerchi Collin; Alvania scobiculata (Møller); Alvania verrili (Friele); Trichotropis borealis Broderip & Sowerby; Velutina velutina (Muller); Natica clausa Broderip & Sowerby; Propebela novajasemliensis (Leche); Propebela reticulata (Brown); Oenopota cinerea (Møller); Oenopota ?bicarinata (Couthony); Oenopota declevis (Loven); Taranis amoena (G.O.Sars); Diaphana ?minuta Brown; Diaphana vedelsbyae Schiotte; Retusa obtusa (Montagu); Cylichna alba (Brown); Cylichna occulta Mighels; Nuculana pernula (Muller); Limatula hyperborea Jensen; Astarte borealis (Schumacher); Astarte ?warhami Hancock; Astarte crenata (Gray); Thyasira gouldi (Philippi); Thyasira dunbari Lubinsky; Axinulus pygmaeus (Verrill & Bush); Lyonsiella abyssicola (G.O.Sars).

The final section deals with distribution and zoogeography. In the fiord there are three habitats; the inner fiord with depths down to 80 metres; the threshold, shallow, only down to 10 metres; the outer fiord also reaching 80 metres. Twenty eight species occur in the inner fiord and sixty three in the outer fiord and threshold. The threshold seems to be an effective barrier for most species. The reason may be the relatively high temperature in the inner fiord and the low and variable salinity over the threshold. There is a detailed discussion of the distribution of the species found in the fiord in relation to the arctic and other parts of Greenland. An extensive bibliography is given.

This is a useful review of the molluscs in this little-known area.

C. Pain

THE CONCHOLOGISTS' NEWSLETTER

No. 113

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

Market Harborough,
Leicestershire,

June 1990

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COLLECTORS IN EAST AFRICA - 14. F. FÜLLEBORN

F. Fülleborn (1866-1933)

Prof. Friedrich Fülleborn born on September 13th. 1866 in Kulm an der Weichsel (then in West Prussia now in Poland, Chelmo on the Wista [Vistula]) collected a few molluscs in south Tanzania (then Deutsch Ost-Afrika) which were described by von Martens subsequent to his monumental 'Beschaltete Weichethiere Deutsch Ost-Afrikas'. After studying medicine and natural sciences at Berlin, Fülleborn undertook a journey to North America in 1894 under the auspices of the Royal Prussian Academy to carry out research into zoology and evolution. Between 1896 and 1910 he served as a military doctor with the German Army in Deutsch Ost-Afrika and during this period undertook a number of study trips in connection with research into tropical medicine. He served in the Herero War in South West Africa and was an early visitor to the London School of Tropical Medicine and a staunch admirer of the great Patrick Manson under whom he had studied in 1900-1901. It is clear therefore that he was not permanently in East Africa. During the First World War he was badly wounded at the front and later worked as a malaria expert on the Balkan Front. He returned to England after the war to visit the shrine of Patrick Manson (and to enjoy a saddle of mutton at S----'s). He appears to have been somewhat of a bon viveur, an epicure and a connoisseur of art. He had visited most countries in Europe and America. He was one of the original founders of the 'Institut für Schiffs -und Tropenhygiene' in Hamburg in 1901 and associated with it until his death; in July 1930 he was its Director and had been Prof. of Tropical Medicine at Hamburg since 1926, his eventual full title being Geh. Medizinalrat Prof. Dr. Fülleborn. Towards the end of his life he became very interested in parasitology and at the time of his death was one of the world's greatest helminthologists with an international reputation. He was universally respected and beloved as a man and was a sympathetic friend. The Royal Society of Tropical Medicine and Hygiene had made him an Honorary Fellow.

It seems to me rather odd that such a man stationed in Africa off and on for 15 years (the same period of time I spent in East Africa myself) should have collected so few molluscs. I suspect he was encouraged to do so by either Stuhlmann or von Martens when it was known he was visiting an area where no material had been collected before. If he had had a deep personal interest in the group he would have obtained a great deal more.

I remember meeting Sir Philip Manson-Bahr (1881-1966) (he married Edith Margaret, daughter of Sir Patrick Manson in 1909) in Nairobi about 1960 or so and he telling me he was writing about Fülleborn. This was natural since they had much in common, both having served in the great war, both being great experts on tropical diseases and both ardent admirers of Sir Patrick Manson. I was able to give Manson-Bahr information about Fülleborn's molluscan collections; it appears, however, that no biography was completed.

I am very grateful to James Beaton, Assistant, Bibliographic Services and Modern Medicine Collection, The Wellcome Institute for the History of Medicine, for all the biographical information.

List of molluscs described from material collected by Prof. F. Fülleborn in southern Tanzania

- Buliminus bambuseti von Mts., 1900. Tanzania, Kraters des Vulcans Ngosi (type*).
Cerastua bambuseti (von Mts.).
Buliminus (Rhachis) fuelleborni von Mts., 1901. Tanzania, 'Deutsch-Ostafrika, südlichster Theil' (type). Rhachidina mozambicensis (Pfr.).
Ennea cruciata von Mts., 1900. Tanzania, Bulongva (type). Gulella cruciata (von Mts.).
Helix binaria von Mts., 1900. Tanzania, Bulongva (type). Zingis sesquicincta (von Mts.).
Helix fuelleborni von Mts., 1900. Tanzania, Kinga-Gebirge in einer Höhe von 2000 bis 2300m., Bulongva (leg. 24 Sept. 1899) (type). Halolimnohelix fuelleborni (von Mts.).
Helix infrafusca von Mts., 1900. Tanzania, Ukinga östlich von Rickwa-See. (type). Halolimnohelix infrafusca (von Mts.).
Helix (Phasis) sesquicincta von Mts., 1900. Tanzania, Kraters des Vulcans Ngosi am Rukwa-See (type). Zingis sesquicincta (von Mts.).
Macrochlamys aureofusca von Mts., 1900. Tanzania, Bulongva, 2000-2300m. (type). Zingis aureofusca (von Mts.).

*All types are in the Zoological Museum of the Humboldt University, East Berlin.

Geographical notes

Bulongva = Bulongwa, 9°20' S, 34°03' E (in Ukinga Mts.)(Njombe Distr.)
Kinga - Gebirge = Ukinga Mts.
Ngosi Vulcan = Ngozi Volcano, 8°59' S, 33°33' E (Rungwe Distr.)
[Note: none of these is that close to Lake Rukwa (Rickwa = Rukwa-See)]

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Bernard Verdcourt

THE MOLLUSCAN FAUNA OF LOCH BROOM AND LITTLE LOCH BROOM, SCOTLAND

In September 1988, while taking part in a Marine Conservation Society (MCS) survey (SEASEARCH), I had the opportunity to record the molluscan fauna of Loch Broom and Little Loch Broom.

Loch Broom and Little Loch Broom are two sea lochs some 13-14km. long in the NW of Scotland. Glaciation considerably influenced the form of the lochs, producing deep basins with passes and sills. The maximum depth in Loch Broom is 87m., and 110m. in Little Loch Broom, with a tidal range of 4.5m. Quantities of fresh-water run-off from the surrounding mountains led to pockets of freshwater overlying seawater at many of the dive sites.

SEASEARCH is a survey of the sublittoral marine habitats of Great Britain, run by MCS on behalf of the Nature Conservancy Council. The aims of this SEASEARCH expedition were to describe the major habitat and community types in Loch Broom and Little Loch Broom, and to record any human activities or impacts present at these localities. Time also permitted a limited examination of the approaches to Loch Broom.

The aims of the survey were carried out by pairs of divers working from inflatable boats. As one of these divers, I recorded habitats and community types for the survey, and in addition, recorded molluscan species. I collected species where necessary for confirmation of identity when observed during each dive. Samples of algae (mostly foliose red, not kelp), maerl (site 14) and hydroids were collected and examined in a laboratory, for small species. Unfortunately, time did not permit me to look at any shores in the survey area. Observation from the boats indicated steep rocky/boulder shores along the sides of the loch, with muddy sand at the head of each loch. The north side of Isle Martin was exposed cliff, with a low diversity of molluscs (entirely dominated by 'juvenile' Mytilus edulis) at the intertidal level.

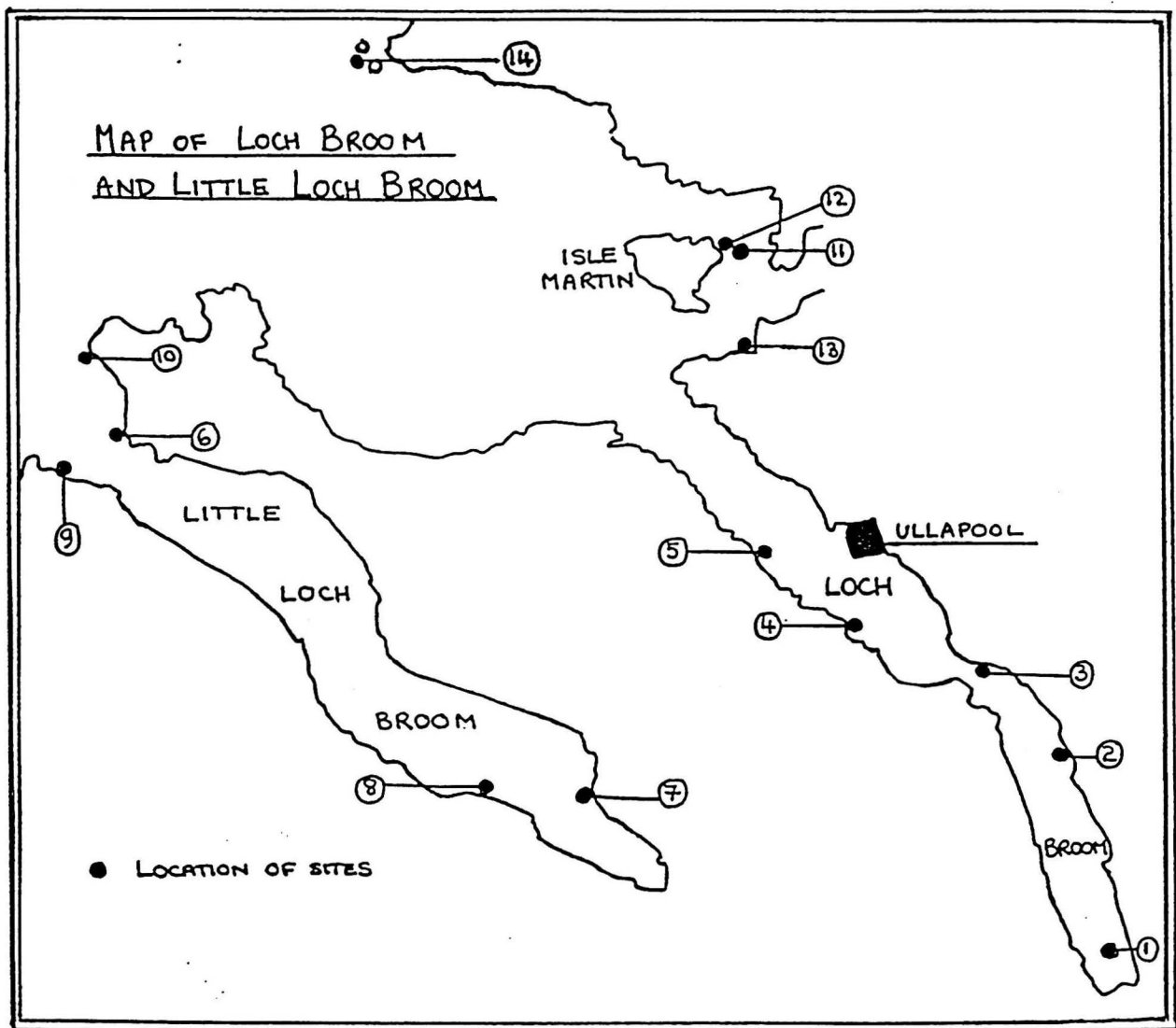
In total, I looked at 17 different habitat types comprising mud, sand, maerl, pebbles, cobbles, boulders or bedrock at 14 sites, with additional records from another 27 sites. 85 species of mollusc were recorded, of which 69 were observed alive (see list). Most species were not abundant. The commonest opisthobranchs were Philine aperta and Aplysia punctata (3-4 specimens on foliose red algae). No one site supported either large numbers or diversity of nudibranchs, with site 10 being the best with four dorid species. Limaria hians was locally common in nests, as were Modiolus modiolus, Aequipecten opercularis and Mytilus edulis. Ensis sp. (probably arcuatus) was abundant and almost certainly living over much of both lochs. The dead shells were found on many dives, as were those of Arctica islandica. Gibbula cineraria and Calliostoma zizyphinum - common in shallower water on kelp. A number of unusual species were recorded from the survey area. Janolus hyalinus, Embletonia pulchra (discovered in the laboratory amongst Tonicella marmorea collected from silt-covered bedrock) and Doto millbayana (on Plumaria setacea) were all new records for Sea Area 30 in the Sea Area Atlas published by the Conchological Society (1982; ed. D. Seaward). Two other interesting species were Turbonilla rufescens which was new to me, and Alvania beanii which I had only previously seen on a shallow sublittoral maerl bed in Co. Galway, Eire. Both species were recorded from the maerl bed near Iolla Bheag (site 14). One specimen of Cuthona caerulea was collected when observed underwater on the inside of a dead Arctica islandica shell on mud (site 13).

As expected, the muddy habitats supported very few species of mollusc. In deeper sheltered waters, the mud was dominated by beds of the sea pen Pennatula phosphorea. Otherwise, there were mainly dead shells - Pecten maximus, Ensis sp., Arctica islandica, and Turritella communis. At some sites, there were live specimens of P. maximus, Modiolus modiolus, Philine aperta, Buccinum undatum and Aequipecten opercularis.

The sandy habitats supported similar quantities of shell debris of the same species. One unusual habitat consisted of pebbles and stones held together in clumps on mud above nests of Limaria hians. Pebble/cobble sites either were dominated by beds of Modiolus modiolus or supported species typical of kelp (Trochidae spp.) with chitons (Tonicella spp.) on the stones.

In shallower waters (15m), kelp dominated boulders or bedrock, and had a wider diversity of species - especially on the vertical surfaces. Samples of red foliose algae and hydroids yielded a number of small species, and most of the nudibranchs observed during this survey.

The most interesting and richest habitat that I examined was at site 14,



Sites examined for molluscan fauna

Depth range (m to C.D.)

1. Rubha Airdan Turc, Loch Broom	+ 2.0 - + 0.7
2. Off Leckmelm Farm, Loch Broom	- 3.3 - -28.2
3. Camas an Daimh, Loch Broom	-11.5 - -15.5
4. Rubha Buidhe, Loch Broom	- 7.5 - - 9.5
5. Buckle Patch, Loch Broom	-10.5 - -26.0
6. N.W. of Corran Sgoraig, Little Loch Broom	-18.0 - -32.4
7. Sron Creag Na Cipaich, Little Loch Broom	-13.5 - -25.3
8. Ardessie, Little Loch Broom	- 3.0 - -26.9
9. Red Cliffs, Little Loch Broom	-18.5 - -19.5
10. Sron a Gheodha Dubh, Little Loch Broom	- 6.8 - -11.8
11. Loch Kanaird Narrows, Isle Martin	- 9.1 - -11.1
12. North of Rubha Glubhair, Isle Martin	-27.8 - -38.8
13. Cul a Bhogha, Outer Loch Broom	- 1.7 - - 7.7
14. Iolla Bheag, Outer Loch Broom	-17.3 - -23.3
	- 7.4 - -20.5

There were additional occasional observations of large molluscan species from other divers from 27 sites over the survey area.

which was a maerl bed at about 15m. 44 species were observed here, of which 14 were unique to the site. The chiton Tonicella marmorea was particularly common on the vertical surfaces of the bedrock underlying part of the maerl bed.

It is clear from these observations, that the molluscan fauna within the two lochs is poor in diversity, although typical, reflecting the dominance of mud and sandy habitats both at the sheltered head of the lochs and the sides. Even the shallow sites within the lochs supported few species on the boulders and kelp, possibly due to grazing by the urchin Echinus esculentus. A comparable shallow water site on Isle Martin supported a greater number of species. In fact, 49 live species of mollusc were found in the Isle Martin/Outer Loch Broom area, as compared with 34 for Little Loch Broom and 29 for Loch Broom.

This brief survey of the molluscan fauna of Loch Broom and Little Loch Broom underlines how important it is to conserve certain types of habitat, particularly maerl beds which support such a wide diversity of species, yet are known to be vulnerable to impact by man.

My thanks go to all those who helped to provide the molluscan records, to Shelagh Smith for assistance with identification and especially to Susan Gubbay and MCS for giving me the opportunity to participate in the survey.

Species list

Live: Leptochiton asellus, Lepidochitona cinereus, Tonicella marmorea, Tonicella rubra, Emarginula fissura, Tectura virginea, Helcion pellucidum, Margarites helicinus, Gibbula magus, Gibbula tumida, Gibbula cineraria, Calliostoma zizyphinum, Turritella communis, Lacuna vincta, Littorina littorea, Rissoa rufilabrum, Rissoa interrupta, Rissoa parva, Pusillina inconspicua, Pusillina sarsi, Alvania beanii, Alvania punctura, Onoba semicostata, Lamellaria latens, Velutina velutina, Euspira montagui, Vitreolina philippi, Buccinum undatum, Hinia incrassata, Raphitoma linearis, Chrysallida obtusa, Odostomia plicata, Brachystomia rissoides, Turbonilla rufescens, Philine aperta, Aplysia punctata, Tritonia plebeia, Lomanotus marmoratus, Doto coronata (agg.), Doto fragilis, Doto millbayana, Goniodoris nodosa, Adalaria proxima, Onchidoris muricata, Polycera quadrilineata, Janolus hyalinus, Coryphella verrucosa, Cuthona caerulea, Embletonia pulchra, Eubranchus pallidus, Antalis entalis, Nucula nucleus, Mytilus edulis, Modiolarca tumida, Modiolus modiolus, Limaria hians, Aequipecten opercularis, Pecten maximus, Pododesmus patelliformis, Pododesmus squamula, Parvicardium exiguum, Cerastoderma edule, Ensis arcuatus, Arctica islandica, Circomphalus casina, Timoclea ovata, Turtonia minuta, Hiatella arctica, Thracia villosiuscula.

Dead: Aporrhais pes-pelecani, Euspira poliana, Ocenebra erinacea, Mangelia nebula, Retusa truncatula, Ostrea edulis, Lucinoma borealis, Acanthocardia echinata, Laevicardium crassum, Lutraria lutraria, Gari tellinella, Dosinia exoleta, Paphia rhomboides, Venerupis senegalensis, Clausinella fasciata, Mya truncata.

Julia Nunn

SOME OBSERVATIONS ON THE DEVELOPMENT OF JUVENILE SHELLS OF TRIVIA

Dead shells of Trivia monacha and T. arctica are not uncommon finds on the strandline of beaches around the coasts of the British Isles. On the other hand, juveniles of these species are not so often found, and in spite of having examined fine shell sand from many locations where adult shells of Trivia were to be picked up on the strandline I had long failed to come across any juvenile specimens. In June 1989, however, I took samples of shell sand in Balnakeil Bay near Durness in the far north of Scotland and was rewarded with a single small juvenile a little over 1mm. in height. For confirmation that this was, indeed, a juvenile Trivia it

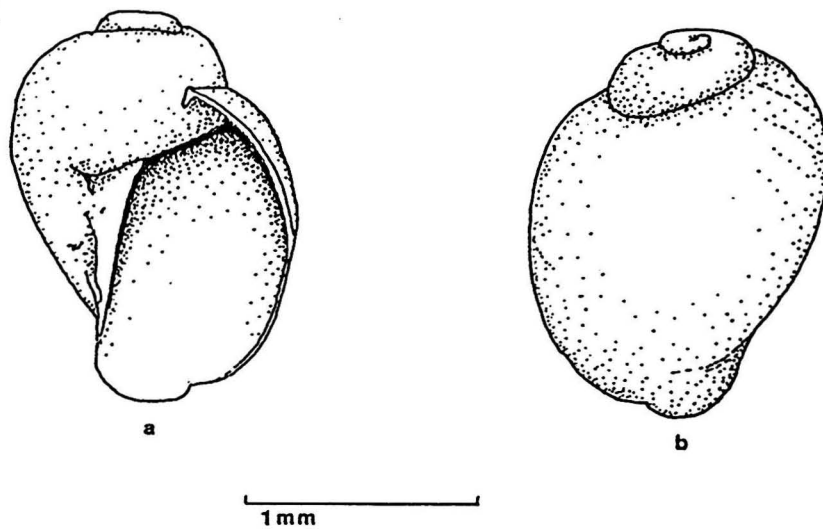


Fig. 1 Juvenile specimen of Trivia from Balnakeil Bay, near Durness, Scotland, 1989. a. Apertural, b. abapertural aspect.

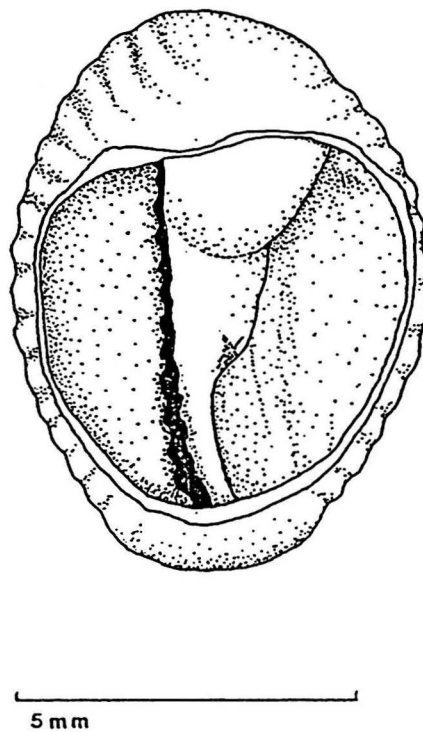


Fig. 2 A breached specimen of Trivia revealing internal details. Northumberland, 1989.

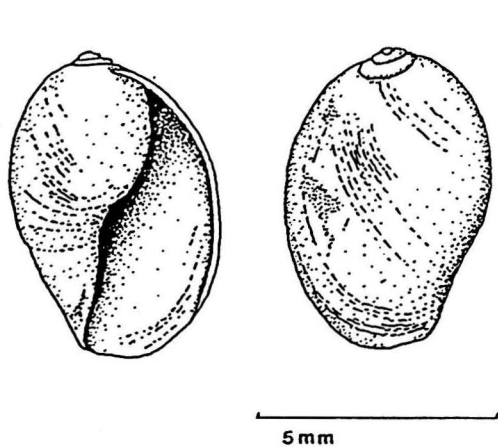


Fig. 3 Trivia arctica juvenile.
Berwick-on-Tweed, 1978.

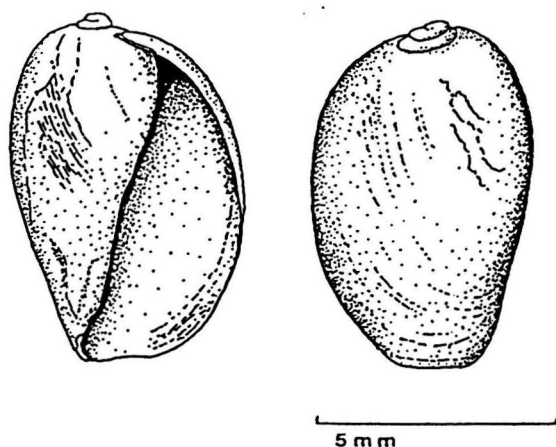


Fig. 4 Trivia arctica juvenile showing
lengthening form. Berwick-on-Tweed, 1978.

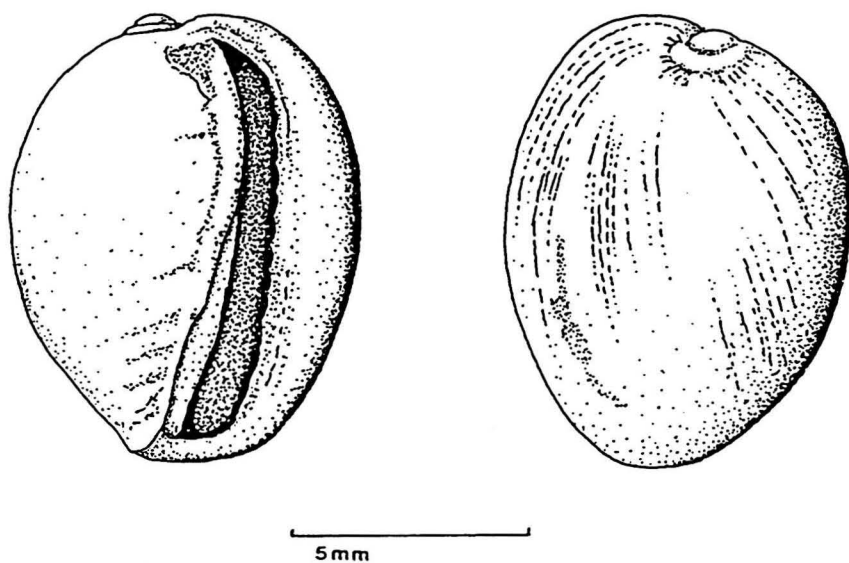


Fig. 5 Trivia arctica juvenile showing development of slot-like aperture.
Berwick-on-Tweed, 1978.

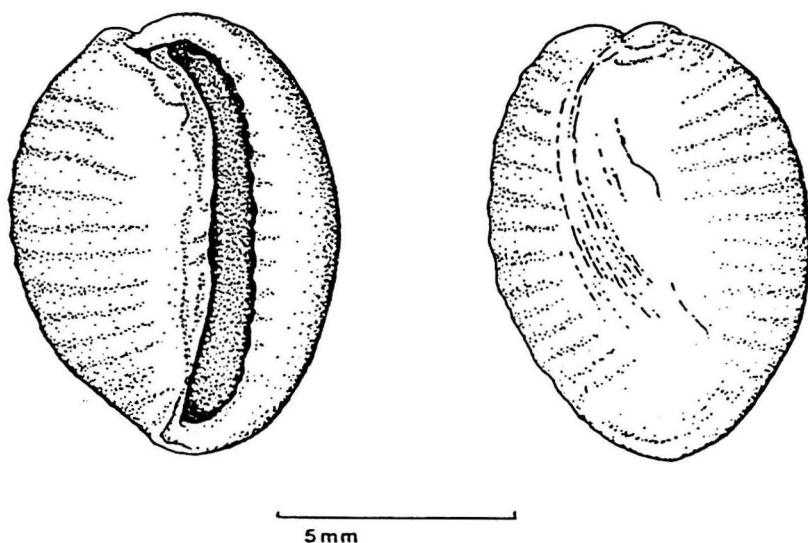


Fig. 6 Trivia arctica juvenile, nearly mature, showing deposition of slight
ridges progressively round the shell. Berwick-on-Tweed, 1978.

was necessary to go to the 1853 monograph of Forbes and Hanley where, under the name Cypraea europoea, a small illustration is given of the juvenile form. By a fortunate coincidence, a short time afterwards I picked up on the strandline at Sugar Sands, near Longhoughton in Northumberland, a specimen of Trivia which had been breached abaperturally allowing the internal details of the shell's growth to be seen, including a view of the 'lost' juvenile shell. Juvenile and adult forms of Trivia are very different and the successive developmental stages are shown in the accompanying illustrations. I am very grateful to Dr. Shelagh Smith who kindly provided me with the specimens shown in Figures 3 to 6 which illustrate intermediate growth stages. Dr. Smith's specimens are of T. arctica and were taken live at Berwick-on-Tweed in 1978.

Figure 1 shows the juvenile specimen from Balnakeil Bay. It has a fairly conventional gastropod form of about three whorls. It is thin, globose and has a very wide aperture with a long, fairly straight columella. The surface of the whorls is smooth and shiny with only the faintest of growth lines visible. Figure 2 shows the adult shell breached abaperturally. The black down the centre is the aperture viewed from the inside. To the right of the aperture is the much strengthened columella which now supports one margin of the slot-like aperture of the adult. Also visible is an abapertural view of the 'lost' juvenile shell analogous to Figure 1b.

Figures 3 and 4 (which are less magnified than Figure 1) show the further development of the young juvenile. The developing whorl has lengthened downwards and is already covering the globose form of the earlier shell. At the same time the aperture is becoming progressively elongated and D-shaped, the straight stem of the D being given added strength by the incurling of the whorl. The shell is still thin, smooth and glossy, but is distinctly more robust than the shell shown in Figure 1. It still has only the faintest of growth lines.

The abapertural view of the shell shown in Figure 5 is not very different from that shown in Figure 4, only larger, and the whorls of the apex can be seen to be overlaid by progressive accretions of shell material; the shell is still smooth and glossy with slight growth lines but is now very much stronger. The apertural view of Figure 5 shows marked differences from that of Figure 4, however:

- i. Incurling along the growing edge of the whorl.
- ii. Ridges are beginning to develop along the incurled growing edge but do not yet extend far.
- iii. The internal face of the whorl within the aperture is much strengthened and now stands as the columella, the original columella of Figure 1a being completely enclosed.
- iv. Simultaneously, faint ridges are beginning to develop on the surface of the whorl to the left of the columella. ('Left' and 'right', 'vertically' and 'horizontally' are here used in respect of the illustrations, not of the animal in life).
- v. A raised lip is beginning to form along the columella; this will later become the left-hand side of the adult aperture, concealing the columella.

In the specimen shown in Figure 6 the adult features of Trivia arctica are not yet fully present. By now the smooth columella is almost out of sight and the slight ridges which were beginning to develop in Figure 5 are spreading round the shell from either side of the aperture but they are still very shallow. The aperture is now strongly incurled at top and bottom and this is accompanied by a further general strengthening of the shell. It is to be noted that the animal has a mantle which, when not withdrawn, can fold back so as to cover virtually the whole of the outside of the shell, allowing secretion by the mantle of shell material over the entire external surface. This can be seen to be taking place in the aba-

pertural view of this specimen where the slight ridges are extending round the shell but have not yet reached the central area which still shows the smooth surface and slight growth lines of earlier stages. The apex of the earlier shells is becoming buried and its form blurred under deposited material.

In the matter of the advantage conferred by the ridges of the adult shell one may note that a ridged sheet is stronger, weight for weight, than a smooth one (cf. corrugated iron), the ridges giving added strength at right angles to their orientation. Thus the great strength of Trivia shells is provided 'vertically' by the surface ridges and 'horizontally' by the thick columella and the incurling of the aperture to right and left. One may wonder how the small slot forming the aperture of a young adult becomes the longer slot found in older specimens. It would appear that the leading (growing) edge of the right-hand side of the aperture progressively envelopes the younger shell, lengthening its profile as it does so. It may also be that some re-absorption of shell material by the mantle takes place permitting enlargement of the aperture and continuous modification of its form especially at the incurled edges.

There appears to be some variation in the size of shell at which developmental changes appear. It is to be noted that the specimen shown in Figure 5 is larger (though less mature) than that shown in Figure 6 and it is common to find fully developed specimens of Trivia which are smaller than either of these.

All the illustrations given here were done using a binocular microscope with camera lucida attachment.

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J. E. Phorson, [REDACTED], Belmont, Durham, [REDACTED] August 1989

WEYMOUTH DREDGING TRIP, SEPTEMBER 9/10, 1989

It was a weekend to remember. A fire in the New Forest caused a monumental tail-back on Friday afternoon as M27 traffic was diverted onto country roads. Undaunted, we pulled out maps and navigated across the A and B roads of Hampshire and Dorset to Bournemouth and Weymouth. A lot of others were doing the same and doubtless speculating about the fire engines racing back along the way we had come.

A powerful wind on Saturday frustrated our plans to round the Bill of Portland to dredge in West Bay and off Abbotsbury. Dave Pitman, boat-owner and skipper, advised against it, and we don't argue with Dave. So it was east again along the coast, going over familiar 'ground', but this time dredging inside the Lulworth Bank in the lee of the Chalk cliffs. Five hauls at three stations, two of them empty, took us to the entrance to Lulworth Cove where I asked if we could move along the Upper Jurassic cliffs to the east of the cove while the last haul, from the Lulworth Scallop Beds, was being sorted. Dave obliged, moving slowly and close along the cliff of Portland Stone, surmounted by Purbeck Fossil Forest and Broken Beds, all the way to Mupe Rocks and into Warbarrow Bay. There we saw a fabulous succession of steeply-dipping Wealden sands and clays, absolutely complete with

Purbecks at one end and Chalk and Greensand at the other.

By now some of the sorters were getting distracted by the geology, and I asked for more. Warbarrow Tout loomed out of the gloom where white Portland Stone reared from the sea in a gigantic arch above black Kimmeridge Clay forming the celebrated Gad Cliff, but seldom seen from the sea. Then everyone was looking at the geology. Continuing, we stopped in Brandy Bay, just short of Kimmeridge Bay, for Bill Farnham to do a dive. Bill dives for marine algae and returned with a mysterious bag, the contents of which we never saw but, with Gad Cliff to look at, no one seemed concerned.

Soon it was time to return and Dave advised against another haul in Weymouth Bay. When we got there we understood why: the north-easterly driven waves were being obliquely intersected by reflected waves and the 'Black Tigress' plunged about like an unbroken horse. A lot of sea came aboard, helped by the wind, drenched us and drained away down the scuppers. It was quite impressive, but Dave, unperturbed, took us into a safe harbour past the crowd of small moored yachts, the masts of which were waving wildly in the swell.

As we unloaded gravel-filled bags onto the harbour, curious spectators looked in vain for the mackerel, cod and ling they might have expected; and we explained the scrapings from the sea bed by muttering about 'marine biology'. "Ah!" they exclaimed knowingly and moved on to other boats with more interesting catches. Later, in The Boot, oldest pub in Weymouth with stone mullions in the windows, we ate and drank modestly, distributing Lat. and Long. coordinates and tried to remember who found what and where. Two useful finds were Calliostoma papillosum and Pandora pinna, both alive in our Weymouth Area 3. Clean dry clothes, after a day of drenching sea, must be one of life's many unsung pleasures.

Sunday started with a down-pour at the south east end of the Fleet. 'Down-' seems hardly appropriate for rain driven nearly horizontally by the wind, and driving us into the lee shelter of the toilets. But not for long; soon we were conducting our usual search for Truncatella and Paludinella, finding both in that, still, amazing interstitial fauna in the shingle of Chesil Bank. It is not just the molluscs that amaze me, but the ophiuroids and the barnacles living about a foot down in wet shingle. Having seen it all before I prowled about looking at the shingle flora and, climbing to the brow of the bank, saw an entertaining sight on the seaward side. As far as the eye could see towards Portland, and the other way towards Abbotsbury, there were fishermen with rod and line, spaced out every twenty yards, each with a canvas shelter and large colourful umbrella. God help the fish unwise enough to venture too near that shore, for none would escape that phalanx of baited hooks.

The afternoon was spent at Church Ope Cove on the east side of Portland, just south of Rufus Castle, in much milder weather. There, on the undercliff, marked on the map as the 'Southwell Landslip', we searched for terrestrial gastropods lured out by the morning rain. Expert guidance was provided by leader Ian Killeen, backed up by Adrian Rundle; all amidst a fantastic landscape of tumbled, kitchen-sized blocks of Portland Stone. A fascinating place with enough interest to keep anyone 'off the streets'.

It was a surprise, but shouldn't have been, when everyone proclaimed at the end of the day, that the trip had been 'one of the best'. The weather had been pretty foul and upset a few stomachs on the Saturday, but we remained in high spirits, cracking jokes and making up puns on molluscan nomenclature, two of which "Nucula fallout" and "Buccinum barmaid" are attributable to the witty Mrs. Light. I for one will not forget the impact of Gad Cliff and its vertical wall of Kimmeridge Clay capped by Portland Stone, nor that miniscule pulmonate Truncatellina callicratis lurking beneath limestone slabs at Church Ope.

Phil' Palmer

A SCURRILOUS TALE OF A CONCHOLOGICAL TERM

Like everyone else over the age of ten I am aware that dictionaries contain words that are best avoided in polite company. But I was amused to find a conchological connection with such a word, which I will recount - and try to get it past the Publications Committee!

My three and a half inch thick, two and a half thousand page "Shorter Oxford English Dictionary on Historical Principles" has long filled me with admiration. It is a splendid work, endlessly useful and informative, but, as some wag once claimed "It's a rotten story but at least every word is explained". With it I finally mastered the spelling of 'until', 'parrot' and 'paroemia', but had failed to read the preface and the introductory pages that follow. In fact there are 22, or strictly xxii, pages before one arrives at "A (a) the first letter of the Roman and English Alphabet" and it was in such an academic and high-minded frame of mind that I resolved to repair the omission.

Dictionaries are full of surprises. I thought that C.T. Onions, in large letters on the title page, was the compiler of the SOD, but I learned that it was "William Little M.A., late Fellow of Corpus Christi College Oxford", together with H.W. Fowler and J. Coulson. He carried out the Herculean task of condensing the multi-volumed Oxford English Dictionary into the shorter version. During nearly two decades, 1903 to 1922, he "prepared entirely without assistance the manuscript for the letters A to T and V". Following his death in 1922 Fowler and Coulson completed the remaining letters.

Now I confess to having been vastly intrigued as to why, after slogging his way through A to T, he jumped U and finished V. What was so special about V that he couldn't wait to get at it? Certainly S, with 343 pages, and T with 161 pages are very long sections; but U and V have respectively only 49 and 46. So, I concluded that it was not the number of pages that put him off U: there seemed nothing for it but to scan the pages of V in search of a clue.

One of the first words to catch my startled and high-minded attention was 'vagina'; while one of the last few words was, perhaps not surprisingly, 'vulva'. An unworthy thought presented itself: "Surely", I thought, "surely not". However, not having read the definition of the last word since I was ten, I thought it time I was reacquainted with its true meaning. The first usage hadn't changed, but the second was entirely new to me - "2. Conch. An impression behind the umbones of Venus-shells 1840". "My word", I thought "I don't remember that at the age of ten" and concluded that my motives then may not have been all that high-minded. Perhaps they have remained that way for I have known for several decades why Carl von Linné gave the generic name Venus to certain heterodont bivalve molluscs. The reason is plain to see in the postero-dorsal region of most venerid bivalves.

Clearly, the next thing to do was to look up the definition of our familiar term for the same region - escutcheon. Following on from armorial and heraldic uses I found "d. Zool. An oval depression behind the beaks of certain bivalves 1854." Evidently, some high-minded zoologist between 1840 and 1854, aware that the two regions, in bivalve molluscs and higher vertebrates, were not homologous, had introduced the term 'escutcheon' for the former. Certainly the two regions are not homologous, but the bivalve escutcheon resembles a shield far less than it resembles the other place; so I wonder if the real reason for the change of nomenclature was some sort of scientific Bowdlerization. If so, it has not escaped my attention that low-minded botanists have allowed Phallus impudicus to stand, if you will excuse the expression, though the question of homology has never been seriously entertained, at least not in polite company.

So there you are - "Tut! What next?!" you may exclaim. Indeed, what next?! Well, I'll tell you what next. Knowing what a fruity-minded lot that 18th. century crowd could be I checked Linné's 1758 edition of Systema Natura to see what terminology he had used in defining his bivalve genus Venus. I can do no more than quote Linné himself.

"274 Venus Animal Tethys. Testa bivalvis, labiis margine antico incumbertibus. Cardo dentibus 3; omnibus approximatus; lateralibus apice divergentibus. Vulva & Anus distincta".

"For Pete's sake!" I thought. "So that's how he viewed the dorsal region of venerid bivalves". Retrieving a Venus verrucosa from my collection I could, with a certain orientation, see what he meant; but I had to admit that it betrayed the sort of experience one would normally keep quiet about.

From Linné's description it was clear that he used the latter term in the same sense as our familiar term Lunule which I found in the longer Oxford English Dictionary was introduced by Sowerby 1842 "3. Conch. The crescent-shaped depression in front of the umbo of bivalve molluscs". So, with the OED to hand I looked up - no, it could be better phrased - I looked for the second term under A to see if it had any conchological connections. I wish I hadn't, for there were two uses: the first was what one might have expected, but the second left me stunned "2. An opening at the base of some flowers 1730". I read it again and checked I was looking at the right word: I was. I read it again and noticed a reference to Martin, Phil. Trans. vol. 36, p. 380 which was but thirty paces away. In a flash I was up the library steps thumbing through vol. 36 and yes, there it was "These flowers have no Anus at the base." Staring wildly at those hallowed rows of Phil. Trans. I descended the steps muttering "Plants have no alimentary tract so why the devil should they have an ----?" when a kindly librarian asked me if I was alright and did I need help to find a reference. I use that library every day, so how could I explain what I was doing at the top of the library steps?!

Later, in the Common Room, I asked a palaeobotanist colleague if he had heard of that term used in that sense. He said I was mad, but without, I noticed, a trace of concern. I searched for an argument to refute his but none came to mind.

Stirring my coffee I wondered what I could possibly say to the men in white coats should they come for me as I lay prone in a flower bed staring through a x10 hand lens at the base of a crocus. Suppose I gave them the Phil. Trans. reference, would any of them bother to check to see if I was really talking gibberish?

"WHO REFEREED MARTIN'S PAPER?" I almost shouted out on the platform of South Kensington station. Then I realised that I had to get a grip on myself, learn to forget, my whole future was in jeopardy. I resolved not to tell anyone - but you know how it is - it is very difficult keeping something like that to yourself.

The moral of this tale is: Don't read prefaces; or you could very easily find yourself lying prone in a flower bed with a very angry crocus.

Phil' Palmer

MEETING OF THE EUROPEAN INVERTEBRATE SURVEY AT TUBINGEN

It is normal practice at European Malacological Congresses to hold a meeting of the European Invertebrate Survey in which each country present reports on the progress made on non-marine mollusc recording. The meeting held at Tübingen was chaired by Dr. Jungbluth who introduced the various speakers.

Dr. Berger explained the data-base on a main frame computer system using the

Rapid Management Information System set up for German records and the linking of this system with input from compatible personal computers. The scheme now has one full-time member of staff and about 15 people contributing data. Dr. Van Goetham showed the Atlas which had been produced for Belgium with their fauna of 199 species. Using as examples Deroceras caruanae, Pyramidula rupestris and Balea perversa he was able to show how maps can document the increase and decrease of distributions of molluscs and he pointed out the decrease in range of 50% of the Belgian species that had been evident in the last 20 years. Dr. Okland reporting for Norway outlined the work of Dr. Walden of Sweden who is now recording terrestrial molluscs in Norway and also that of Dr. J. G. J. Kuiper on Pisidium, which adds to the existing data collected by Dr. and Mrs. Okland on freshwater faunas in Norway. UTM maps (50km grid) were presented for small bivalve species.

Dr. Walden reported on the situation in Sweden where he has been involved in amassing a considerable amount of data but using a manual system since there is no official funding for computer facilities. He is now expanding his work to include Scandinavia as a region, including northern parts of the Arctic circle and he pointed out a need for help with mapping Danish molluscs.

Dr. Valovirta from Finland explained the complex committee structure but was pleased to report that a member of staff has just been appointed to manage their mapping scheme. Present work and funding are biased towards endangered species, hence the current programme with freshwater pearl mussels. Satellite pictures are being used to study vegetation cover.

Dr. Van Knorre, reporting for eastern Germany showed some of their recent publications. For western Germany Dr. Jungbluth outlined the division of work into regions with a view to published lists, atlases and bibliographies for each region. The bibliography already produced for Bulgaria was then circulated. Dr. Wiktor reported on the progress with mapping the 27 bivalve and 47 gastropod species in Poland.

Dr. Turner of Switzerland reported on the mapping scheme started in 1983 which has one full-time member of staff. The group also run seminars in universities to introduce and interest students in mapping projects.

Dr. Richard Preece presented the report for Britain which is given later. The meeting was concluded with a report from Miss Susan Wells on the IUCN voluntary mollusc specialist group. A draft has been prepared for an action plan on mollusc conservation on a global basis which would be discussed at a separate meeting in Tübingen at the end of the Congress. She requested the support of the European Invertebrate Survey in this work.

June Chatfield

STREPTAXIDS IN THE NATIONAL MUSEUM OF WALES

During the Conchological Society meeting at the National Museum of Wales, Cardiff on 15 April 1989 I examined the collections of Streptaxidae. These are extensive but as with so much of the Melvill-Tomlin collection the labels are often very inadequate as to provenance and collector. Many too, had only specific names. This is a frequent practice particularly with entomologists where different species are pinned in ranks under a generic heading. Tomlin and others had a similar system where the generic name was often not put on individual boxes. It cannot be emphasized often enough that full data needs to be put on each container since when the collection is moved or broken up it may be impossible for the new owners to identify the specimens. Few people now have an encyclopaedic knowledge of the world's molluscs - at most they know the fauna of one or two areas fairly well or

one or two families worldwide completely. They are at a loss in an area foreign to them or with families they have not studied. I managed to put generic names on quite a few boxes of African Streptaxids but it would need some weeks of work with all available literature to hand to thoroughly name the material.

Many of the specimens are probably paratypes but in the absence of proof are at least authentic. It is well known that Preston distributed and sold masses of material to many private collectors and museums. His collectors in the field such as the game warden Blayney Percival in Kenya must have collected large quantities of material, often in places never again visited by a mollusc collector. It is not possible to know now if the material distributed under a given name is truly a paratype or merely topotypic. Occasionally duplicate material purporting to be conspecific consists of two or more different species.

It is not my intention to give long lists of species but merely to draw attention to the wealth of material present. A few examples will suffice.

Species described by Preston - probable paratypes (modern names with Preston's generic disposition in brackets)

<u>Tayloria desiderata</u> (Streptaxis)	<u>Tayloria urguesensis</u> (Streptaxis)
<u>Gonaxis gwandaensis</u> (Streptaxis)	<u>Gonaxis percivali</u> (Streptaxis)
<u>Gonaxis woodhousei</u> (Streptaxis)	<u>Gonaxis elgonensis</u> (Ennea)

Species described by others - certain or possible paratypes

<u>Gulella puella</u> Connolly	<u>Gulella gaudionii</u> (Dupuy) (Streptaxis)
<u>Gonaxis ordinarius</u> (Smith) (= <u>denticulatus</u> (Dohrn)) (Streptaxis)	
<u>Gonaxis nsendweensis</u> (Putzeys) (Streptaxis)	<u>Gonaxis translucidus</u> (Dupuis & Putzeys) (Streptaxis)

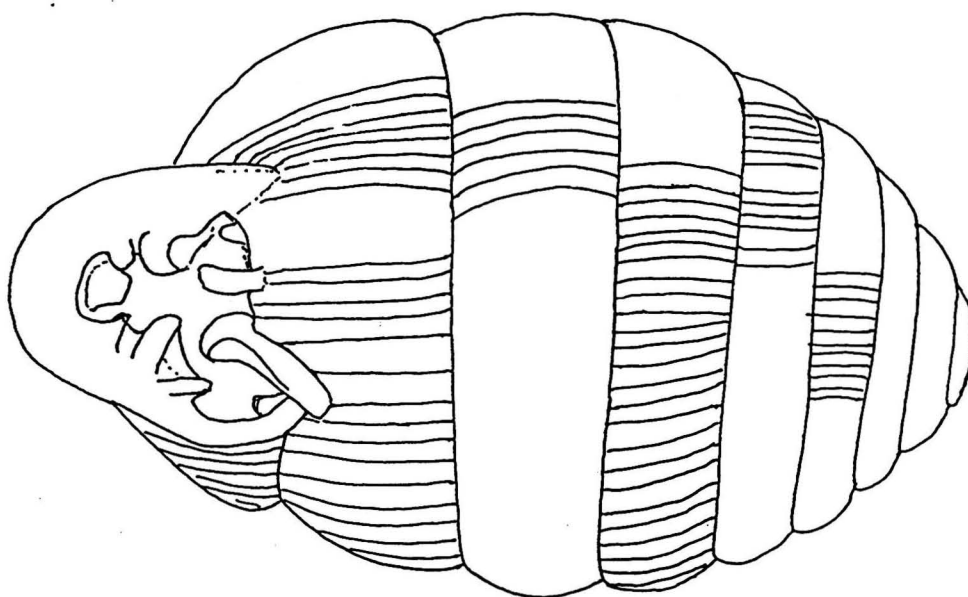
Extension of range

Tayloria desiderata Kenya, Larogi Hills

Very often the localities of the putative paratypes are vague, e.g. 'Upper Congo' and one wonders if there was some reason for not giving the precise locality stated in the original description. Possibly in some instances material was filtered from lots destined for a single collection of a museum who actually paid the collector. Official duplicates sent out after description are mostly fully documented.

A few lots which particularly interested me I borrowed. Notes on these follow. One lot labelled Gulella subringens (Crosse) from the T. Pain collection particularly caught my eye. This was first described by J. C. H. Crosse (1885) as Ennea ringens but a year later he renamed it E. subringens since ringens is preoccupied by Albers. Crosse gives the locality for this (and two other species described at the same time) as 'Habitat in montibus regionis Usagara dictae, Africae orientalis (teste R. Damon)'. It is clear he obtained his material from the Weymouth dealer Damon. The Pain lot bears the locality Mamboia which is not mentioned by Crosse. One wonders who collected the material sold by Damon. The only person to my knowledge who went to the area at the right time was J. T. Last (see my brief account, 1980). As far as I was aware all his material went to Smith at the British Museum but it seems likely some found its way to Damon but was shorn of both collector and accurate locality. Gulella subringens is virtually unknown and probably never re-collected so I am re-figuring it here (Figures 1a, b). The two specimens had slightly different dentition not agreeing exactly with my key (1962).

A lot with neither locality nor collector but almost certainly from the Mathews Range in Kenya is I feel sure my Gulella aekei (1985) but I am now rather unsure how distinct this is from G. copiosa (Preston) also from the same range. I have examined three paratypes in the British Museum (Nat. Hist.) and they are more slender than G. aekei. There are also 8 further specimens from the Larogi Hills



2mm

Figure 1a

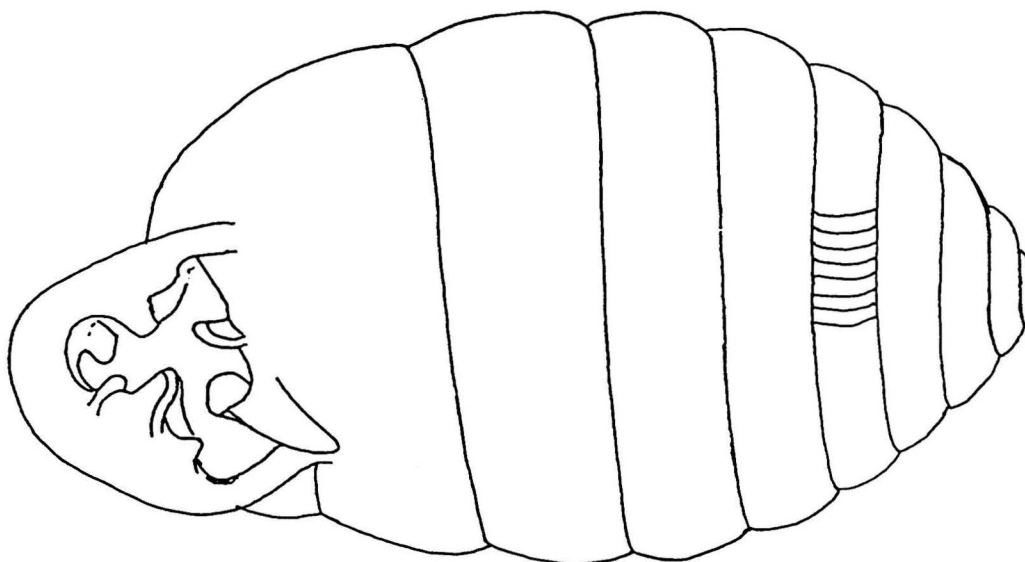


Figure 1b

Gulella subringens (Crosse). Two shells from Tanzania, Nguru Mts., Mamboia.
Only some sculpture is indicated.

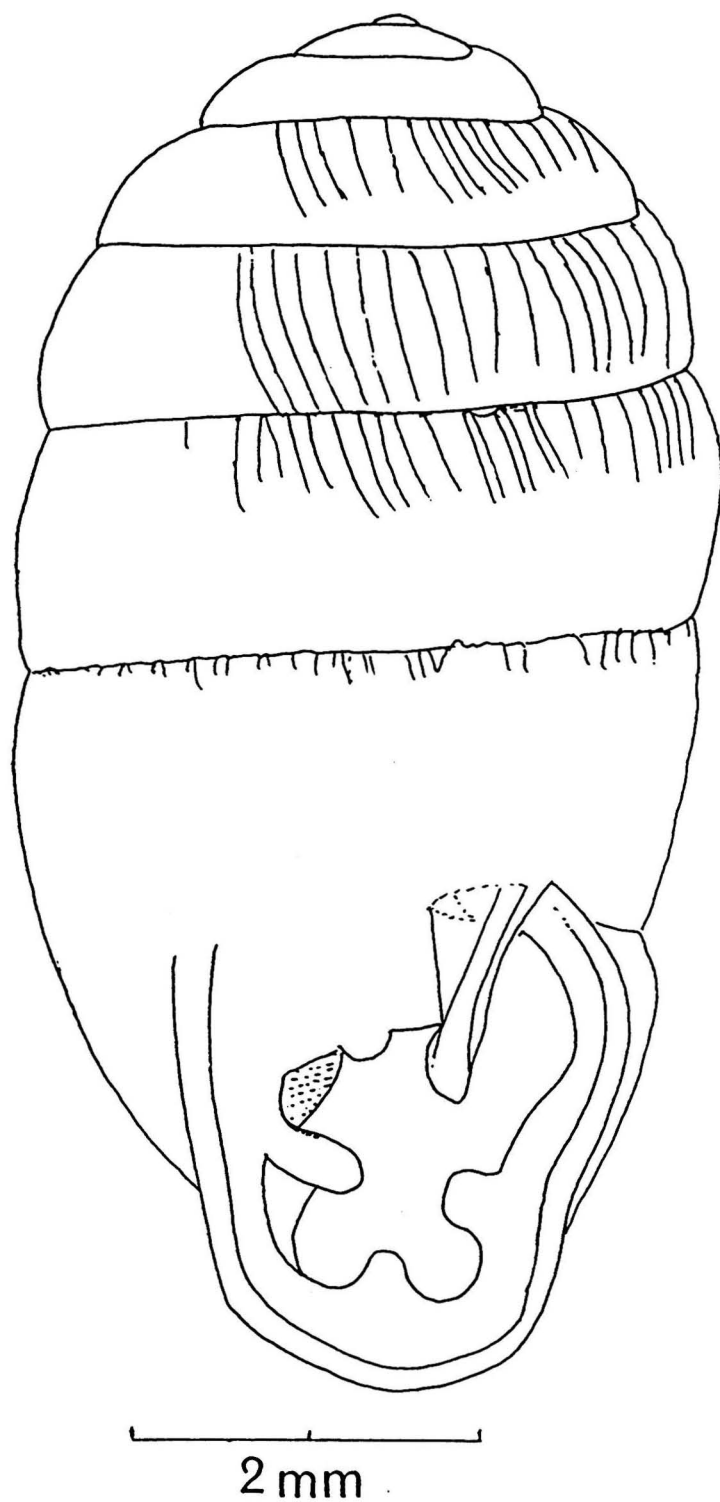


Figure 2

Gulella sp. near G. fortidentata (Smith). Kenya/Uganda, Mt. Elgon.

marked as paratypes but Preston does not give this locality in the original description. It seems likely that my G. aekei and G. aversostriata are no more than forms of G. copiosa and that the dentition is variable; the material is, however, inadequate to verify this.

A specimen from Jombeni (= Nyambeni Hills) is probably Gulella odhneriana Dupuis (arthuri Preston) and another from Voi G. cf. laqueus not previously reported from so far east.

A shell from Mt. Elgon resembles Gulella fortidentata (Smith) but differs in lacking an upper outer lip lamella and in being distinctly ribbed not with merely the suture denticulate. I have so far not identified it with any known species. I have figured it here (figure 2).

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B. Verdcourt

JOHN READE LE BROCKTON TOMLIN (1864-1954)

I first met Tomlin in the Mollusca Gallery of the British Museum (Natural History) in either 1925 or 1926. My mentor the late R. J. Welch had told me that if I ever happened to visit the BM I must "see Tomlin". So when I did get to the BM as a 17-year-old I made my way to the Mollusca and there was a good-looking elderly man. I enquired hesitantly if he could tell me where I could see Mr. Tomlin as I had been told to ask for him. "I am Tomlin" was the reply and from that day on I was taken firmly in hand, conchologically speaking. I spent many happy visits, all too brief for all I wanted to ask him, with him and his wife in the St. Leonards home. Crammed with shells and every conceivable book, pamphlet or journal connected with Mollusca it was a Paradise to me. He was very generous to me in the way of papers, an occasional book, and often specimens. He procured for me a nice copy of Forbes & Hanley - for £3!

From our first meeting almost until his death in 1954 we kept up a regular correspondence, enquiries on my part, and generous replies on his, usually accompanied by a spare separate ("I find I have some duplicate separates for you").

Physically, he was shortish, with a fine head of snowy hair and an alert air. The photograph of him in the Journal of Conchology, vol. 24, no. 2, is a good likeness and he was innocently proud of it.

His own thralldom to the Mollusca dated from his schooldays when he received a letter or two from the great J. Gwyn Jeffreys and I think he knew personally almost every conchologist since Jeffreys. He went dredging in Birterbuoy Bay in the west

of Ireland with Canon Norman (I gather that both were poor sailors and had to have "spells" ashore in which to recuperate). Visits to the Continent enabled him to meet many Continental workers, especially Monterosato who gave him named specimens of many of his new spp. His years of voluntary work at the BM meant that he met fellow-enthusiasts from all over the world. He was very pleased when he was made a Trustee of the BM and wrote proudly to tell me. He was primarily a collector and not much interested in the living animal. I do not think he ever looked at a radula or did any dissecting.

His knowledge of the Mollusca was encyclopaedic and of the relevant literature also. He undoubtedly preferred the marine spp., and in his later days tended more and more to specialise in the South African fauna, perhaps because of his friendship with T. A. Stephenson.

Although he would talk freely - and entertainingly - of the many scientific workers he had known he could not be persuaded to put down his knowledge for the benefit of others.

He grew up in Chester, in the big Sandy Lane house later occupied by Gordon Smith the lepidopterist, and there are "Tomlin" specimens in the collections of the Grosvenor Museum there (now on loan to Liverpool Museum). During the Chester years he knew and visited F. P. Marrat (1820-1904) and H. H. Higgins (1814-1893) of the patriarchal beard, as well as the two Archer brothers (Samuel and Francis).

When at long last his doctor decreed that he must no longer go up to the BM regularly he wrote cheerfully to me that even if he could no longer go up and meet people they came down to St. Leonards to see him, so that he kept in touch with conchological matters.

When he died in December 1954 I lost a dear friend of many years.

Nora McMillan, Department of Zoology, Liverpool Museum

THE BRITISH MARINE WORKSHOP

The 1989 British Marine Workshop was held in Godalming on the 25th. November and by ten o'clock that morning a group of eager conchologists had converged on the welcoming home of Jan Light. A rich programme of topics was provided for the day.

Welcome visitors to the Workshop were Jenny Mallinson and Ken Collins from the Department of Oceanography at the University of Southampton and they began the day with a fascinating talk, illustrated with slides, on sub-littoral collecting and recording. Their underwater photographs of marine life and habitats were excellent. Their current work is directed towards recording all marine life, not just molluscs, along the central south coast of England and their slides included some which showed how marine life has established itself on an artificial reef constructed from gypsum blocks made from the ash of a power station.

The next activity was devoted to the identification of Turrids. A sheet of illustrations and a key were provided together with good examples of all the main species likely to be encountered in British waters. The specimens could be handed round for examination and for comparison with the participants' own specimens.

The Workshop was planned to be a blend of formal and informal activities and it was so arranged that the latter part of the morning could develop into separate discussions on any topics related to molluscs. Difficulties were discussed in informal small groups or pairs, specimens were passed round for examination or comment

and help was offered in identifications.

The afternoon session began with an illustrated talk by Jan Light on the theme of recording on a rocky shore, a theme which appropriately complemented the morning's talk on sub-littoral recording. With her excellent slides Jan illustrated various zonations of a rocky shore, the many particular habitats in which molluscs may be found, and techniques of collecting and recording.

The British species of Patella are not as easy to identify as it may appear and the illustrations in books are not always helpful. The next part of the programme was therefore devoted to these species: dead shells and live specimens were provided of P. vulgata, P. aspera and P. depressa and there was discussion on the diagnostic identifying features of each. Afterwards, the meeting broke up again into informal groups and discussions on any topics that came up.

The mixed programme was of benefit to participants at all levels of knowledge and experience and no beginner would have felt out of place in the group. When conchologists meet there is never a lack of topics for discussion and there was throughout the Workshop a marked atmosphere of friendliness and willingness to help which we all benefited from. The pleasure of making personal contacts was not least among the benefits of the occasion.

There were present Ian Killeen, Phil Palmer, Christine Street, William Penrice, John and Joan Llewellyn Jones, Malcolm Symonds, Bill Pocock and, of course, Jan Light and the writer. Our special thanks are due to Jan who hosted and organised the Workshop, to Ian who gave valuable support in the preparations and to Jenny Mallinson and Ken Collins who joined us from Southampton.

Ted Phorson, [REDACTED], Belmont, Durham, [REDACTED]

PUBLICATIONS RECEIVED

Poirieria Vol. 15, No. 6, April 1989. Published by the Conchology Section of the Auckland Museum. Editor Ian Scott, [REDACTED], Balmoral, Auckland 4, New Zealand.

Articles of general interest include the following; The Cominella nassoides complex by Dave Gibbs and Ian Scott: a bewilderingly variable group; A closer look at Maricopsis octagonus by Ian Scott, again a variable species which the author efficiently clarifies; some notes on a newly described abyssal gastropod living on sulphur bacteria surrounding hydrothermal vents, by Nancy Smith - the article is unusual in that the mollusc has still to be named.

There are notes on some Buccinulum species from Fiordland by Dave Gibbs and Noel Gardner provides useful hints for shell show exhibitors. The publication is illustrated with very fine colour photographs of the species reviewed.

Nature Conservancy Council, 15th. Annual Report: 1 April 1988 - 31 March 1989.

It is natural at this time, that the NCC should feel threatened by the proposed radical administrative changes put forward by the Government, changes which to say the least, seem controversial. In spite of all the past work of the NCC, never have all aspects of the natural world in this country been under greater threat than at present and a very strong counterbalance is needed against the inroads of concrete and commercialism. The situation has of course moved on since the termination date of this report, and the development of the A3 Winchester bypass, to take an example, goes to prove that no sites of natural, beautiful or historic importance can be regarded as safe anywhere when needed by the all-powerful road lobby,

intent on saving motorists those few extra minutes.

Meanwhile, the useful work of the Council goes on, and its activities, as fully recorded in the Report, are manifold. The Report comes in the well-known format, with excellent illustrations and much of what it has to say brings good cheer, but at the same time, the Chairman points out that after some years of expansion in line with growing public interest and increasing responsibilities, the NCC now faces a significant reduction in resources and a likelihood of more cuts. Work programmes are having to be cut and staff reduced at a time when damage and the pressure of development are undoubtedly increasing. A large number of SSSIs are suffering some damage and the use of Private Bills to circumvent planning procedures is another unwelcome development.

One cheerful note is the rise in importance of voluntary conservation bodies and the excellent co-operation which has been set up. The concern is widespread and it is essential that the demand should be met. Sponsorship is doing a great deal but increased Government support is really needed now.

T. E. Crowley

Geographical distribution of the small mussels (Sphaeriidae) in North Europe (Denmark, Faroes, Finland, Iceland, Norway and Sweden) by J. G. Kuiper, Karen Anna Økland, Jørgen Knudsen, Lauri Koli, Ted von Proschwitz and Ilmari Valovirta. Distribution maps of 23 species presented based on more than 11,000 revised samples from 10 zoological museums, etc.. [Reprint with The Newsletter Editor]

REPORT OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND TO EIS

Since the publication of the Atlas of the Non-marine Mollusca of the British Isles (Kerney 1976), the Conchological Society of Great Britain and Ireland has continued to collect 10 km square records of non-marine molluscs under the direction of the Non-marine Recorder, Dr. M. P. Kerney. Sufficient new material has now been added and changes to distributions noted to warrant the publication of a second atlas.

The new atlas will differ from the 1976 edition in several respects. First, the date categories have been altered so as to differentiate between records made before and after 1965 (as opposed to 1950). Second, coverage of fossil material will be extended to include Late-glacial as well as Post-glacial records, the former distributions and several taxa now extinct in the British Isles will consequently be included. To make it more useful to non-malacologists using it for conservation work, an explanation of the distribution and ecology is to accompany the map for each species. The spread of recently introduced molluscs like Boettgerilla pallens will be a feature of the new atlas.

Some counties are now being mapped on the tetrad system, which, being smaller units, better reflects relationships between mollusc distribution with geology and habitat.

Due to reduction in Government funding, the Biological Records Centre, who financed the publication of the first atlas, will not be able to take on the second, so a different source is being investigated.

June Chatfield and Richard Preece

SNAILS FOR SALE

As a result of the Biological Recording in Scotland Campaign's freshwater

mussel survey, my attention was drawn to an advert. in the National Press offering Aquinos for sale as a means of maintaining crystal clear water in garden ponds. My curiosity aroused, I wrote for samples and in due course received a parcel clearly labelled in large type 'BIOLOGICAL SPECIMENS, *FIRST CLASS!*, PERISHABLE, AMERICAN WATER SNAILS. On opening the parcel I encountered a small polythene bag containing some damp water weed wrapped around a medium sized example of the common Swan Mussel, Anodonta cygnea (Linnaeus) together with an invoice for £5.30 plus postage. Further enquiry revealed that the firm also supply foreign pond snails for ornamental ponds which I am led to believe are Viviparus sp.

Following this a colleague in the Glasgow Museum drew my attention to the fact that a local pet shop were also selling freshwater mussels for use in aquaria, these being reputedly from Singapore. He duly purchased an example on my behalf for the sum of £1.90 and this also proved to be Anodonta cygnea, which, as far as I am aware, is not native to Singapore, the example in question being of European origin.

Inquiries indicate that Pet shops throughout Britain sell not only freshwater mussels and pond snails but land mollusca and marine species including gastropods belonging to Conus and Cypraea, sea slugs, and bivalves. These sales raise the following questions:

1. The potential health risks to man through direct injury, as in the case of Conus sp., or infection through diseases transmitted into the pond or aquarium by the molluscs, which presumably have not been under quarantine.
2. The detrimental effect the introduction of alien species would have on the native species as amply demonstrated by the introduction of the Asiatic clam, Corbicula, into the freshwater river systems in North America.
3. The distortion of distributional patterns of native British Mollusca. Here again even introductions of native species in new localities may have disastrous consequences for critical species unable to compete with introductions in their area.
4. The effect of uncontrolled removal of animals from the wild on natural populations, especially critical or endangered species.

In order to assess the extent of the problem it would be helpful if members could check their local Pet Shop to see if any Molluscs are being sold there and, if so, what species are involved. I would appreciate it if members could pass on their observations to me in order to determine the extent of the problem.

Fred. R. Woodward

Natural History Department, Art Gallery & Museum, Kelvingrove, Glasgow, G3 8AG

GENERAL NOTES

Shells in Graveyards

I have seen shells closely associated with graves in an almost subconscious way over the years. Is there a folklore/mythical or even religious explanation for this? Consideration of this was brought on by a visit to Killiecrankie at which several gravestones were decorated with Strombus gigas. Perhaps some association with a maritime life style may be a partial reason. Killiecrankie is about as far away from the sea as one can get in Scotland, never mind the South Seas, and scrutiny of the inscriptions gave no clues. Perhaps the more prosaic use of these conchs as flower holders in the absence of, or a more attractive substitute for, glass jars is an explanation which could hold water (!). On the other hand a page of a previous issue of the Conchologists' Newsletter probably carries an exposition on the subject which I have not seen. Can any reader elucidate?

E. G. Hancock, Glasgow Museum

ANNUAL GENERAL MEETING OF THE CONCHOLOGICAL SOCIETY OF G.B. & I.

At the A.G.M. on 17th. March, Alan D. Seccombe was elected Hon. Treasurer; the following were elected to Council (replacing those retiring) - Ms. J.E. Reynolds, Dr. A.J. Rundle and Mr. M.F. Symonds. All other Officers and Council members were re-elected. Mr. I.J. Killeen is Programme Secretary, that is for both indoor meetings and field meetings, Dr. M.J. Willing is Conservation Officer.

EXCHANGE WANTED. Filomena M.C. Amarin, [REDACTED], Maputo, Mozambique, wishes to exchange marine shells with other collectors. Her interests are mainly the Muricidae and Volutidae and she collects from Mozambique. Please write and make contact.

COPY DATES FOR NEWSLETTER CONTRIBUTIONS

Copy for the March	issue should reach me	before	6th. January
" " " June	" " " "	"	6th. April
" " " September	" " " "	"	6th. July
" " " December	" " " "	"	6th. October

Newsletter Editor

THIRD INTERNATIONAL MEETING ON LITTORINID BIOLOGY - 5 to 12 September 1990, at the Dale Fort Field Centre, Wales, U.K. First announcement and call for contributions. Following the very successful meeting held at Tjärnø in Sweden in 1988, we are organising a meeting on Littorinid biology to be held at Dale Fort this year. We hope to attract workers interested in the ecology and systematics of this fascinating group, which is the centre of growing attention and of much fruitful work. The meeting will also interest those working in the wider field of the biology of intertidal gastropods.

Dale Fort, on the Pembroke coast of south west Wales, is surrounded by a variety of excellent shores on which all the British species of Littorina can be seen and a good deal else besides. We intend that an important element of the meeting should be field trips and workshop sessions. The likely cost of the meeting will be about £120 including full board and registration fee.

It is intended that the proceedings of the meeting should be published; we hope by the Malacological Society of London. If you would be interested in attending the meeting and, we hope, giving a paper or papers, please write soon to one of us at the address below.

Dr. J. Grahame or Dr. P.J. Mill, Department of Pure and Applied Biology, Baines Wing, The University of Leeds, Leeds, LS2 9JT, U.K.

Please send further information on the Littorinid Meeting.

Name: Title:

Address:
.....

I would like to offer a paper on:
.....

EDITORIAL COMMENT

It has come to my knowledge recently that certain members of Council and a former secretary have expressed dissatisfaction with the Conchologists' Newsletter and have claimed that it does not meet the requirements of the members. However, no evidence in the form of names and specific complaints have been produced. I, as Honorary Newsletter Editor, have not received any criticisms or complaints from members during the past 26 years. Obviously any comments relating to the Newsletter should be made to me in a straightforward manner and not to a third party.

Since the Newsletter is produced for all the members of the Society and not merely for a small minority, it seems only right to consult the membership. So, will you please let me know if you wish this Newsletter to continue in the present form and whether it does, or does not, meet your requirements (bearing in mind the limitations of finance and the range of contributions submitted).

Those of you who have read my editorial article in issue No. 100 will be aware of my aims: to produce the Newsletter regularly and promptly with a good standard of English and accuracy and with as varied a selection of items as the material submitted will permit. I believe I have achieved these aims. I think it would be a great pity if the smooth running of a successful publication were to be disrupted as the result of the eagerness of some individuals for change just for the sake of change.

So let me know your feelings. If I do not hear from some of you for various reasons I shall naturally assume that you support the Conchologists' Newsletter in its present form.

P. E. Negus, Honorary Newsletter Editor, May 1990

ADVERTISEMENT

If you are interested in malacological journals such as JOURNAL DE CONCHYLIOLOGIE, please contact: Dieter Schierenberg BV, Rare illustrated books and periodicals on Natural History, [REDACTED], 1016 HP Amsterdam, Netherlands.
Tel.: [REDACTED]; Fax: 20-265650. All catalogues free upon request.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Applications published in the Bulletin of Zoological Nomenclature

The following applications were published on 27 March 1990 in Vol. 47, Part 1 of the Bulletin of Zoological Nomenclature. Comment or advice on these applications is invited for publication in the Bulletin and should be sent to the Executive Secretary, I.C.Z.N., c/o. The Natural History Museum, Cromwell Road, London, SW7 5BD.

Case 2547 CYMATIINAE Iredale, 1913 (1854)(Mollusca, Gastropoda) and CYMATIINAE Walton in Hutchinson, 1940 (Insecta, Heteroptera): proposal to remove the homonymy.

Antti Jansson
Zoological Museum, P. Rautatiekatu 13, SF-00100 Helsinki, Finland.

Alan G. Beu
New Zealand Geological Survey, DSIR, P.O. Box 30368, Lower Hutt, New

Zealand.

Abstract. The purpose of this application is to remove the homonymy between the molluscan family-group name CYMATIINAE Iredale, 1913 (1854) and the insect family-group name CYMATIINAE Walton in Hutchinson, 1940. It is proposed that the latter be altered to CYMATIAINAE by changing the stem of the type genus *Cymatia* from CYMATI- to CYMATIA-.

- Case 2641 Limax fibratus Martyn, 1784 et Nerita hebraea Martyn, 1786 (actuellement Placostylus fibratus et Natica hebraea; Mollusca, Gastropoda): conservation proposée pour les noms spécifiques; et Placostylus Beck, 1837: désignation proposée de L. fibratus comme espèce-type.

Philippe Bouchet

Museum National d'Histoire Naturelle, 55 rue Buffon, Paris, France.

Abstract. The purpose of this application is to conserve two gastropod names, Limax fibratus Martyn, 1784 and Nerita hebraea Martyn, 1786, which were published in *The Universal Conchologist* by T. Martyn (1784-1787), and to designate L. fibratus as the type species of Placostylus Beck, 1837. Although in use, the specific names are at present formally unavailable because Martyn's work has been rejected as being non-binominal (Opinion 456, March 1957).

- Case 2558 Proptera Rafinesque, 1819 (Mollusca, Bivalvia): proposed conservation.

Mark E. Gordon

Tennessee Cooperative Fishery Research Unit, Department of Biology,
P.O. Box 5114, Tennessee Technological University, Cookeville,
Tennessee 38505, U.S.A.

Abstract. The purpose of this application is to conserve the name Proptera Rafinesque, 1819, for a genus of North American freshwater mussels, by the suppression of the senior objective synonym Potamilus Rafinesque, 1818.

THE CONCHOLOGISTS' NEWSLETTER

No. 114

ISSN 0573-2336

Newsletter Editor: P. E. Negus,

Market Harborough,
Leicestershire,

September 1990 COPYRIGHT

Produced by THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

FILLING A GAP

Whatever we may find just cause to complain about, there is one area where we should be well contented. There is no shortage of first class illustrations of British molluscs: Fretter and Graham, Thompson and Brown, Kerney and Cameron, Ellis, and Tebble have almost made Forbes and Hanley redundant; almost, but not quite. Despite the riches there are still a few gaps where one is at a loss for a good modern illustration, and one of these is our top-shore British marine pulmonates. There are, in fact, drawings of Ovatella, Leucophytia and Otina in Nora McMillan's book "British Shells"; but, unlike the excellent text, these drawings exhibit, shall we say, a certain divorce from reality.

At one time or another all of us have stared at one of those brownish-white 'land-snails' found at the top of sheltered shores and wondered "Is it a 'Whatsit' bidentata or a 'Thingy' myosotis: even the correct genus escaping us. Any attempt to put a name on it will result in half your library off the shelves trying to find a figure of 'Whatsit' or the other one. The trouble lies with all those teeth in the aperture of both of them. Kerney and Cameron, surprisingly, figure neither species and, after leafing through the book twice, I read the title "A Field Guide to the Land Snails of Britain and North-west Europe". Surely these top-shore pulmonates qualify as 'land snails', for they are never found living in among Corallina nor in the Laminaria zone, and never dredged in 60m offshore. But there it is, no one, it seems, loves our Elobiids.

However, as any list will show, there are four British top-shore marine pulmonates and, typically, there are twice as many names as species; but no illustration to compare with those of Fretter and Graham et al listed above. So, on the assumption that I am not alone in this predicament, I made some sketches of three of them and raided that endlessly useful book Collins 'Sea-Shore-Guide' for the fourth. My sketches are not in the G. B. Sowerby-league, but they do bring out the essential features and, perhaps, may be excused on those grounds.

Ovatella myosotis (Draparnaud 1801) Figure 1.

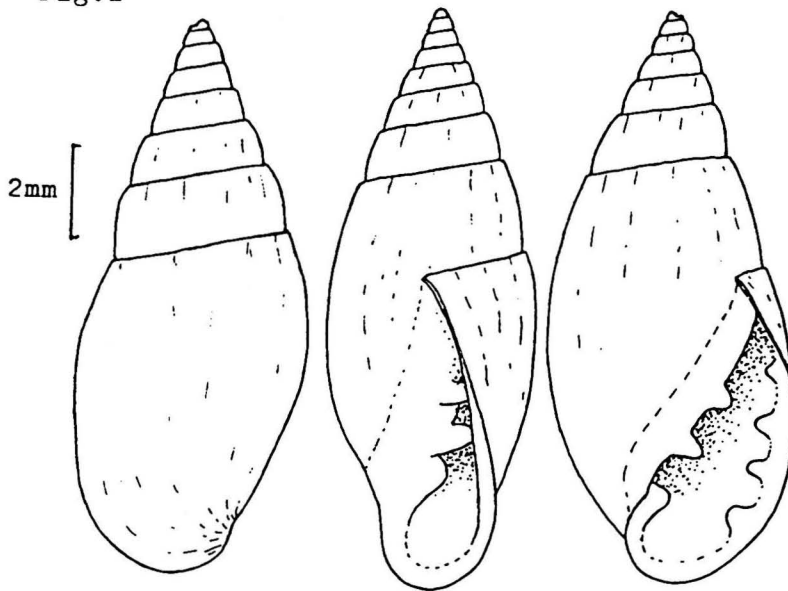
Shell up to 12mm high, semitransparent and pale reddish-brown. The aperture is about 46% the total height of the shell, with three teeth on the columella and a variable number, one to four, just inside the outer lip. The animal has thick tentacles which are slightly annulated in the middle and streaked with purple. It is typically found in salt marshes near the top of the shore, and doesn't seem too fussed when covered with salt water.

Leucophytia bidentata (Montagu 1808) Figure 2.

Shell up to 7-8mm high, white, solid and opaque in the adult, with a shorter spire than O. myosotis. The aperture is about 48-50% of the total height of the shell, with two teeth near the base of the columella but none inside the lip. The animal has short flattened tentacles. It is also found in salt marshes near the top of the shore and also under stones on sheltered shores. Some Ovatella may have very

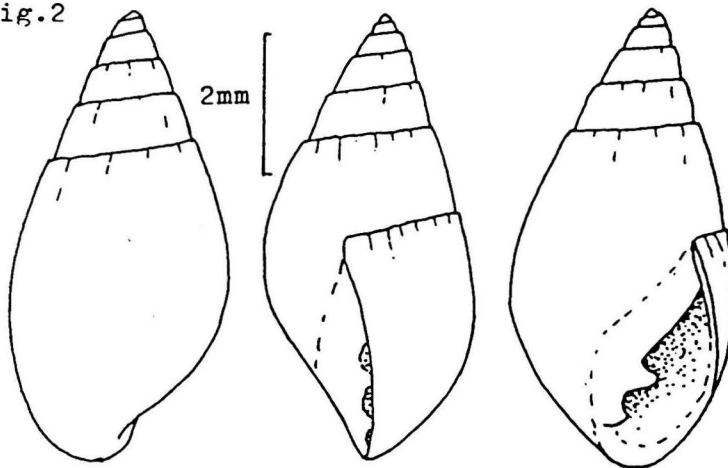
BRITISH MARINE PULMONATE GASTROPODA

Fig.1



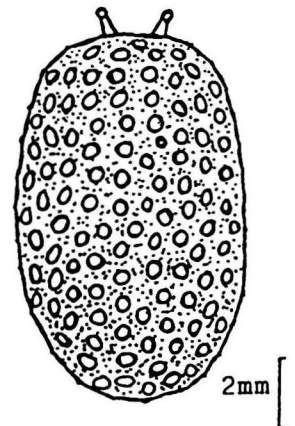
Ovatella myosotis
(Draparnaud 1801)

Fig.2



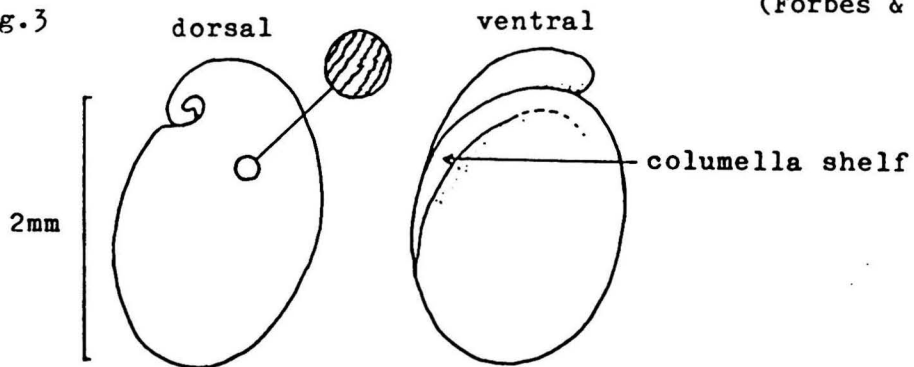
Leucophytia bidentata
(Montagu 1808)

Fig.4



Onchidella celtica
(Forbes & Hanley 1852)

Fig.3



Otina ovata
(Brown 1827)

pale shells and poorly developed teeth inside the lip and, consequently, look confusingly like a Leucophytia. If the animal is present the tentacles should separate them, if not, seek counsel of an expert.

Otina ovata (Brown 1827) Figure 3.

Shell minute, up to 3mm, of which the expanded aperture makes up nearly all of that dimension. The shell is rather like a Haliotis in form, but without the holes: it is smooth with faint irregular radial striations, thin and pale brown, expanding rapidly. The animal is white and extends beyond the edge of the shell all round, so that it is unable, like a limpet, to withdraw into its shell. It is found on rocky shores in crevices and empty barnacle shells, from the upper part of the middle shore to the upper shore.

Onchidella celtica (Forbes & Hanley 1852) Figure 4.

The body is up to 12mm long, without a shell, dark greyish-green and covered with rounded tubercles. The tentacles are short and thick, with bulbous eyes on the tips - hence its inclusion in Stylomatophora. It is found in crevices in rocks in Cornwall mainly on the upper shore: MacMillan also records it from Loch Fyne in west Scotland. At first glance this pulmonate could be mistaken for a dorid nudibranch, but the absence of paired rhinophores just behind the head, and lacking a circle of gills on the postero-dorsal surface, confirms that it is not a nudibranch. Nevertheless, there has been some discussion as to whether it is an opisthobranch or a pulmonate. But, since Thompson & Brown have excluded it from their Linnean Society monograph of "British Opisthobranch Molluscs", there seems good reason to regard it as a stylomatophoran pulmonate - though a very odd one for all that. There is a good illustration of this species in Barret and Yonge's "Guide to the Seashore" which is here reproduced; and a photograph in Yonge & Thompson's "Living Marine Molluscs" which shows two specimens living among barnacles, indicating that their range must include at least the upper part of the middle shore, so that they are covered by tides twice daily.

Phil' Palmer

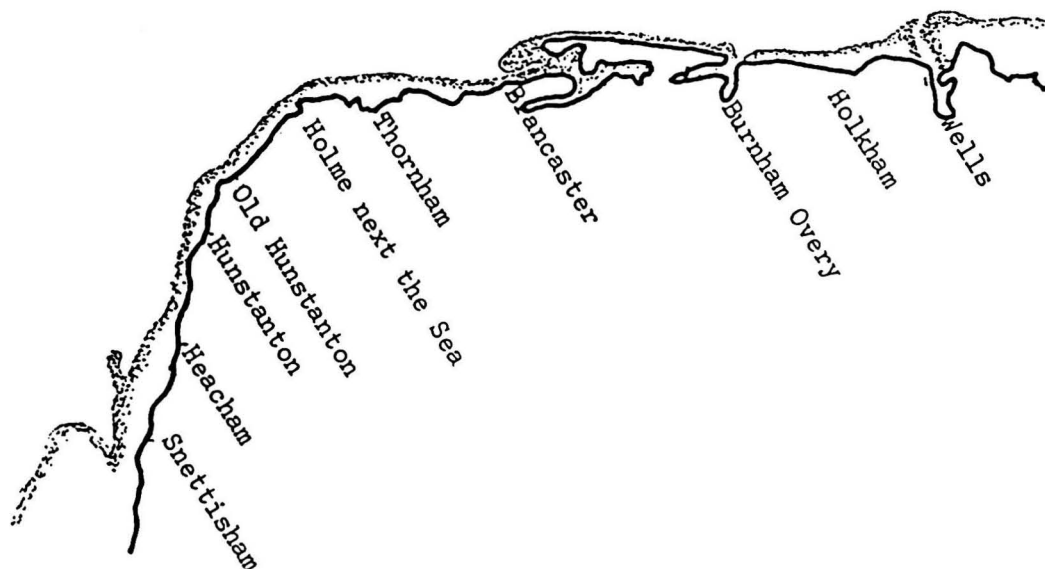
THE ARRIVAL IN BRITAIN OF ENSIS AMERICANUS (BINNEY)

While walking the strand line of Holme beach in North Norfolk on the 10th. April 1989 I picked up ten small razor shells, one shell had traces of the animal inside, the remainder were empty, all the shells were in perfect condition. The largest shell measured 111mm x 18mm, the smallest 105mm x 17mm.

At the time of collection I was not sure what these shells were, they looked a little like juveniles of Ensis arcuatus (Jeffreys), but this particular beach no longer supports this species as it had died out during the last 5 years. I then started to think about Ensis americanus and it was with this thought in mind that I decided to take the shells home for further study. On arrival home and armed with the Journal of Conchology Vol. 32, Part 6 with Dr. R. M. van Urks excellent article and illustration of this species, I soon determined that all ten shells were indeed Ensis americanus (Binney). I have since sent some shells to Dr. van Urk who has confirmed my determination.

This year, after all the very bad storms the area has suffered, I decided to survey the strand line of the beaches from Snettisham in the Wash to Wells to find out the extent of the spread of this species, if any, and to record the numbers found in each particular area. The results of this survey are as follows.

Snettisham ----- No sign of any shells.
Heacham ----- No sign of any shells.



Hunstanton -----	No sign of any shells.
Old Hunstanton ----	20 broken shells.
Holme-next-the-Sea -	The number of shells here was impossible to count, there were literally thousands. One 200yd. stretch had a band of shells a yard wide and three shells deep, several of these were still alive. The majority were juvenile, but there were a few adult specimens, the largest one found measured 144mm x 22mm.
Thornham -----	Again far too many shells to count. The vast sand flats around the estuary were covered in shells, most of these were juvenile but a few adults were found, one or two shells found with part of the animal still inside.
Brancaster -----	126 shells, most of them broken. 103 juveniles and 23 adults.
Burnham Overy ----	Too many shells to count but a much lesser number than at Holme. 40 shells complete with the animal or part of. Mostly juvenile shells but a few adults were found.
Holkham -----	50 + shells, nearly all of them broken. All juvenile except 3 specimens.
Wells-next-the-Sea -	15 shells, all broken. 14 juvenile and 1 adult.

Conclusion

There are two centres of activity, the first and by far the largest being at Holme-next-the-Sea. From the evidence of live beached shells this colony seems to take up the whole area from Holme to the Thornham estuary. The second colony is smaller and is centred around the Burnham Overy estuary outfall. I feel all the broken shells in between these two places and easterly to Wells-next-the-Sea have been carried by the tide and the waves from the two established colonies. The future of the Holme colony must be classed as uncertain, apart from the devastation caused by this year's bad storms any remaining molluscs have very polluted water to contend with.

As I have already mentioned Ensis arcuatus (Jeffreys) has now totally disappeared from the area and Ensis siliqua (Linnaeus) has been reduced to a rarity. However, americanus did successfully colonize this area and multiplied in large numbers, so possibly all is not lost. I feel that the colony at Burnham has got the best chance, this area is a little cleaner and populations of other species are still fairly healthy even though recent years have seen a reduction in numbers.

D. J. Howlett, April 1990

THE MOLLUSCAN PUBLICATIONS OF DR. W. B. LORRAIN

In 1856 three new species of land snails were described as Bulimus lorraini Pfeiffer [1856(a)], Rhaphaulus lorraini Pfeiffer [1856(b)] and Clausilia lorraini Menke, all being in honour of Dr. Lorrain MD.

Who was Dr. Lorrain? and what were his contributions to Conchology? He was the son of Dr. William Lorrain, Rector of the Old Grammar School, Glasgow in the first quarter of the last century. As a result of his family status in society he received a sound educational upbringing and entered the University of Glasgow about 1822.

This period in history saw a wealth of adventurers and exploration of foreign parts with the result that William became obsessed with a desire to see the world. As a result he left the University in the Autumn of 1823 to be bound as an apprentice seaman to the Liverpool firm of Cropper, Benson & Co. and sailed from that city on the 29th. September 1823 aboard the 'Bengal' bound for Calcutta, arriving there on the 20th. February 1824. During the return voyage the ship put in at St. Helena for water and William took the opportunity to collect examples of the endemic and now almost totally extinct land snails which are now preserved in the Thomas Gray collection at Glasgow. The 'Bengal' arrived back in Liverpool on the 19th. October 1824 after a return voyage of six months and three days.

William returned to his studies and gained his MD. from Glasgow University in 1829 and may have returned to sea after this but practised medicine in Glasgow as Physician & Surgeon in the late 1840's.

He was a founder member of the Natural History Society of Glasgow in 1851 and was elected its first Vice President and took an active part in its meetings until ill health necessitated his resignation from this position in 1852 and his leaving Scotland for Penang.

His main interest was in land and freshwater mollusca of which he had an extensive collection including several which were new to science. He corresponded with Cuming, Menke and other workers in Europe as well as with Joseph Clark in the U.S.A.

His scientific work on mollusca is indicated by the brief glimpses recorded in his three papers to meetings of the Natural History Society of Glasgow. The first was given at the meeting of the 4th. November 1851 and is as follows:

"Some observations on the Helices of North America, by way of introduction to a paper on the Habits of Helix concava."

"Having read an account of some Ampullariae being brought in a living state from the river Nile to London or Paris, it struck me how much more easily the beautiful Helices of North America could be carried across the Atlantic, more especially after they had closed up the mouths of their shells with the membrane or epiphragma, and gone into winter quarters.

In the hope, therefore, of being able to naturalise them in this country, I applied to a good practical naturalist, my friend Mr. Joseph Clark of Cincinnati, Ohio, who entered into my project with great alacrity, and began to collect the Helices of his neighbourhood as the winter came on, so that early in the spring of last year I received a box containing the following species. viz.: Helix thyroides, profunda, Pensylvanica, multilineata, alternata, perspectiva, palliata, tri-dentata, fallax, and, what I was most anxious to preserve and propagate, Helix hirsuta, monodon, and concava.

From an unlucky accident, occasioned by the mistaken kindness of the captain of the ship (who seeing the box marked "Objects of natural history" had it placed in his own cabin, within a few feet of the stove), many of the Helices had died, and the box, on being opened, emitted anything but an agreeable odour.

However, I at once commenced the process of resuscitation, by dipping each individual Helix into a basin of lukewarm water, and then with a small brush carefully removing all clay from the shell, taking the greatest care not to disturb the epiphragma. I then placed them near the fire, and soon, to my great delight, observed some of them commence eating up the membrane or epiphragma, and extending the head and foot. So soon as they became active and lively, I placed them in flowerpots previously filled with earth, and covered with a glass shade having a hole at the top for the admission of fresh air. It being very early in spring, I could only procure for their food the common winter green and slices of raw potatoes, the latter of which they devoured with avidity, and in a few hours seemed to have quite recovered from their cisatlantic trip.

The North American Helices do not seem to be so exclusively nocturnal in their habits as our own native species, for I find that they move about and feed at all hours of the day. This, however, may be partly owing to the denseness of the American forests, which the rays of the sun never penetrate, and where the atmosphere is generally loaded with moisture, for they appear to be very intolerant of the direct rays of the sun, becoming so relaxed under their influence as to be almost entirely withdrawn from the shell, and dropping down from the glass shade on which they were crawling.

The greater number of the American Helices are very translucent, the shell appearing to be formed in regular ridges or rings in a circular or vertical direction across the whorl, and laid on with the utmost regularity.

The Helix thyroides I found to be the most active, and they soon became my greatest pets, in consequence of the clearness of their shell and body, which were so translucent as to enable me with the naked eye to observe the pulsations of the heart, the distribution of the large vessels, and to trace the morsal of food from the mouth along the long aesophagus to the stomach, and also to distinguish the outline of the liver. The animal of H. thyroides is much like our own native Helix aspersa, but much more attenuated, and of an ash colour a little darker on the back. The H. multilineata is a slower moving animal, resembling H. thyroides in form and size, but of a dirty black colour, which prevents the beautiful red lines which mark the shell being seen while the animal is alive.

H. profunda is the largest of the flattened kind, having a large and deep umbilicus, - whence the name. The shell is frequently marked by red bands.

H. alternata seldom leaves the ground to crawl on the glass or leaves, remaining the greater part of the time burrowed deep in the soil, and completely out of sight. The shell is too deeply coloured to allow the internal organs to be seen, except in very young individuals, its body being of a brick red, and the foot beautifully fringed with vermillion.

These four Helices I succeeded best in rearing and propagating, and as they seem also the most hardy, I have planted them out in various parts of the country, for the benefit of other naturalists.

The pulse or stroke of the heart in all these Helices I found to be, on an average, 42 beats in the minute during the summer months; but when they close up the shell and return into winter quarters, it comes down to 17 or 15 beats, - a rate at which I observed it during very dry weather, or when I had neglected to water the flowerpots, when they also closed up the mouth of the shell; and when the

animal has entirely withdrawn itself within the whorls, the heart seems entirely to cease to beat. When at rest on the side of the glass, I have observed a peculiar motion of the collar, a kind of undulatory creeping of the part, which I am inclined to believe to be a kind of respiration, though we can scarcely see the need of such a motion when the respiratory opening is always dilated.

The *Helix* prepares her nest partly by licking away the soil with her foot, and partly by burrowing with her head. This nest she makes rather better than an inch deep in the ground, slightly widened out at the bottom, and lined with a coating apparently of the glairy matter which the *Helices* occasionally leave on the ground when crawling. She takes a little more than a day to deposit her eggs, about thirty in number, beautifully white, and covered with a thin membrane. These eggs are hatched in about twenty days, and when the young appear they are quite transparent, - with the exception of *H. multilinea*, which is as black as its parent."

Dr. Lorrain read the following paper, which proves that he was a keen and meticulous observer, to the next meeting of the Society which took place on 2nd. December 1851: -

"On the structure and Habits of *Helix concava*, a Carnivorous Snail of North America".

"The Terrestrial Pulmonaria, as far as we know, are all vegetable feeders, except the *Testacella* and the subject of the following short notice, the *Helix concava* of Say, both of which feed exclusively on animal matter. As the habits of the two are so very alike, the one preying on the earthworm, and the other on the different species of *Helix* proper, it may not be inappropriate to make a few remarks on the *Testacella* before proceeding to describe the *Helix concava*.

The *Testacella*, to outward appearance, scarcely differs from the common slug, but is distinguished by carrying a small shell above the tail.

Unlike the slugs, the *Testacella* burrows in the soil, and is the dread of the earthworm, on which it feeds; and these habits are accompanied with corresponding changes in its organisation. Its body is more cylindrical than that of the slug, and, in lieu of a shell, confined to a limited portion of the neck, the whole body is encased with a thick coriaceous coat, to guard from the additional pressure to which it is exposed, and to afford sufficient strength to execute its burrows.

But the most marked differences are found in the digestive organs. "In the mouth there is no corneus denticulated jaw, nor a membranous spinigerous tongue, but from between two vertical lips issues a very small cylindrical proboscis, and appropriated to it, a muscle, which forms the most curious part in the structure of the creature. It is large, cylindrical, lies along the whole belly, and is attached to the left side of the back by a dozen of very distinct fleshy slips, almost perpendicular to the principal muscle of the body. The size and strength of this muscle indicate its paramount importance, and its actions are of a two-fold nature. When the *Testacella* has become aware of the presence of a prey, to surprise and take it unawares is necessary, for the earthworm when alarmed is more alert by far than its foe. The advantage is given to the latter by having the power, through the medium of this muscle, of suddenly darting out its proboscis, which in an instant is applied to the object in view. It is then retracted by the same muscular apparatus, and made to grasp with firmness the struggling victim."

Mr. G. B. Sowerby, in reference to the *Testacella scutulum*, says he was surprised "that an animal generally so extremely sluggish in its motions, after discovering its prey by means of its tentacula, thrusting from its large mouth its white crenulated, revolute tongue, should instantly seize upon with extraordinary rapidity, and firmly retain an earthworm of much greater size and apparent force

than itself, and which by its utmost exertion is unable to escape. To increase its power to retain a secure hold the tongue is furnished, around and just beneath its margin, with short hair like bristles." So much for Testacella; I now proceed to Helix concava, which is not unlike some of our genus Zonites, with the exception of the umbilicus.

The Helix concava of Say is orbicular, flattened, a little convex above, almost transparent, moderately glossy, of six whorls, which are a little convex and incurved at the sutures, and of which the last is proportionately large, and flattened towards the outer side of the lip. The lip is slightly reflected, the umbilicus very wide and deep, showing all the whorls, the mouth circular, unless when encroached upon by the last whorl.

The animal is an inch and a quarter in length, of a dirty ash colour, a little darker on the back and tentacula. The upper tentacula are only twice as long as the lower ones, and much thinner, and there is a white oval spot on the posterior of the foot or tail. When the animal has entirely retired within the shell the white oval space becomes the part exposed at the mouth of the shell in the form of an operculum. This is effected by the animal folding the posterior over the anterior part of the foot, and drawing it within, thus doubled upon itself. When this rounded operculum-looking part is touched with the point of a needle it feels rough and resisting.

When the animal is in motion, the shell is balanced obliquely, or nearly horizontally, on its back, but when climbing over the shell of its prey it is sometimes raised almost perpendicular. The tentacula are protruded and withdrawn with surprising quickness. In very dry weather they emitted a phosphorescent light during the night. The beat of the concava's heart I found to be thirty-five in a minute in its ordinary state, but as the cold weather advanced and the animal gradually withdrew into its shell the pulsation became proportionably slower and slower, and the body so opaque that I could no longer perceive the motion of the heart. In crawling I have often seen it stop short, fix itself by the posterior part of the foot (with which it forms a kind of disk, and adheres to the surface on which it crawls like a boy's sucker), stretch out its body to its full length, examine and feel all around, then resume its pace, and repeat this till it came in contact with any other Helix, - upon whom it would immediately crawl, till it had its whole foot on its foe, when it would fix its disk firmly, then, advancing its mouth over the edge of the shell, seize the victim by the tender part near the respiratory opening. The animal attacked would instantly draw itself into its own shell, but be still followed by the persevering concava, who now elongates and forms his whole body into a kind of proboscis, and sucks or eats away his prey into the very last whorl. When the shell attacked is strong and large, I have often seen it shake off the concava by mere strength, and, withdrawing into the shell, present the foot, which the concava did not seem able to penetrate.

Three days after impregnation they prepare their nest, as the other helices do, and deposit thirty beautifully snow-white spherical eggs, covered by a calcareous shell. The young are able to crawl out of the nest on the eighteenth day, when they have two and a half or three whorls, and are perfectly transparent. The young that I have reared do not attain the full size, or the reflected lip, till after they are a year old. On their arrival in this country from Ohio, and on being first put under a glass shade over a flowerpot, the concava were very timid and apprehensive of danger, the slightest motion of the glass causing them to withdraw quickly into their shells; but in a short time they seemed to get over their alarm. Before I discovered their carnivorous propensities, however, they had devoured some dozens of their fellow travellers, the vegetable-feeding helices, and Succinea campestris, whom I had unwittingly placed under the same glass shade, and whose remains I every morning found lying on the surface of the flowerpot, generally with a concava attached. This went on till only a few vegetable feeders remained, when,

on closer inspection, I discovered that all their shells were quite empty and that the concava were all healthy and vigorous, though in all their wanderings over the greens and vegetables placed for their maintenance I had never once seen them make even an attempt to feed. This raised my suspicions, and I soon after caught one in the very act of devouring a Helix monodonta, which was a signal for me at once to confine them by themselves, and supply them with pieces of fresh beef, worms, etc. (which they devoured greedily), till I had procured a supply of young native helices for them. The habitat of the Helix concava is the dense and swampy forests of Ohio and the Western States. On ascertaining their carnivorous propensities, I wrote to the gentleman who sent them to me inquiring if this fact were known to him, and in reply he informed me that it had been for some time, and that in his excursions he generally killed all that he fell in with. I have a strong suspicion that concava, in its anatomical structure, is very similar to Testacella; but as I had only five specimens I was unwilling to sacrifice one of them even to decide this point".

His third and final paper was given to the Society on 6th. January 1852 when he read a paper on the Indian Land Snail, Nanina vitrinoides and exhibited living specimens.

"About three years ago, our worthy Chairman, Mr. Gourlie, presented me with a living specimen of the Nanina vitrinoides, and the notes were made from observation during the time I had it confined in a glass shade. When in my possession it added nearly half a volution to the shell. I fed it entirely on lettuce leaves and cabbage. The shell resembles in every respect the European genus Zonites, but the animal is very different. When stretched in crawling, it is very long and slender. The posterior extremity terminates very unlike any of the Helices; it is split horizontally, with a part turned up like a tail, and at the root of this horn-like tail is a small hole. On each side of the mouth of the shell, the mantle is elongated in two pointed lobes; these are in constant motion, contracting and expanding, in close contact with the surface of the shell, and often covering the umbilicus, but always more or less grasping the side of the umbilical cavity.

The Nanina seems to lick or clean its shell like a cat dressing her fur. The animal is ash-coloured, the mantle yellowish, becoming darker as it extends into the elongated lobes; the foot is grey, with an edging of a lighter colour. My Nanina was very lively in the evenings, but was usually quiet during the day, except when it was damped, or had water poured over it. It seemed to have some difficulty in drawing itself entirely into the shell.

The Nanina was discovered by Mr. Benson."

This, as far as I can determine completes his publications, his main shell collection subsequently passed into the possession of his friend and pupil Thomas Gray (1820-1910) whose collection is now in the Art Gallery & Museum, Kelvingrove, Glasgow. A smaller collection of North American Freshwater Mussels which he sent to the Reverend Dr. D. Landsborough (1781-1854) from Penang about 1854 are preserved in the Dick Institute, Kilmarnock.

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Fred. R. Woodward, Art Gallery & Museum, Kelvingrove, Glasgow, G3 8AG

In June 1989, the Conchological Society held a field trip to the beautiful County Donegal in Eire. There were several aims of the trip - Shelagh Smith (SS) is compiling further records for a detailed atlas of the marine molluscs of the west coast of Scotland (see Newsletter 102, p. 33); there were still a number of obvious gaps in the records of mollusca from Sea Area 33, and it was a good opportunity for a group of enthusiasts to get together to share their experience and knowledge of marine mollusca.

We rented a large house outside Rathmelton, near Letterkenny, with a spectacular view of Lough Swilly. This enabled us to come and go with complete freedom, and the house was large enough to accommodate 9 people, and all their collecting gear, specimens and microscopes!

Due to a number of reasons, the majority of the party were unable to arrive on the first day, so freeing three of us (SS, Julia Nunn[JN] and Graham Day [GD]) to visit NW Donegal to fill in some gaps in the atlas being prepared by SS.

Day 1 - 1st. June

On a sunny, but breezy, day the small party of three headed towards NW Donegal, specifically to Magheraroarty. The mud flats there yielded the usual fauna, with SS finding a moribund Eledone cirrhosa. We walked around onto the sandy beach which was comparatively barren apart from excellent shell sand. Especially interesting were Neolepton sulcatulum (new to Ireland), Semierycina nitida, Tellimya ferruginosa, Moerella pygmaea, Alvania carinata, Jordaniella nivosa, Anisocycla nitissima, Teretia teres and Limaria loscombi (all dead). A long, exposed, cobble and boulder shore near the pier yielded large numbers of Monodonta lineata on the upper shore. We then moved onto another 'square' of the atlas, at Altawinny Bay. The red cliffs and stacks gave sheltered inlets with rock pools. Aplysia punctata was abundant and large.

Day 2 - 2nd. June

With the arrival of most of the rest of the party (Helen Ross [HR], Stanley Francis [SF], Karl Wichtl [KW], Jan Light [JL], Ian Killeen [IK]), an eight-strong group descended on Mulroy Bay! Mulroy Bay is a long large 'inlet' with several 'narrow' points. The tidal difference between the mouth of the bay and the ends of the bay at North Water and Broadwater is up to 4 hours. This enabled us to explore several sites on the same good low tide. Ballyhoorisky Island, at the mouth of the bay, was notable for its large rock pools in the causeway, containing abundant Aplysia punctata, and Elysia viridis on Codium sp.. The south side of the island was very exposed with large numbers of small Mytilus edulis. The unusual rissoid Onoba aculeus was discovered amongst algal samples.

On the way to our next site, we stopped off for half an hour at Bullogfeme Bay. This site was muddy and unpromising, but we found live bivalves such as Tapes decussatus and Anomia ephippium, and the nudibranch Jorunna tomentosa. Our third site, Marks Point, turned out to be the most interesting one of the trip. It is a small sheltered bay at the tip of a point and subject to strong current. It had many boulders, easy to turn over, with a rich algal flora. The normally sublittoral feather star Antedon bifida was seen here. Elysia viridis was abundant. Species found included Leptochiton cancellatus, Placida dendritica, Ammonicera rota, Dikoleps nitens, Skenea serpuloides, Puncturella noachina (dead), Rissoella globularis and Coryphella pedata. The most interesting find was the chiton Leptochiton scabridus (which was common), only previously known from the Channel Islands. This site clearly showed by the species observed that it exhibited what is known as the 'subtidal emergence phenomenon', where normally subtidal species are found on the lower shore, and other tidal species are found higher on the shore than usual.

Day 3 - 3rd. June

As SS had previously visited the sites chosen for this day, she went alone to NW Donegal to examine sites for her atlas. John Baxter (JB) had joined us the night before, so once again 8 of us went to look at sites - this time on Lough Swilly. Shellbrook was only ten minutes away by car from our house, so was a convenient and quick site to examine before the low tide. The crevices in the stone pier yielded Chlamys varia, Anomia ephippium and a single specimen of Modiolus adriaticus. This site had deteriorated in terms of number of species since being visited previously by the author in 1986, with considerably more sand and shell debris. The main site for the day, Lambs Head Bay, was a disappointment for me, for this site too seemed impoverished when compared with the visit in 1986. However, we did find Raphitoma linearis and Leptochiton cancellatus. Several of our party then decided to return to Marks Point, while JN and GD examined a new site in Mulroy Bay - Moross Castle. At first glance, this site looked unpromising, with blanket coverage of boulders by Ascophyllum nodosum. But below this zone, in wadeable water, there were boulders to turn over with large Leptochiton asellus being common, with many ascidians and sponges. Under one large boulder, washed up from an offshore nest, were three live active Limaria hians. SS explored six sites in NW Donegal, most briefly. The best of these was at Rinnageeragh Point, which had very good shell sand, including Euspira montagui, Limacina retroversa, Cylichna cylindracea, Gouldia minima, Montacuta substriata (all dead) and Philine punctata (live).

Day 4 - 4th. June

On the final day, the whole group headed south to Murles Point. This is (arguably) the best shore site in Ireland with over 100 species collected live from there by the author alone. The site is excellent for nudibranchs and we were not disappointed, observing Favorinus branchialis (very common on clumps of dead Corallina sp.), Goniodoris castanea and Aeolidiella sanguinea amongst others. There were many live species of bivalve, including Irus irus and a number of Venerupids. Odostomia acuta was found in algal samples.

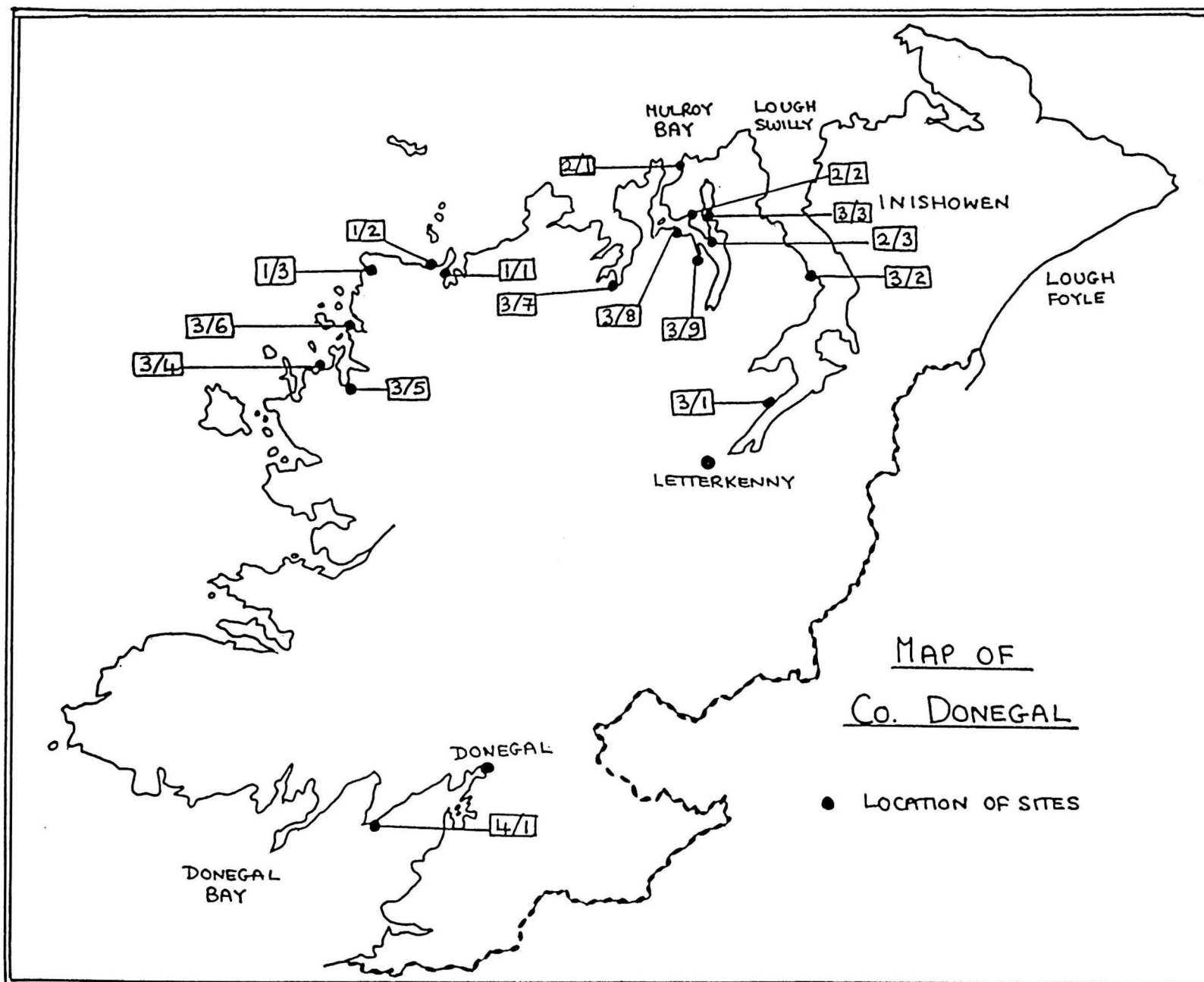
In all, we visited 16 sites and saw 207 species of mollusc (133 of them live) during this field trip, with 38 new or updated records for the two sea areas 33 and 34. In addition, new data was obtained to help complete the atlas of mollusca for Scotland. The best sites were Magheraroarty Point (122 species), Rinnageeragh Point (103), Murles Point (90), Marks Point (84) and Ballyhoorisky Island (75), although the first two sites were notable mainly for their shell sand.

Finally, I would like to thank all those who took part in the trip, making it, for me at least, a very enjoyable and rewarding four days in Donegal.

NEW OR UPDATED RECORDS FOR THE SEA AREA ATLAS (live unless otherwise stated):

Area 33: Leptochiton asellus, Leptochiton scabridus, Dikoleps nitens, Skenea serpuloides, Lacuna crassior (dead), Alvania carinata (dead), Velutina velutina (dead), Euspira montagui (dead), Epitonium turtonis (dead), Capulus ungaricus (dead), Neptunea antiqua (dead), Teretia teres (dead), Parthenina decussata (dead), Partulida spiralis (dead), Jordaniella nivosa (dead), Anisocycla nitissima (dead), Rissoella globularis, Ammonicera rota, Philine punctata, Placida dendritica, Limacina retroversa (dead), Otina ovata (dead), Modiolus adriaticus, Limaria loscombi (dead), Palliolium tigerinum (dead), Semierycina nitida (dead), Montacuta substriata (dead), Neolepton sulcatulum (dead), Parvicardium ovale (dead), Spisula elliptica (dead), Venus verrucosa (dead), Gouldia minima (dead), Thracia villosiuscula (dead).

Area 34: Littorina nigrolineata, Onoba aculeus, Partulida spiralis, Odostomia acuta, Lutraria angustior (dead).



DESCRIPTION OF SITES (numbers of species of mollusc found are shown in brackets, 'living' first)

- 1/1 Ballyness Bay 55°08.6'N 08°10.0'W 1.6.89 SS, JN, GD
Sheltered sandy/mud flats, edged on one side by saltmarsh, the other by sand dunes. Stream entering and widespread freshwater runoff. Brackish. (8, 2).
- 1/2 Magheraroarty Point 55°08.9'N 08°10.4'W 1.6.89 SS, JN, GD
Open sandy beach with boulder beach moderately exposed to north. Good fucoid cover on many boulders. (39, 83).
- 1/3 Altawinny Bay 55°08.8'N 08°17.3'W 1.6.89 SS, JN, GD
Small cave at base of cliffs (30m+), moderately sheltered. Some rock ribs and pinnacles running out to sea, and boulder beach. Rocks to south with sheltered rock pools. Patchy fucoid cover. (36, 1).
- 2/1 Ballyhoorisky Island 55°08.8'N 07°45.5'W 2.6.89 SS, JN, GD, KW, SF, JL, HR, IK
Open shore, moderately exposed. Quay with causeway to island. Bedrock with pools, especially in area between island and mainland. Gullies with boulders and overhangs on south and north shores of island. Patchy fucoid cover, good algal turfs at low water on bedrock and boulders in sheltered inlets, but considerable sand trapped in roots. (60, 15).
- 2/2 Bullogfeme Bay 55°12.0'N 07°44.3'W 2.6.89 SS, JN, GD, KW, SF, JL, IK, HR
Very sheltered horseshoe bay with boulder gravel beach and a little bedrock. Stream entering, so slightly brackish except at high tide. Almost blanket fucoid cover. (26, 9).
- 2/3 Mark's Point (The Hassans) 55°10.0'N 07°43.7'W 2.6.89 & 3.6.89 SS, JN, GD, KW, SF, JL, IK, HR, JB
Very sheltered point sticking out into tidal current. Rocky skerries off point, some low rock at back of beach. Mostly boulders set in gravel. Blanket fucoid cover. Laminaria digitata on boulders, patchy algal turf at low water. Codium sp. common. (71, 13).
- 3/1 Shellbrook 55°0.0'N 07°37.5'W 3.6.89 JN, GD, KW, SF, JL, IK, HR, JB
Muddy shell gravel along sides of long old stone pier. Crevices and small boulders in pier. Very sheltered. (22, 12).
- 3/2 Lambs Head Bay 55°08.5'N 07°32.2'W 3.6.89 JN, GD, KW, SF, JL, IK, HR, JB
Bedrock outcrops on sand with large weedy boulder area with pools. Moderately exposed. (34, 5).
- 3/3 Moross Castle 55°11.75'N 07°42.9'W 3.6.89 JN, GD
Sheltered boulder shore, subject to tidal current. Boulders with blanket cover by Ascophyllum nodosum, mid to low water. Undersides of boulders at low water covered with ascidians and sponges. (27, 4).
- 3/4 Rinnageeragh Point 55°02.5'N 08°22.1'W 3.6.89 SS
Open coast with very indented rocky headlands between sandy bays. Sand and kelp offshore. Site in a moderately sheltered inlet with a quay. Cliffs and a boulder beach. Large pool with runnel out of it. Patchy fucoid cover, good kelp bed offshore, good algal turf at low water, sandy. (50, 53).
- 3/5 Anagarry 55°01.3'N 08°19.4'W 3.6.89 SS
Head of large sandy inlet. Sheltered muddy sand, rocks and saltmarsh. Brackish. (8, 1).

- 3/6 Maghera Point 55°05.4'N 08°19.4'W 3.6.89 SS
Open coast with a rocky headland between sandy bays. Sand and kelp offshore. Moderately exposed boulder beach - very large boulders. Patchy furoid cover. No algal turf, just clumps chiefly Macrocarpus stellatus. (32, 0).
- 3/7 Duntally River 55°08.0'N 07°52.0'W 3.6.89 SS
Head of large sandy inlet with river coming in. Very brackish, muddy mussel beds and saltmarsh. (6, 0).
- 3/8 Mulroy House 55°11.2'N 07°45.3'W 3.6.89 SS
Sheltered boulder shore with current. Stone pier. Blanket furoid cover. (0, 2).
- 3/9 Mulroy Bay : Back Lough 55°09.7'N 07°42.9'W 3.6.89 SS
Very sheltered lagoon, brackish. Very muddy with boulder/pebble upper shore. Much of lower shore blanketed by rotting gungy filamentous algae. If clean, would have patchy furoid cover. Little saltmarsh. (18, 6).
- 4/1 Murles Point 54°36.2'N 08°17.0'W 4.6.89 SS, JN, GD, SF, KW, JL, IK, HR, JB
Open moderately sheltered shore with very wide rock platform sloping gently seawards. Some boulder areas. Large lagoon with gravel floor and strong stream out over bedrock, gravel and boulders. Shallow pools at all levels. Small overhangs at low water. Blanket furoid cover, patchy algal turf at low water, capping boulders. Small Zostera bed in lagoon. (79, 11).

Julia Nunn

SOME OBSERVATIONS ON JUVENILE SHELLS: CHAUVETIA BRUNNEA AND EPITONIUM CLATHRATULUM

Growth series of juvenile shells can often be the key to identifying those awkward specimens which usually turn up in samples of fine shell sand. But such growth series may be interesting for other reasons. They can, for example, illustrate the development of gastropods from the protoconch into the postlarval shell. In the case of adult shells these early stages are often not apparent because they are worn down or broken off (even when the shell is fresh), or because they are covered by subsequent whorls of the adult shell.

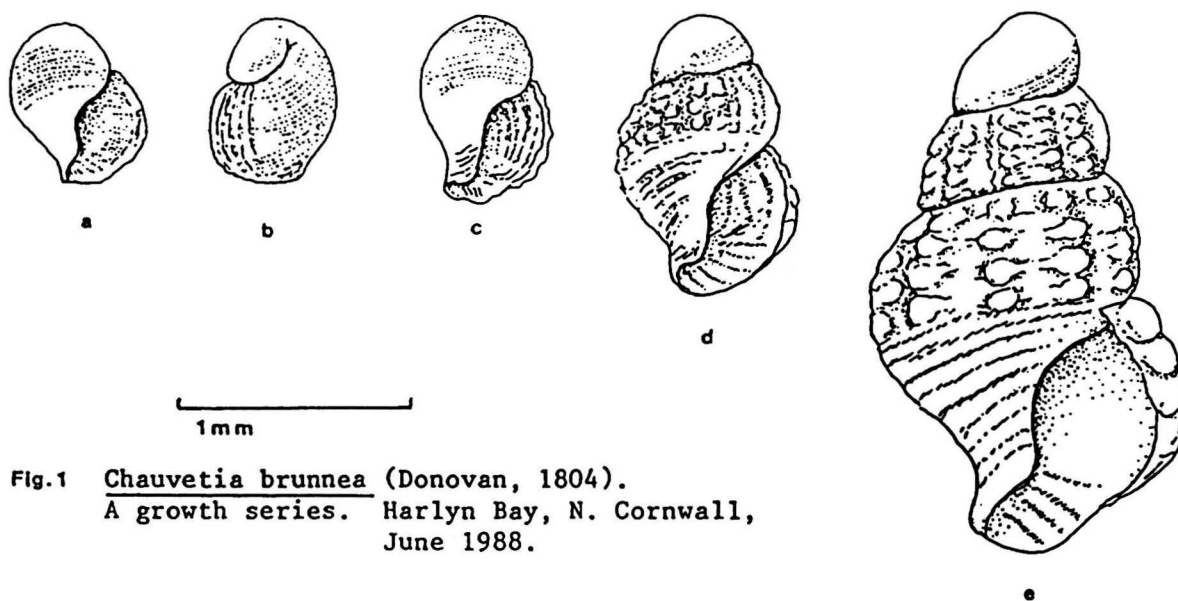


Fig.1 Chauvetia brunnea (Donovan, 1804).
A growth series. Harlyn Bay, N. Cornwall,
June 1988.

Fig. 1 shows the first part of a longer growth series of Chauvetia brunnea (Donovan, 1804) made up from numerous small juveniles of that species found in a sample of shell sand taken in Harlyn Bay (N. Cornwall). The shells are a glossy chestnut brown and are rather solid for their size. The series shows how the development of the shell from the relatively smooth protoconch to the complex sculpture of the adult shell takes place by stages. Fig. 1a shows not much more than the 'bulb' of the protoconch; it is fully coloured and the surface is marked with finely punctate spiral lines. The transition to a more sculptured surface can be seen to have only just begun and the siphonal canal is beginning to develop. Fig. 1b gives an abapertural view of a slightly larger shell showing that the first postlarval sculpture is no more than closely set, irregular costae. In Fig. 1c can be seen the apertural view of a larger shell on which the costae have become more undulating and the siphonal canal has widened. At the next stage, in Fig. 1d, can be seen the point at which vertical rows of three (later four) tubercles begin to appear between the suture and a point below the periphery where the next suture will lie. Below this are spiral lines down onto the siphonal canal. Finally, Fig. 1e is of a shell which is already showing the clear characteristics of the adult shell.

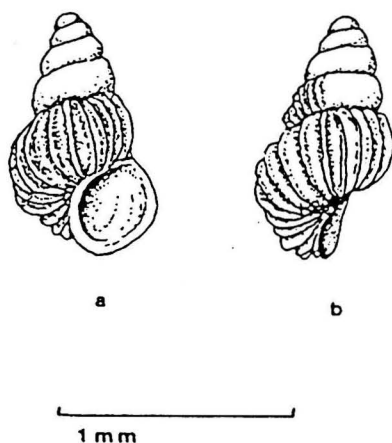


Fig. 2 Epitonium clathratulum (Kanmacher, 1797).
Two views of a single specimen. Harlyn Bay, June 1988.

In the case of other species the whole transition may be revealed in a single shell. Fig. 2 shows such a case and gives two views of a single specimen of Epitonium (= Clathrus) clathratulum (Kanmacher, 1797). The protoconch (of about $3\frac{1}{2}$ - 4 whorls) is a pale brown and slightly transparent, the subsequent whorls being white. The surface of the protoconch appears smooth and shiny (the dots on the figure are intended to represent shading and form, not sculpture). Fretter and Graham mention "many close-set flexuous growth lines or low lamellae" on the protoconch of Epitonium spp. but such are not apparent on this specimen which nevertheless appears to be unworn. In a very strong side light and at 35x which is my best magnification there may just be a hint of a surface texture but I think it would take a SEM photograph to reveal it. Fig. 2b shows the shell rotated to reveal the abrupt transition from the protoconch to the postlarval shell which bears the normal close-set costae of E. clathratulum.

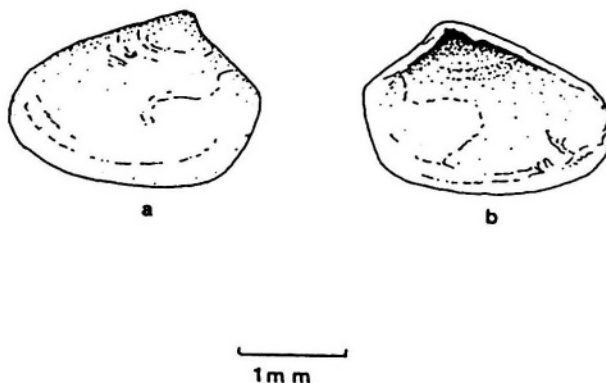


Fig. 3 External and internal views of the left valve of a small bivalve.

Fig. 3 is intended to introduce a question. It shows external and internal views of the left valve of a bivalve and is an example of a juvenile which I have been unable to name because I have never been able to put together a growth series. I have found similar specimens at many locations round the British Isles and in Brittany, from which I conclude that it is a common species. It is not Mya arenaria, for I have a good growth series of that species. It should be very easy, but it defeats me: are there any suggestions?

All the illustrations here were done using a binocular microscope with a camera lucida attachment.

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 Fretter, V. and Graham, A.: The Prosobranch Molluscs of Britain and Denmark. Part 7 'Heterogastropoda' etc. Supp. 11, J. Moll. Stud. (pp. 386, 390-1).

J. E. Phorson, [REDACTED], Belmont, Durham, [REDACTED] January 1989

RUSKIN ON SHELLS

Whilst visiting the new Ruskin Gallery in Sheffield, I came across a diary entry made by John Ruskin in 1848 which refers to the shell gallery in the British Museum. The exhibition in Sheffield includes selections from Ruskin's prolific writings and some of his drawings of natural objects as well as architectural subjects, for which he is better known. Like biologists who draw to observe and understand the structure and function of an animal or plant, Ruskin's drawings helped him to understand buildings in the structural as well as the aesthetic sense.

John Ruskin came from a very protected childhood background. He was born in London in 1819, the only child of a prosperous sherry merchant, but when he was four the family moved to the then rustic surroundings of Herne Hill, now a built-up part of south-east London. Ruskin was a gifted and precocious child who travelled through Europe extensively with his parents and he was particularly inspired by the Swiss Alps. He went on to Oxford University, taking a BA and here he showed great interest in geology and mineralogy which he studied under Dr. Buckland. But Ruskin was really an arts person rather than a scientist with a strong aesthetic sense and actively opposed to developments in contemporary science - later in life he was an

opponent of Darwin's theory of evolution.

Apart from his short-lived marriage, Ruskin continued to live with his parents and in such a background he experienced no financial hardship or necessity to earn a living. On leaving Oxford he devoted himself to writing on art and architecture and this necessitated various travels around Europe. When in good health he worked very fast and in his lifetime produced a vast literary output, although at various stages all progress was halted, sometimes for several years at a time, by depression and illhealth. Ruskin covered broad fields - he was inspired by, and wrote about, landscape, minerals, natural history, architecture, art, music, political economy and educational history. He was not a man of science but one of ideas, and much of his thinking was ahead of his time. On his travels, Ruskin was a great collector of works of art and minerals and these formed the basis of a museum which he gave to his foundation, The Guild of St. George - and it is this which is on display at Sheffield. The Guild of St. George revered the natural world, opposed the evils of industrialisation and advocated a back-to-the-land policy, but it was too idealistic to work in practice. Ruskin eventually became aware of how the other half lived and he devoted the latter part of his life to philanthropy (dispensing his father's fortune) and writing on social reform. He lectured in working men's colleges and was aware of the importance of museums in education.

The sense of form which he used as an architect enabled him to appreciate shells. The following is an extract from his diary of 1848 inspired by shells at the museum:

"FORM

December 20th. I was struck in looking over the Shells at British Museum yesterday, with the difference in the nicety of outline in the patterns on shells and plumage and in their forms themselves. Now I think that Form, properly so called may be considered as a function or exponent either of Growth or of Force, inherent or impressed; and that one of the steps to admiring it or understanding it must be a comprehension of the laws of formation and of the forces to be resisted; that all forms are thus either indicative of lines of energy, or pressure, or motion, variously impressed or resisted, and are therefore exquisitely abstract and precise. Variegation, on the contrary, is the arbitrary presence or absence of colouring matter and the beauty is more in the colour than outline. Hence stains, blotchings, cloudings, etc. in marble, on skins and so on, and their beauty of irregularity we shall have three kinds of Form: that of mere stains on the surface, shells and skins; that of organic structure on the surface, serpent scales up to most beautiful plumage; and real form, the most precise of all in muscular or other separate developments."

In this piece Ruskin was interested in the functional and structural determination of form in the shell, and that which is functional has a beauty and sincerity.

Ruskin also showed an interest in the presentation of museum objects and spoke against the Victorian tendency to put too much into the show case. The following is from his Deucalion, 1883.

"THE MUSEUM

In all museums intended for popular teaching, there are two great evils to be avoided. The first is, super abundance; the second, disorder. The first is having too much of everything.

You will find in your own work that the less you have to look at the better you attend. You can no more see twenty things worth seeing in an hour, than you can read twenty books worth reading in a day. Give little but that little be good and beautiful, and explain i[t] thoroughly."

He also wrote a piece on cockle shells and snails which he was also inspired to draw.

"THE COCKLE SHELL

Here is a little grey cockle-shell, lying beside me, which I gathered, the other evening, out of the dust of the Island of St. Helena; and a brightly spotted snail-shell, from the thistly sands of Lido; and I want to set myself to draw these, and describe them, in peace.

'Yes' all my friends say, 'this is my business; why can't I mind it, and be happy?' Well, good friends, I would fain please you, and myself with you; and live here in my Venetian palace, luxurious; scrutinant of dome, cloud and cockle-shell... And little enough mind have I for any work, in this seventy-seventh year that's coming of our glorious century, wider than I could find in the compass of my cockle-shell. But alas! my prudent friends, little enough of all that I have a mind to may be permitted me. For this green tide that eddies by my threshold is full of floating corpses, and I must leave my dinner to bury them, since I cannot save; and put my cockle-shell in cap, and take my staff in hand, to seek an unencumbered shore."

From Ruskin's *Fors Clavigera*, 1876.

The Ruskin Gallery is at 101 Norfolk Street, Sheffield and is open Mondays-Fridays from 10.00 - 7.30, Saturdays 10.00 - 5.00.

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June Chatfield

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Applications published in the Bulletin of Zoological Nomenclature

The following applications were published on 29 June 1990 in Vol. 47, Part 2 of the Bulletin of Zoological Nomenclature. Comment or advice on these applications is invited for publication in the Bulletin and should be sent to the Executive Secretary, I.C.Z.N., c/o. The Natural History Museum, Cromwell Road, London, SW7 5BD.

Case 2630 Helix (Helicigona) barbata Férussac, 1832 (currently Lindholmiola barbata; Mollusca, Gastropoda): proposed confirmation of lectotype designation

Dietrich Kadolsky, Meadowcroft, 54 Ewell Downs Road, Ewell, Surrey, KT17 3BN, U.K.

Abstract. The purpose of this application is to conserve the name barbata Férussac, 1832 in its accustomed usage for a S.E. European species of pulmonate gastropod. The nomenclature of the nominal taxa Helix (Helicigona) lens Férussac, 1832 and H. (H.) barbata Férussac, 1832 has recently been reviewed by Gittenberger & Groh (1986), but unfortunately their lectotype selection for barbata is not valid under the Code.

Case 2699 Rissooidea (or Rissoacea) Gray, 1847 (Mollusca, Gastropoda): proposed precedence over Truncatelloidea (or Truncatellacea) Gray, 1840
G. Rosenberg & G. M. Davis, Academy of Natural Sciences, Philadelphia, Pennsylvania 19103, U.S.A.

Abstract. The purpose of this application is to conserve the family-group name Rissooidea Gray, 1847 for one of the largest superfamilies in the Mollusca. The name is threatened by the senior family-group name Truncatelloidea Gray, 1840, over which it is proposed it be given precedence.

Case 1643 Mytilus anatinus Linnaeus, 1758 (currently Anodonta anatina; Mollusca, Bivalvia): proposed designation of a neotype

Peter B. Mordan, The Natural History Museum, Cromwell Road, London, SW7 5BD, U.K.

Fred. R. Woodward, Natural History Department, Art Gallery and Museum,
Kelvingrove, Glasgow, G3 8AG, U.K.

Abstract. The purpose of this application is to conserve the name Anodonta anatina (Linnaeus, 1758) in its accustomed usage for a common species of European freshwater mussel by the designation of a neotype. This will also conserve the name Pseudanodonta complanata (Rossmässler, 1835).

GENERAL NOTES

CONTRIBUTIONS FOR THE NEWSLETTER

I should particularly like to receive a few articles on the popular tropical marine molluscs, with clear line drawings of shells if possible. Remember, you don't have to be an 'expert' to write an interesting article, think of J. M. Douglas's entertaining contribution from Saudi Arabia in the June 1989 issue, no. 109. At first he classified shells as 'pretty' or not! Several members have requested more articles in this vein, so please start writing. If you happen to know of any meeting, exhibition or museum display with a conchological flavour, let me have brief details for the Newsletter. Also, if you have any queries or problems relating to any group of shells why not write to me? It may be that another member will be able to provide you with the answer through the Newsletter.

P. E. Negus, Hon. Newsletter Editor

DISTRIBUTION OF THE NEWSLETTER

If any member has not received their Newsletter in recent months (assuming that they see this note) or if you know of someone who has not received it, please let Mrs. Beryl Rands, the Acting Secretary, or myself know. This applies particularly to newly elected members and to changes of address. Unfortunately there has not been proper liaison between officers, resulting in instructions not being passed to the right person.

P. E. Negus

GIBSONE'S CONCHES

Recently a collection of nearly 2000 sheets of very high quality original watercolour illustrations of shells by George Gibsone have come to light in the City Library, Newcastle-upon-Tyne. Some further examples of his work are in the possession of the Natural History Society of Northumbria. It is suspected that some of these drawings could include the first illustrations of some species.

Some documentation and a manuscript catalogue exist, but almost nothing is known of George Gibsone or the circumstances leading to his preparation of the drawings. If any member can provide any information about him or his drawings I would be very grateful if you would write to me.

Charles Pettitt, Manchester Museum, The University, Manchester, M13 9PL

CONSERVATION OF NON-MARINE MOLLUSCS IN EUROPE

Through World Wildlife Fund support, it has been possible to develop a project investigating the state of mollusc conservation in Europe that had been started by IUCN in 1984 but not brought to a conclusion. Together with Susan Wells, who initiated the original project, and using the data which was gathered earlier, we are

now up-dating the information on the status of mollusc species and their habitats together with progress on mapping schemes, conservation recommendations, Red Data Book listing and legal protection. Greater emphasis is being placed on habitat protection as the way forward to conserve molluscs. We are particularly interested in species which come under the Red Data Book categories of Endangered, Vulnerable or Rare and of species where a high proportion of the world's population occurs in a limited area.

Anyone working on non-marine molluscs in any European country is invited to participate and put their views forward on species listing, habitat protection and conservation. I am particularly interested in habitat change which is detrimental to the future of non-marine molluscs. The report is scheduled for completion at the end of 1990, so please write as soon as possible if you would like to help to: Dr. June Chatfield, [REDACTED], Alton, Hampshire, [REDACTED], UK.

PISIDS OF NORTHERN EUROPE

Due to difficulty in their identification, the species of Pisidium are often omitted from faunal lists. A new paper entitled "Geographical Distribution of the small mussels (Sphaeriidae) in North Europe (Denmark, Faroes, Finland, Iceland, Norway and Sweden)" by J. G. Kuiper, Karen Anna Okland, Jorgen Knudsen, Lauri Koli, Ted von Proschwitz and Ilmari Valovirta in Ann. Zool. Fennici, 26, 73-101 (1989) gives distribution maps of 23 species of Sphaeriidae from checked identifications of museum specimens. The species lists are interesting on their comparison with the British fauna. They include 15 from the Holarctic geographical region and 7 from the Palearctic (in which Britain is classified). There is also a discussion on the validity of Hans Schlesch's collection in Denmark and it was decided to accept this data in spite of its rejection by A. W. Stelfox, R. A. Phillips and Charles Oldham in the 1920s.

Familiar species like Pisidium casertanum, P. milium, P. nitidum, P. obtusale and to some extent P. subtruncatum and Sphaerium corneum are well distributed over the whole area while P. amnicum and P. pulchellum are noticeably absent from Norway. P. personatum is less widespread in the northern part of Europe than it is in the British Isles. Species like P. lilljeborgii and P. conventus that are rare in Britain are more widespread and frequent further north, whilst other species not on our fauna list, like P. hinzi, P. subtilestriatum, P. waldeni and Sphaerium nitidum occur in the region covered by this paper. Pisidium stewarti was recorded fossil in two localities but is only known alive from Siberia. The authors, who are involved in current recording, point out the dynamic state of the distributions of pea mussels, historically with climatic change, using fossil and subfossil evidence for interpreting present maps of species.

I am grateful to Dr. Valovirta for sending a reprint of this useful paper.

June Chatfield

BULLETIN OF ZOOLOGICAL NOMENCLATURE - OFFPRINTS IN MOLLUSCA

An opportunity to keep abreast of nomenclatural problems in the Mollusca. For the price of £15 or US\$25 a year individual scientists can receive offprints of all cases (Applications, Comments and Opinions) relating to the Mollusca as soon as they are published in the Bulletin of Zoological Nomenclature. This offer is for the years 1990 and 1991, but back stock can be ordered back to 1980. Send your order with £15 or US\$25 for each year wanted to: I.C.Z.N., c/o. The Natural History Museum, Cromwell Road, London, SW7 5BD, U.K.

EXCHANGE WANTED

As a result of interest generated by an undergraduate research project into the evolution of the Cypraeidae which I carried out some years ago, I am now trying to start a collection of fossil Cypraeidae. So far I only have the two common Siphocypraea species from Florida. I am particularly keen to obtain any British, European, far Eastern and Australian species, especially such extinct genera as Palaeocypraea, Proadusta, Vatalopodia, etc., as well as extinct species and sub-species of Recent genera. I can offer in exchange worldwide Recent marine, land and freshwater shells (not fossils), particularly from Japan and Brunei.

Julian Joseph, [REDACTED], Chippenham, Wiltshire, [REDACTED]

WANTED - JOURNAL DE CONCHYLIOLOGIE

Has anyone got a run, or odd volumes, or even odd numbers of this Journal? Mrs. N. F. McMillan, [REDACTED], Bromborough, Merseyside, [REDACTED], is anxious to obtain copies and is willing to buy or exchange. Please write if you can help.

ADVERTISEMENT

If you are interested in malacological journals such as Journal de Conchyliologie, please contact: Dieter Schierenberg BV, Rare illustrated books and periodicals on Natural History, [REDACTED], 1016 HP Amsterdam, Netherlands. Tel.: [REDACTED]; Fax: 20-265650. All catalogues free upon request.

A SCHOOLBOY'S AMUSEMENT IN SOUTHEY'S DAYS

One very odd amusement, which I never saw or heard of elsewhere, was greatly in vogue at this school. It was performed with snail shells, by placing them against each other, point to point, and pressing till the one was broken in, or sometimes both. This was called conquering; and the shell which remained unhurt acquired esteem and value in proportion to the number over which it had triumphed, an accurate account being kept. A great conqueror was prodigiously prized and coveted, so much so, indeed, that two of this description would seldom have been brought to contest the palm if both possessors had not been goaded to it by reproaches and taunts. The victor had the number of his opponents added to its own; thus when one conqueror of fifty conquered another which had been as often victorious, it became conqueror of an hundred and one. Yet even in this, reputation was sometimes obtained upon false pretences. I found a boy one day, who had fallen in with a great number of young snails, so recently hatched that the shells were still transparent, and he was besmearing his fingers by crushing these poor creatures one after another against his conqueror, counting away with the greatest satisfaction at his work. He was a good-natured boy, so that I, who had been bred up to have a sense of humanity, ventured to express some compassion for the snails, and to suggest that he might as well count them and lay them aside unhurt. He hesitated, and seemed inclined to assent, till it struck him as a point of honour or of conscience, and then he resolutely said no! that would not do, for he could not then fairly say he had conquered them. There is a surprising difference of strength in these shells, and that not depending upon the size or species, I mean whether yellow, brown or striped. It might partly be estimated by the appearance of the point or top (I do not know what better term to use); the strong ones were usually clear and glossy there, and white if the shell were of the large, coarse, mottled, brown kind. The top was then said to be petrified; and a good conqueror of this description would triumph for weeks or months. I remember that one of the greatest heroes bore evident marks of having once been conquered. It had been thrown away in some lucky situation, where the poor tenant had leisure to repair his habitation, or rather where the restorative power of Nature repaired it for him, and the wall

was thus made stronger than it had been before the breach, by an arch of new masonry below. But in general I should think the resisting power of the shell depended upon the geometrical nicety of its form. - Life and Correspondence of Dr. Southey.

From 'The Zoologist', 1st. series, Vol. 15 (1857) (Submitted by Mrs. Stella Turk)

PACHYCHILUS (PLEUROCERIDAE) USED FOR FOOD IN MEXICO

Mrs. Lulu Windsor-Shaw, knowing of my interest in snails collected some from a market display at San Cristobal de las Casas, Chiapas, Mexico and photographed the market stall involved. A species of Pachychilus was involved and judging by the numbers on sale it is clearly an important article of diet in the region. Unfortunately, since the sellers had almost no Spanish the mode of use could not be ascertained. Some American reader may be able to enlighten us. I am grateful to Drs. David Brown and Fred Naggs for confirming the genus but the taxonomy is too confused for a specific name to be available.

B. Verdcourt

