Mollusc World

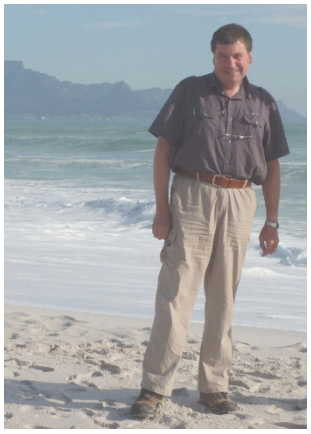
Issue 25 March 2011

Searching for Lemon Slugs

Long lived bivalves and ancient feasts

THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

From the Hon. Editor



Firstly, a warm welcome if you have joined the Conchological Society recently. It is always a pleasure to welcome new or returning members and I hope you will be able to take the opportunity to join in some of our planned meetings and activities (see pages 30-31) whenever you can. If you have joined from overseas and cannot participate in this way, hopefully you will find our publications of interest and of course you will always be welcome if you find yourself in the UK at the time of any of our activities. Oh, and don't be afraid to submit something for publication in the magazine, however small (details of how to do this can be found on the back cover).

Don't forget, if you are out and about in the coming months, to submit records of any molluscs found to our Marine or Non-Marine Recorders, as appropriate (for details see http://www.conchsoc.org/). It is always worthwhile recording occurrences of the common as well as more unusual species, since this may add valuable data on possible distribution and frequency changes.

Some of you may have caught a glimpse of Mollusc World on the BBC's satirical News Quiz "Have I Got News for You" (series 40, episode 8) back in December last year. Comedian Lee Mack's comment was that "It's an OK magazine but not worth shelling out for..."! Putting this (fairly mild) pun aside, I hope you will agree that participating in membership of the Conchological Society is very worthwhile!

Finally I would like to thank Vicki Harley, Bas Payne and Janet Ridout Sharp for their helpful comments and proof reading relating to this issue.

Peter Topley

Mollusc World

This magazine is intended as a medium for communication between members on all aspects of molluscs. We include articles, field meeting reports, research news, results from the mapping schemes and identification aids. We welcome all contributions in whatever form they arrive (see back cover for further details).

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All photographs and drawings featured in articles are by the author unless otherwise indicated.

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Front cover: Malacolimax tenellus on *Cortinarius violaceus*, Wyre Forest (see page 25) (Photo: Rosemary Winnall)

Arctica islandica, the longest-lived animal on Earth

Paul Butler

figure 1: Live *A. islandica* on the sea bed in a Scottish loch (Photo: Paul Kay[1])

Back in 2007, our research team based at the School of Ocean Sciences in Bangor University gained quite a bit of mollusc-related publicity as a result of the discovery of the longest-lived non-colonial animal known to science, a specimen of the marine bivalve *Arctica islandica* that had lived, remarkably, for just over 400 years. Full page spreads appeared in the *Sunday Times* and the *Daily Mail*, and our research even made it into *Time* magazine's Top Ten Scientific Discoveries of that year. As result, Conch Soc was kind enough to ask me to deliver a talk at its subsequent AGM at the Natural History Museum, and some of you may remember me waffling on about how we could look at the annual growth lines in the shell and use them to give us an insight into marine environments of the past. Last year, we achieved more exposure with an exhibit at the Royal Society's 350th anniversary Summer Science Exhibition, held at the Southbank Centre. The strapline, once again, was longevity based**:** "*Arctica islandica*, the longest-lived animal on Earth", although by this time, after more research, the lifetime of the world's longest-lived animal had increased somewhat and now stood at 507 years.

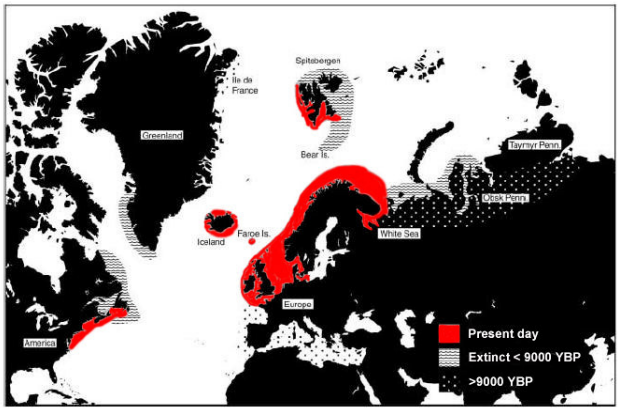

figure 2: Present day distribution of *Arctica islandica* shown in red (image adapted from Dahlgren et al 2000[2]).

Distribution

A. islandica is a burrowing (figure 5) infaunal clam, widely distributed around the North Atlantic shelf seas (figure 2). It is most common off the North American coast between Cape Hatteras and Newfoundland, around Iceland, and on the NW European shelf between the UK and northern Norway. Its southern range limit off Europe is currently in the North Sea and Irish Sea but this may be moving northwards as a result of warming oceans. For the same reason its northern range limit may now extend as far as Svalbard. Its preferred habitat is sandy mud, although around Iceland it lives almost everywhere in a wide range of soft sediments. *A. islandica* is found at depths ranging from the shallow subtidal zone to 200m.

Longevity

The longevity of *A. islandica* is high throughout its range, but the most long-lived shells that we have found come from animals living off the north coast of Iceland close to the island of Grimsey. We have collected and aged several specimens from this site with lifetimes in excess of 300 years. It is one of these specimens that is, at 507 years, the longest-lived non-colonial animal whose precise age has been determined. *A. islandica* from other regions tend not to live quite as long as that, and the oldest individuals from the North American coast, the Irish Sea and the North Sea 'only' reach around 250 years.

Archives of the environment.

If we are to respond appropriately to the potential risks posed by climate change, we need to be able to distinguish between the fingerprint of human activities and the natural background. This requires access to detailed data about the environment going back through the period (the last few hundred years) of increasing human impact. The problem is that instrumental measurements go back only about 200

years at most and are in any case spatially sparse. So we have to augment the instrumental data with so-called 'proxy' data – this just means data extracted from natural archives such as tree-rings, ice cores and corals and interpreted in terms of some local environmental variable, for example temperature. But sources of proxy data also have their limitations. Tree-rings and ice cores record only terrestrial conditions and corals, while they do record the marine environment, are restricted to the tropical latitudes. There are other marine archives derived from sediment cores, but these cannot usually be dated with any great precision or accuracy. This leaves a significant gap in our understanding of the climate system because some of the key components of the global ocean circulation – especially the heat- and salinity-driven overturning which plays a crucial role in the global distribution of heat energy – actually take place in parts of the ocean that are well outside the tropics, including parts of the northern North Atlantic Ocean. What has been missing up until now is a precisely dated, high-resolution archive for the non-tropical marine environment.

figure 3: *Arctica islandica* shells showing distinctive annual banding.

This is where *A. islandica* comes into the picture. I've already described how this species is common in the shelf seas around the North Atlantic Ocean. But it's the fact that we can build an absolutely dated chronology using its shell that makes it supremely useful as a natural archive. Shell growth in *A. islandica* is characterized by a short period every year (probably in late summer or autumn) when deposition becomes very slow or ceases altogether. These periods can be seen as distinct bands on the outside of the shell (figure 3). When we look at the growth patterns internally, under a microscope, they show up as darker lines (figure 4). We can record the amount of growth during the year by measuring the distance between these darker lines.

We can also find how long the animal lived by counting the increments between the lines and, as long as we know the year when the animal died, we can work out the exact calendar year when each increment was deposited.

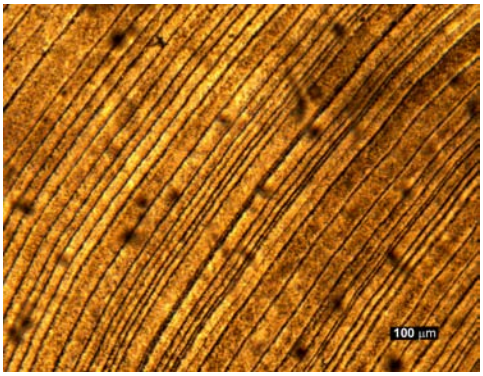

figure 4: Internal growth patterns in *A. islandica.*

That's not all, however. When we compare the patterns of increment widths from several animals that were living in the same part of the sea bed, we find that they were all growing in the same way. In a good year, they all deposit a lot of shell (thick growth increments) and in a bad year they all produce thin increments. That's useful because it shows that they were all responding to the same environmental factors, so just by looking at the growth patterns we can say something about the common environment of all the shells. What's more, the fact that each population shows this synchronized growth means that we can extend our archive back in time. We can take any dead shell we happen to find on the sea bed and see if its growth patterns are similar to the patterns in shells from living animals. If they are, we can work out the dates when the dead shell was being deposited (this technique is derived from tree-ring research and is called 'crossdating'), and then we can use the growth patterns in the dead shells to study marine climate during periods before any of the living clams were alive.
There's one other key characteristic of *A. islandica* that helps us look at past climates, and that is its remarkable lifespan. If a species only lived for a few years or a few decades, we would have to measure, analyse and crossdate an enormous number of shells to extend our dated archive (called a 'chronology') very far back in time. But because single individuals can continue to produce shell for centuries, we can crossdate back in time using relatively few shells. The longest crossdated chronology we have built so far uses *A. islandica* from north of Iceland and goes back 1,350 years.

What can *Arctica* tell us?
Just knowing the year when shell was deposited is not very informative by itself. But there are a number of characteristics of the shell that enable us to say something specific about the environment in which the shell was deposited. First, the width of the growth increments is a simple indication of how much shell material the animal was able to produce in a single year. In most cases this is likely related to food supply, but it may also record other factors, such as seawater temperature or the presence of ice at the sea surface, especially in regions where the animal is stressed by that factor.

Another approach is to look at the composition of the shell material itself. The different isotopes of oxygen and carbon can be measured with great precision and these analyses can tell us about seawater temperature and salinity at the time of shell deposition. They can also help us investigate more complex aspects, such as changes through time in the original source of local water masses, or the uptake of fossil fuel carbon from the atmosphere into the marine environment.

Finally, the concentrations of other elements in the shell (calcium, strontium, magnesium, boron, zinc and many others) can be measured and compared, and these analyses can be used to investigate, for example, marine pollution and ocean acidification.

How far back can we go?

The Iceland chronology goes back 1,350 years, and we have also created one for the Irish Sea with a length of nearly 500 years. The ability to extend them even further depends on the availability of older shell material, which in turn depends on the persistence of the population and the fate of the dead shells. *A. islandica* has been common in the shelf seas surrounding the North Atlantic ocean at least since the last glaciation (about 18,000 years), but it would be difficult to find shells from any single population to cover that whole period. More likely, a network of so-called 'floating chronologies' (made up of shells with growth patterns which match each other but which cannot be linked to any live-collected shells) will be built up with the potential to be connected and correctly dated as more material comes to light.

figure 5: *A. islandica* in its infaunal setting with closed (above) and open siphons (below). (Photos: Martin Sayer)

Ageing research

There is one other strand of research into *A. islandica* that we are involved with, and that is the question of exactly why and how these clams have evolved to be so long-lived. They appear to be able to switch off some of the usual processes of ageing (such as deterioration in muscle tissue and propensity to tumours), and it has been suggested that if they weren't eaten by predators they could in principle live for ever. Laboratory research into the ageing process tends to focus on short-lived model species because they are easy to rear and study in the laboratory. The obvious problem with these species is that they lack the very trait that is of interest – the propensity to live long and healthy lives. If we can identify the mechanisms that delay or halt the ageing process in *A. islandica* it would be possible to target research using the traditional model species, directing it towards the most productive areas.

What about other species?

While many marine molluscs have annual growth bands, *A. islandica* is far and away the most useful for building long chronologies, simply because of its great longevity. However, we have recently been looking at other species, including *Glossus humanus* and *Glycymeris glycymeris* and have found that both these species can be crossdated. *G. glycymeris* in particular has a lot of potential, since it seems to live longer than previously thought (up to 200 years), and it may in some ways be an even more sensitive climate indicator than *A. islandica*.

Where can I find it?

A. islandica shells are commonly found on beaches around the UK, especially around North to Mid Wales (figure 6), the north and east coasts of Ireland and the west coast of Scotland. You may very occasionally find them washed ashore alive, especially after heavy storms. Please don't hesitate to get in touch to tell us about any unusual *Arctica* finds!

figure 6: *Arctica* shell on the beach at Borth, Cardigan Bay.

Where can I find out more?

You can keep up to date with our latest research on our website: http://www.sos.bangor.ac.uk/sclero. Alternatively, you can e-mail us at sclero@bangor.ac.uk or call us at 01248 382853.

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[1] http://www.paulkayphotography.co.uk

[2]Dahlgren, T.G., Weinberg, J.R., Halanych, K.M., 2000. Phylogeography of the ocean quahog (*Arctica islandica*): influences of paleoclimate on genetic diversity and species range. *Marine Biology* **137** (3), 487-495.

West Wood Winchester, following up *Helicodonta obvoluta*

John Glasgow

Some members may recall the Conchological Society field trip to Crab Wood and West Wood near Winchester (June 2009: see *Mollusc World* **22**, 3-6). Being on my local patch, I have occasionally visited West Wood to see how the population of *Helicodonta obvoluta* is doing. On an earlier visit in May 2007, when the woodland floor was damp whilst the tree trunks were dry, I recorded twelve *H. obvoluta* and three *Helicigona lapicida* from between 20cm to 1.5m above ground level on the same beech trunk.

On another visit in July 2010, following two nights of persistent rain which came after thirteen weeks of very dry weather, I collected 15 shells of *H. obvoluta* from the remainder of the log pile examined during the field trip of 2009 (figure 1). The shells show a characteristic wide and deep umbilicus, flattened mouth and everted lip, calluses and some shells retaining hairs to adult stage (figure 2). I photographed two live specimens (figure 3) and one live specimen with an epiphragm (figure 4). A secreted epiphragm is normally associated with hibernation but perhaps in this case aestivation as a stress response to the preceding extremely dry conditions. This photo also shows the specimen's flattened top and convex sides giving it a cheese-like appearance, hence the common name of Cheese Snail.

Moving into the wood I found several *H. obvoluta* at the damp base of trunks and also on the leaf litter surface up to 2m away from the trees and on fallen decaying branches. Over a period of two hours I recorded 57 live specimens. It is good to report that this population is doing well at its westernmost locality. In addition there were two live *H. lapicida* (figure 5) which were not seen on the 2009 field meeting.

My researches at Winchester College relating to the early life of the famous conchologist J. R. le B. (Jack) Tomlin, reveal that his early paper on local land and freshwater shells[1] was read before the Winchester College Natural History Society at 8pm on Whit Monday May 29th 1882, by his younger brother Robert Ernest Tomlin. Where was the young Jack Tomlin? I like to think that maybe he had bunked off to Crab Wood on a more important mission in search of *H.obvoluta* and would not be back in time to read his paper: I wonder.

As a novice I would like to thank June Chatfield for suggesting that I might cultivate an interest in the molluscan world (particularly British land slugs and snails as there aren't too many species to daunt the beginner) and for her continuing mentoring and encouragement. A thank you too to Graham Long for his encouragement and help.

figure 1: Remains of log pile, West Wood near Winchester, 2010.

figure 2: *H. obvoluta* shells from the log pile site.

figure 3: Live *H. obvoluta* shells from the log pile site, note hairs on shell.

figure 4: *H. obvoluta* showing chalky white epiphragm.

figure 5: Live *H. lapicida* in West Wood.

References

[1]Tomlin, J R le B, 1882. Land and Freshwater Shells of Winchester *Winchester College Natural History Society 6th Report* pp.44-47, 1882

Succinea oblonga in Finland

Irene Routio

In September 2009 an extensive colony of *Succinea oblonga* (figure 1) was found in the Kärsämäki section (Finnish Uniform Grid coordinates 67145:2413) of the city of Turku. The species has never before been encountered in Finland.

In Kärsämäki, hundreds of living *S. oblonga* usually appear individually in an area of about 360 × 100m. The area is mainly a lush meadow where birches, aspens and willows grow in clusters. There are also a few dirt roads and an abandoned railroad track. The flora in the habitat comprises chiefly *Epilobium angustifolium*, *Urtica dioica*, *Rubus idaeus* and Poaceae species. *S. oblonga* lives also on the edge of a parkland forest in a rather dry forest meadow area. The area of occurrence borders on fields and asphalted areas. Other land snails in the area include *Arianta arbustorum*, *Cochlicopa lubrica*, *Trochulus hispidus*, *Vallonia excentrica*, *V. pulchella* and *Oxychilus cellarius*. Other occurances have since been observed in nearby areas of the city (e.g. figure 2).

The occurrences in Turku are old cultural occurrences and their origin can only be speculated. The species may have come to Finland from Sweden or Central Europe along with people in many different ways. The species may be more common in Finland than what we know; being rather small, 6–8 mm, it may not be noticed in grassy meadows.

figure 1: *S. oblonga* winters successfully in Finland and the first active individuals can be found in May. Photo: Matti Valta

figure 2: Typical habitat for *S. oblonga;* the Artukainen area in Turku. Photo: Matti Valta

A longer version of this article may be found in *The Malacologist,* 56 at http://www.malacsoc.org.uk/The_Malacologist/The_Malacologist.htm

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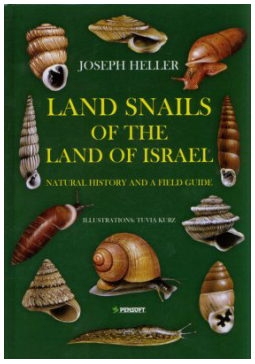
BOOK REVIEW: *Land Snails of the Land of Israel – natural history and a field guide* by Joseph Heller



2009, Pensoft Publishers, Sofia, Bulgaria. 320pp, 174 hand-drawn colour illustrations, 64 colour photographs, 80 b/w illustrations and 80 distribution maps. Hardback, €70, ISBN 978-954-510-2, ISSN 1312-0174.

This book covers the land snails and slugs of Israel, and is written by an academic who has worked on the subject for most of his career; however, it is eminently readable, and the illustrations by Tuvia Kurtz are superb. The book is divided into two parts.

The first section concerns the natural history of Israel's terrestrial gastropods. It provides some basic knowledge without which one cannot proceed, focusing on Israel's land snails and slugs. There are 259 pages covering aspects of the shell, the body, activity, desiccation and heat, predation and defence, biogeography and interactions with man. (The chapter on desiccation and heat was written by Zeev Arad). I particularly liked the section on fossil history. The section then ends with two chapters on water snails of Israel and a historical chapter. Like the author and publisher, I also happen to think that the history of research is important, and I find biographies and old engravings of scientists, book covers, and illustrations of specimens fascinating. They not only provide historical background, interesting in itself, but an insight into the scientific community nearly 200 years ago, as well as documenting developments in the study of natural sciences. Each section is richly illustrated to show details on every aspect discussed in the text, including tables, graphs, maps, photographs and diagrams.

Surprisingly, one then finds 16 pages of references in the middle of the book. After a double-take, one realizes this might be the logical place to put them, since the second section is primarily a field guide. However, it does take some adjustment, looking for a reference in the middle of the book, and I used a bookmarker.

The second part is devoted to a detailed and fully illustrated description of each of the 105 contemporary species occurring in Israel, accompanied by its distribution map. This section is neatly arranged in columns, which works well for the most part, as each species fills a column with its text, distribution map and coloured drawings. The text describes the organism and its local distribution. My only criticism would be that a short line on the species' larger world-wide distribution might have been useful, and no synonyms are provided; the latter could have been included in the checklist. After the species description there is a good glossary followed by an index of terms and scientific names, as well as more generalised words such as algae, beetles and crocodiles.

In summary, I really enjoyed the book; it answers many questions one might ask of the snail fauna of a land with distinct marine, desert, and mountainous terrains and boundaries. The book is successful in its claim to be "addressed to specialists in snails, ecologists, bio-geographers, conservationists, travellers and anyone interested in the nature of the Near East."

Natalie Yonow

[see *Journal of Conchology* 2010 **40**(3) p.361 and *The Malacologist* **55**, p.17 (August 2010) for other reviews - Ed.]

Freshwater limpets on a water beetle

R.J. Driscoll

Light traps are widely used to catch moths, but occasionally attract other types of night flying insect. On 19th September 2009 some members of the Norfolk Moth Group operated a mercury vapour light trap near Lyndford Hall, Norfolk (NGR TL8293). In addition to moths, the catch that night included a large beetle, which was examined, photographed and released. From the photograph Garth Foster was able to identify the insect as a male water beetle, either *Discus semisulcatus* or *Dytiscus dimidiatus* (more precise identification was not possible as the distinguishing anatomical feature was not visible in the photograph).

The light trap had been set up about 1km south of the River Wissey and even closer to a much modified stream that is a tributary of the Wissey, so the capture of a water beetle was not a great surprise. What made the record interesting was the large number of freshwater gastropods found attached to the insect's elytra (see figure 1). Twenty freshwater limpets can be seen in the photograph. Most are *Ancylus fluviatilis* , with a single specimen of *Acroloxus lacustris* near the outer margin of the left elytron.

figure 1: Water beetle with *Ancylus spp.* attached (photo: Joan Saul)

H.W. Kew's *The Dispersal of Shells*, published in 1893 (opposite), is a wonderful example of meticulous, very polite, Victorian natural history writing and is still a useful source of information well over 100 years later. Kew documented numerous examples of freshwater molluscs, mostly *Sphaerium* and *Pisidium* species, but including a smaller number of records of *A. fluviatilis*, *A. lacustris* and *Bithynia tentaculata*, found attached to aquatic insects including Hemiptera (Bugs), Odonata (Dragonflies) and Coleoptera (Beetles). Although most of the insects were found in fresh water, a few of the Coleoptera were caught in flight. An insect brushing against a bivalve and causing it to quickly close its valves could result in the mollusc gripping the insect's antenna, leg or other appendage and being carried off when the insect crawls, swims or flies away (records of *Sphaerium* spp. and *Pisidium* spp.). A prosobranch quickly closing its operculum when contacted by an insect could produce a similar result (record of *B. tentaculata*).

It is less easy to explain how a pulmonate could end up attached to a very mobile and (in molluscan terms) very fast moving insect. Kew (1893) referred to an egg capsule of *A. fluviatilis* "attached to one of the wing-cases of an *Acilius*, a strong flying water beetle." He went on to write "The fresh- water limpets...sometimes ride upon the backs of large flying water-beetles!"

Writing about the dispersal of freshwater molluscs in Britain over four decades after Kew, Boycott (1936) wrote: "The *means of transport* were very well discussed by Kew in 1893... and I do not think anything has been seen since which adds anything really new to his survey, though various fresh examples of snails in transit have been observed." About *A. fluviatilis* he wrote: "It needs a hard clean surface to sit on (which may be supplied by the shell of another snail or a mussel or the elytron of *Dytiscus*, on which it has been caught taking an aerial journey, occasionally by plants, as well as by stones) to which it fits snugly because the edge of the shell consists of periostracum only..."

To return to the Lynford record, how could the beetle have acquired its burden of snails, bearing in mind the large number of individuals representing two species? Kew (1893) provided evidence that gastropod egg capsules could become attached to water beetles (see above). Emergence from such a capsule, or capsules, could have resulted in a number of snails crowded together on the dorsal surface of the beetle, especially if the molluscs were unable to disperse due to a lack of other suitable substrata. From their sizes it is obvious that the snails had not recently emerged, which raises the questions of how long they had been on the beetle and how they had been feeding.

The dorsal surface of even a very large water beetle provides a very limited area on which gastropods can feed. The ventral surface of the insect is probably unavailable as movement of the insect's limbs would prevent snails attaching, or soon dislodge any that managed to do so. Water beetles use their limbs to dislodge detritus and small organisms that might attach themselves. In addition to this mechanical cleaning, Garth Foster (pers. comm.) has pointed out that *Dytiscus* secretes a chemical that acts as an anti-fouling agent that

further limits the growth of algae, etc. (at least on those parts of the body that the limbs can reach). Although it is obvious that snails can remain attached despite the beetle's efforts to dislodge them, even a single individual living on a beetle would soon run short of food.

Of course, the snails may have emerged, fed and grown before attaching themselves to the beetle, in which case the cleanliness of the elytra may be the reason so many snails were present. Boycott (1936) noted that *A. fluviatilis* could not tolerate silt and mud, and Kerney (1999) wrote that the species "avoids muddy substrates or stones coated with mud or thick algae". The smooth dorsal surface of a male *Dytiscus* could provide a very good substratum, mechanically and chemically cleaned by the insect and further washed by moving water whenever the beetle crawls or swims. The deep grooves on the elytra of female *Dytiscus* could make them less suitable as a substratum for snails. That the beetle could provide a means of transport to another habitat would be a potential bonus!

Questions remain. Did the snails attach themselves to the beetle "one at a time" over a protracted period, or did several or all of them attach themselves in a much shorter time interval? How did so many limpets (literally moving at a snail's pace) attach themselves to a highly mobile insect? What was the beetle doing whilst this was happening? Presumably the insect was immobile or virtually immobile when the snails were moving on to it. Why? How long the process take?

The author of this note would welcome suggestions as to how so many snails ended up on the back of a beetle and/or to hear of other records of molluscs attached to insects.

The image of a motley gang of marauding molluscs lying in wait, concealed in submerged vegetation, and then ambushing (or perhaps hijacking is a more appropriate term) a hapless beetle as it crawled or swam past is, no doubt, merely fanciful, but nevertheless quite amusing.

Acknowledgements
David Lester showed the author a copy of *Norfolk Moth Survey Newsletter* (not an obvious source of molluscs records!) which mentioned the Lynford record. Discussion with David and Jo Lester and Garth Foster added to and improved this note. Ken Saul provided information about the moth trapping at Lynford. Joan Saul took the photograph that made it possible to identify the beetle and snails and kindly allowed her photograph to be reproduced here.

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Hygromia cinctella: how long has it been here?

Adrian Brokenshire

Recently, in looking through some slightly older parts of my collection I came upon a nice specimen of *Hygromia cinctella*, collected in late 2002 from drift debris washed into the stone ruins of the old boathouse on the Fleet lagoon at Moonfleet, Dorset, after very high tides and south west winds. I wondered, after all these years if there could be more to be found in the same area? I went off to have a look on 1st November last year.

There was plenty of drift debris in the same area of the old boathouse but no *H. cinctella*, I decided to look further around the ruins on and near some old steps. The area was grown over by grasses, brambles and stunted older trees. Having shouldered my way in and having a good scratch about I collected five empty shells of *H. cinctella*, four faded and badly damaged but one nice shell with only slight damage to the lip and with that nice warm red/brown colour that the shells often have. So it would seem that they are still around in that area although no live specimens were found; that's a job for perhaps another time.

Once home I got to thinking about how these shells got to be here at Moonfleet Manor and also in the area of Pennsylvania Castle on Portland. Other finds and recent reports of *H. cinctella* localities suggest it is expanding countrywide via gardens, garden centres, imported plants, dumped garden refuse into the countryside, modern landscaping, etc. But could it be that at some localities it has been in this country for quite some considerable time, just not looked for or noticed? Take Moonfleet Manor as an example. The buildings may date back from the time of the Mohun family in the 16th century when the grounds extended much further around the buildings that at the present day with well-maintained terraces running down to the edge of the Fleet lagoon and no doubt planted with what would then be considered exotic plants brought in from Europe. These features are now long gone having reverted back to countryside some time ago.

Could it be that *H. cinctella* is not a new visitor here at Moonfleet, but an old accidental introduction that has hung on for many years from the historical past. If this was the case then could some recent reported sightings be of much older populations than were initially thought?

Two thousand years of eating oysters in the UK: an archaeological perspective

Jessica Winder

INTRODUCTION

Readily observable features in oyster shells (*Ostrea edulis)* from archaeological excavations can provide important evidence of where the oysters came from and the way they were exploited by man.

This article gives a brief overview of the methods and preliminary results of investigations that are being made into oysters from excavations of archaeological sites in Britain using observations of their macroscopic characteristics. It is based on a series of published and unpublished reports made to archaeological organisations, and on the doctoral thesis: *A study of the variation in oyster shells from archaeological sites and a discussion of oyster exploitation* (Winder 1993).

BACKGROUND TO THE RESEARCH

Awareness of this potential research opportunity was raised in the 1970s when a surge of construction development and its associated archaeological investigations uncovered large quantities of marine mollusc shells. An example of this was the excavation of Saxon Hamwic in Southampton where vast numbers of marine shells were recovered, mainly oyster, from domestic rubbish pits. The archaeologists had hundreds of large museum boxes full of mud-caked shells in store and wanted to know what to do with them. Had these shells, they wanted to know, any potential for site interpretation? If so, could they be used to indicate how important marine molluscs were in the diet of the community? Where did the shellfish come from? Was it possible to establish the locations being fished in order to understand how far afield people were going for food and to suggest trade links and routes? How intensively were the shellfish beds being exploited – how much effort and organisation was invested in the activity?

Another aspect which intrigued archaeologists was whether some degree of oyster cultivation had been taking place. Were the oysters fished from natural (wild) beds or were they farmed, cultivated and subjected to more commercially orientated activities? It has always been assumed by historians that the Romans introduced oyster cultivation to Britain but could this be substantiated from the archaeological record?

The problem for the archaeomalacologist is to discover what actually survives in the oyster shells that can possibly help to answer the questions posed by the archaeologists about the way people have exploited oysters in the past. Much of what is already known about the oyster and man relationship can be found in the general literature, particularly accounts from the 19th and early 20th century discussing eating, fishing and farming oysters. Despite some serious gaps in the periods covered, and not a few misunderstandings, this older literature contains some very useful information - including a quotation from the Roman poet Lucilius who said:

> *When I but see the oyster's shell,*
> *I look and recognise the river, marsh or mud,*
> *Where it was raised.*

It is clear from allusions in the literature that, in fresh oyster shells at least, it is possible to observe variations that could be attributed to the place of origin. This idea was developed by Alfred Bell (1921) where he meticulously described variations on British oyster shell shape, ascribing sub-species and variety names to specimens from different locations. Unfortunately, it seems likely that his descriptions may have been based on just a single specimen in some cases.

METHODS

Many of the distinguishing features found in the shells of fresh or live oysters may not survive burial conditions over hundreds of years. Most soft parts of the mollusc itself, or the organisms attached to it, are likely to be absent. Breakage, wear and erosion will have affected harder parts, smoothing the sculpturing or ornamentation and damaging adhering epibiont structures. Whilst many excavated shells are worn and relatively featureless, some can remain surprisingly fresh in their appearance and even retain pigmentation and fragments of ligament and periostracum. Figure 1 shows the similarity between an oyster washed up on the beach at Oxwich Bay, Gower in 2005 and a 12th century shell recovered from an extensive midden on the edge of Poole Harbour in Dorset.

The one thing that was abundantly clear from the examination of that first batch of oyster shells from Saxon Southampton (Winder 1980; Winder 1997) was that the size and shape varied considerably within the samples. And once the shells had been carefully washed, other features could be seen such as the remains of encrusting epibiont organisms like barnacles and Bryozoa, and damage caused by burrowing worms and sponges. The shells could be adhered together in clumps. Miscellaneous debris like pebbles or other marine mollusc shells was frequently attached. Man-made marks were noted such as v-shaped notches on the shell margin caused by opening the oyster and cut marks on the smooth inner surface where the meat had been scraped off. A collage of some of these epibionts on oyster shells can be seen in Figure 2.

A standard method has been devised for recording both the measurable and objective features as well as the subjective and descriptive characters of each oyster shell. Up to 25 features are recorded. The information can be collated and expressed as a mean frequency of occurrence of each characteristic in the whole sample. These frequencies give each sample a unique description. The samples can then be compared on an intrasite or intersite basis, between feature types, different areas of site, and different periods of occupation.

CAVEATS TO ANALYSES OF THE ARCHAEOLOGICAL DATA

There are many challenges to working with archaeological oyster shells. There are possible biases to the material that would affect the analysis and interpretation of the data. For example, how representative are the shells from an

figure 1: Two well-preserved *Ostrea edulis* L. left valves showing colour banding
left: Modern 21st century oyster shell washed up on the beach at Oxwich Bay, Gower
right: Early medieval 12th century oyster shell Poole, Dorset.

figure 2: Examples of surviving evidence of epibiont organisms in archaeological oyster shells.

individual site of the original incoming samples to that site – both in quality and quantity? Moorgate and Coleman Street excavations in London (Winder 1987) of 11-12th century domestic rubbish pits uncovered strikingly different shells in different pits. One contained poor quality oysters of very small and very large size, while the other had all the better quality shells of the optimal mid size range. It is easy to see how erroneous conclusions could have been drawn if the specimens from only one pit had been selected for analysis.

Has there been an excavation bias with only the larger or intact shells being retained? How much reliance can be placed on comparisons of archaeological oyster shells with samples of modern material from known locations?

Finally, the taphonomic history of the shells, soil conditions and disposal methods will affect the chemical and mechanical wear on the shells. There is randomness to shell survival and recovery as well as to the process of shells being made available for study. All of these factors have to be considered and they place restraints on the interpretations based on the shells. Additionally, there can never be enough samples. With this awareness, the following analysis of the data was carried out.

A FEW RESULTS

Some results of the analyses of the two main contributors to variability in the shells of *O. edulis* L. are presented here. These relate to size and evidence of infestation and encrustation by epibionts.

Size differences

The size of oyster shells recovered from ancient sites results from a combination of factors: natural environment, genetics and human influence. Examining size can potentially help to distinguish, for example, between oysters originating from different localities or subject to varying fishing practices. Measurements of approximately 20,000 oyster shells were used initially and comparisons between the samples made by parametric and non-parametric tests for various categories of sample. These categories included samples from different geographical regions, inland and coastal sites, urban and rural sites, and various historical periods.

Comparisons of size for broadly defined historical periods reveal interesting variations in mean sizes between the Roman, Saxon, Medieval, Post-medieval and Modern oyster shells. This appears to indicate statistically significant temporal differences in the average size of oyster shells. Roman shells are largest but size decreases progressively through successive periods until a recovery to almost Roman dimensions in the Modern period. The data will be reworked using more sophisticated computer software and the much larger database that has been acquired since this analysis was first completed. Figure 3 is a simple bar chart presenting the differences in size of oyster shells through time based on the original analysis.

Epibionts

Differences in encrusting or infesting epibiont organisms in oyster shells closely relates to the natural conditions in which the oyster was growing – such as the depth of water, the substrate and the geographical location. Principal Component Analysis (PCA) was used initially to compare the sum total of all recorded characteristics of an oyster shell sample. However, PCA proved most useful in differentiating oysters from different regions based on the infestation characteristics (Winder 2002).

Figure 4 gives the result of a PCA of infestation in Roman oyster samples and demonstrates regional differences. Each coloured symbol on the chart represents a sample from a named site. It is only necessary to note for present purposes that the chart shows samples segregated mainly into two groups. Those from Essex and Suffolk are grouped together on the left and whilst those from Dorset, Hampshire and Wiltshire to the right. Samples denoted 'Shir*'* for The Shires excavation in Leicester, and 'Pud' from Pudding Lane in London are included in the grouping of samples known to have originated in East Anglia and indicating that oysters at these inland sites were obtained from that part of the country.

The same marked differentiation can be seen for PCAs for other periods as well. The organisms that seem primarily (but not exclusively) to account for this regional differentiation of oysters from the South Coast compared with the East Coast are polychaete worms of the *Polydora* genus. These worms leave characteristic burrows in the shells. *Polydora ciliata* (Johnston) seems to be ubiquitous while the larger species *P. hoplura* Claparède appears to be restricted to southern waters. PCA seems a promising approach for pinpointing the source of oyster samples and will be developed.

THE GENERAL PICTURE

Oyster and other marine mollusc shells have been examined from 60 sites for this project. In addition to firmer ideas about movements of oysters between different localities in the past, and site specific information about oyster usage, in broad and brief terms, the following picture emerges about oyster exploitation in Britain. No oyster shells seem to have been recovered from Iron Age sites. Specimens found at Owslebury in Hampshire are now believed to be incorrectly dated to that period.

Roman sites throughout the UK are renowned for the massive quantities of oysters. Contrary to assertions in the literature, no physical or documentary evidence has been found so far to indicate that the Romans introduced oyster cultivation to Britain. Although they used cultivation techniques in Italy, these would have been impractical and unnecessary in Britain. Oysters appear to have been an unexploited resource immediately prior to the invasion.

The claim that oysters were transported around Britain alive in lead tanks of salt water seems also to be highly unlikely and immensely impractical. Oysters will remain fresh for up to ten days if kept cool and packed closely to prevent opening of the valves. The transport system was excellent by road, river and sea.

The large average oyster size for the period may reflect an abundance of mature specimens, a preference for eating larger oyster meats than we select today, as well as a rapid growth rate.

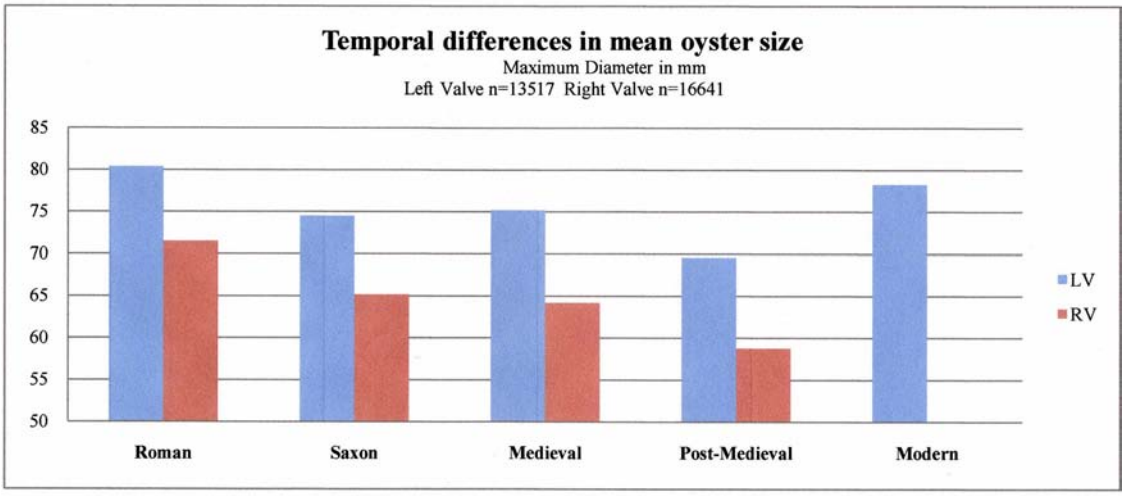

figure 3: Temporal differences in oyster size infestation differences.

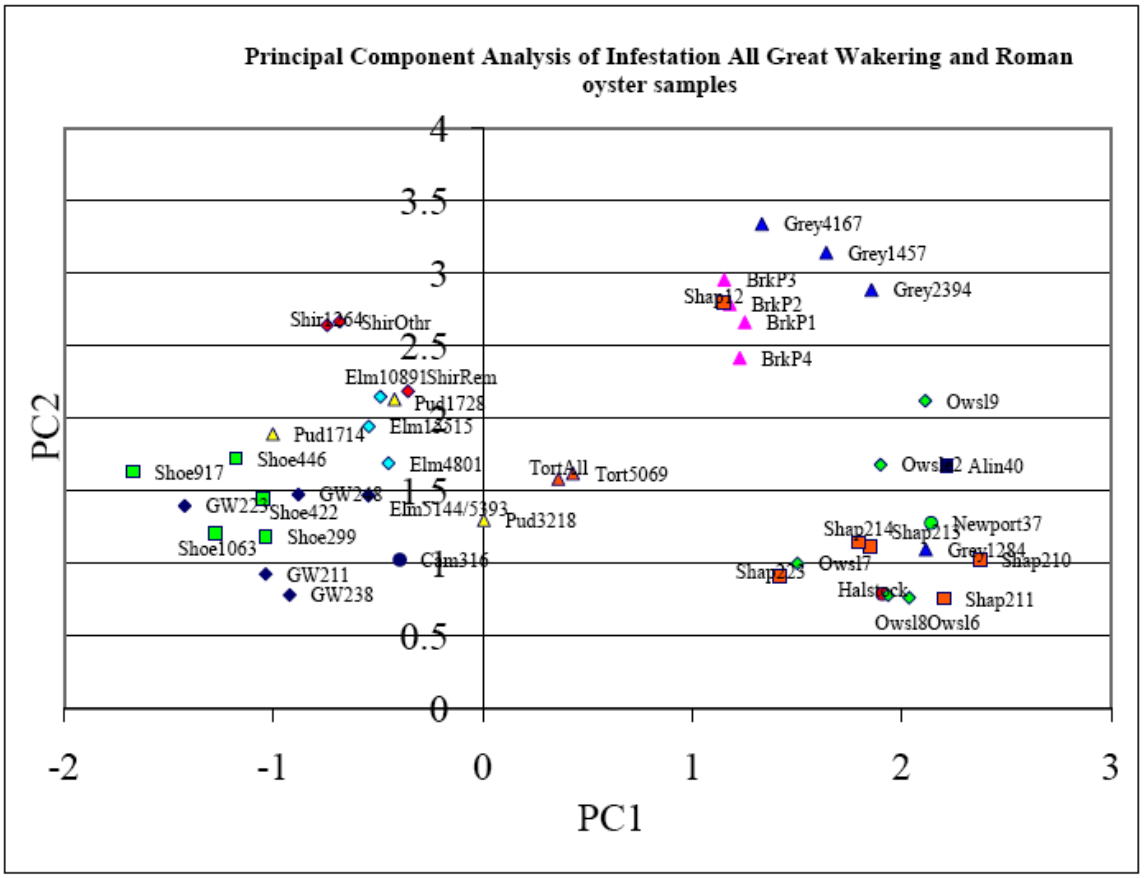

figure 4: Principal Component Analysis of infestation in Roman oysters.

Saxon sites also produce lots of oysters but these are mostly near the coast or with easy access by river to the coast. Deterioration of the roads with the exit of the invaders and poorer organisation meant that oysters could not be sent far. Average size is slightly but significantly smaller than those from Roman sites. To date there is still no evidence for farming or cultivation of oysters.

By the **Medieval** period, oysters were far more widely distributed across the country. Their size tended not to be the result of selecting less mature specimens but rather a much slower growth rate. This could be attributed to temperature changes but is also likely to be a direct result of oyster relaying and storage activities. Documentary records are made about the ownership of oyster beds and oyster fishing rights. Oysters that are re-laid inter-tidally and periodically exposed at low tides cease to grow whilst out of water. Simultaneously they learn to keep the valves tight shut when exposed to the air. This ability means that they stay alive for longer when traded and dispatched. Improved longevity in keeping fresh means that oysters can be sent greater distances. The greater numbers of oysters found on coastal sites reflects their easy availability and indicates that they were a staple of the diet. The smaller numbers of oysters found at inland sites suggests that the cost of transporting them made them an occasional and luxury item for these people.

Not many oyster specimens of **Post-medieval** date were made available for study, so conclusions are few. The shells were smaller than in earlier periods.

The **Modern** period, for current purposes, is taken as including the 19th century onwards. This saw the advent of oystermen and more and more boats went out to fish the beds. Holding pits on the shore became commonplace to store the catches before marketing. Prices of oysters plunged. They became the food of the common people everywhere, not just those living on the coast. They were so cheap that London apprentices complained of their monotonous diet of oysters and salmon.

Eventually, the oyster beds were over-fished and stocks became depleted. Efforts were made to cultivate oysters and breed foreign species. All attempts failed. The final blow to the incredibly successful oyster industry of the 19th and early 20th centuries came with massive extinctions of beds in the 1920s – thought to result from extreme cold weather and disease.

A few natural beds of oysters survived. Oysters became a luxury item on the menu again. A second catastrophe in the form of *Bonamia* (a protozoan parasite) disease decimated remaining stocks in the 1970s. This time modern technology came to the rescue of the British oyster industry by breeding oyster spat of both *O. edulis* and *Crassostrea gigas* in the laboratory so that beds could be restocked. Oyster farming today with its net bags of brood oysters and floating platforms would not be recognised by our predecessors. Their methods were undoubtedly simpler but harder and we still have much to find out about them.

After working on oysters for over 30 years now, I remain as passionate about the subject as ever, fascinated by their variability and what this might mean for the interpretation of archaeological material and our understanding of both the railways and with them a cheap way of selling oysters to the masses all over the country. It was a boom time for human exploitation of this marine resource and of our changing natural environment.

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Truncatellina cylindrica alive, and gigantic, in Scotland

Gordon Corbet

In the *Conchologists' Newsletter* no. 152 (March 2000) I reported the finding, in November 1999, of *Truncatellina cylindrica* at Dumbarnie Links Wildlife Reserve (Scottish Wildlife Trust) in Fife (N0 440022). At that time only empty but fresh shells had been found. Since then many more similar shells have been found throughout the seven hectare site, making 114 in all, but also seven live individuals between January 2001 and November 2009. All the live ones were at one location, in grass divots at the base of a concrete WW2 pill-box. Searching by myself and others has failed to find it at its only known 20th century site in Scotland, on Arthur's Seat in Edinburgh in the 1930s.

In December 2009 a remarkable empty but fresh shell was found by sieving sand on the reserve – similar in diameter to the others but 2.7 mm high. A sample of 67 others from the reserve measured 1.50 to 1.95 mm (median 1.80), with a single one 2.20 mm. Apart from the height, with two additional whorls, the giant closely resembles normal specimens. The photograph (right) shows the giant along with a normal one 1.8 mm in height. Are there any precedents in this or related species?

Regional Meeting - 6th November 2010
University Museum of Zoology, Cambridge

Peter Topley

Seven of us met at the museum where Richard Preece, Senior Assistant Curator in Malacology, took us "behind the scenes" to view the important mollusc and other zoological collections and also into the galleries themselves. The Dry Invertebrate Store containing the main mollusc collection, is a large area, with a variety of cabinets containing the taxonomically arranged specimens (figure 1).

figure 1: Richard introducing the mollusc collections.

Richard explained that the mollusc collection is formed around that bequeathed to the university by Robert MacAndrew in 1873. His collection contains almost 16,000 species and 200,000 specimens, including types, many of which are self-collected from areas including the Gulf of Suez prior to the building of the Suez Canal, an event that has subsequently resulted in faunal exchange between the Red Sea and the Mediterranean. MacAndrew was interested in growth series and Richard showed us examples of such series mounted on characteristic blue card. This collection includes part of that accumulated by W.H. Benson who lived and collected in India and neighbouring areas in the early 19th century, consisting of land and freshwater shells, many of which are endemic species from localised habitats, some of which are possibly now extinct. Richard showed us several drawers of Benson designated type specimens from this collection, the status of many of which are, unfortunately, difficult to confirm. The mollusc collection also includes good representation of island faunas, including series of Pacific island *Partula* snails, many of which are now extinct and the important R.T. Lowe collection of Madieran non-marine molluscs. There is in addition the Jane Saul Collection from 1895, consisting of about 13,000 shells, mostly from the Indo-Pacific, including a number of type specimens, some of which were figured by Lovell Reeve in his superbly illustrated Conchologia Iconica.

The museum is progressing a project to image all its type specimens and Hilary Ketchum explained an ongoing contract she is involved with at the museum to catalogue the bivalves and make this data available online.

We visited the extensive spirit collections (figures 2 and 3) where Richard pointed out that some of the jars have blue stripes indicating a type specimen. "We have a lot of type material, including specimens brought back on the Beagle by Charles Darwin. There are some type molluscs: for example we have the Walter Collinge collection, so we have the type of *Arion flagellus* that he described. We also have material from the British Antarctic Survey; for example Antarctic bivalves." As we went to leave the room there was a brief moment when we thought we were locked in for the weekend with the jars of pickled snakes and no mobile signal, but luckily the door was eventually opened and we emerged into the light of the main galleries, where Richard explained interesting exhibits of fossil tetrapods from Greenland, early Pleistocene faunas of Britain and Charles Darwin's beetles, barnacles and finches.

figures 2 and 3: viewing specimens in the spirit room.

After a brief visit to the vertebrate collections, the opportunity was taken to return to the molluscs to examine areas of personal interest to the participants, which included British freshwater mussels and African and New Zealand landsnails. Trays of bivalves in need of identification were also put out in the demonstration room and assistance was provided and offered where possible. A fascinating and absorbing day was had by all and our thanks go to Richard, Hilary and Richard's research student Tom White for making it so successful.

Molluscs of the northern Wey, Hampshire

June Chatfield

Field meeting 26th June 2010

figure 1: introductory talk near the Hen & Chickens pub at Froyle. (photo: Peter Topley)

This freshwater meeting investigated the northern branch of the River Wey in east Hampshire, a chalk stream that arises from springs at Will Hall Farm just outside Alton. Further springs augment the flow as it travels north-east to Farnham in Surrey. The river meanders across a wide valley of pasture land below the villages of Holybourne, Froyle and Bentley that are situated on river terrace gravel. Beyond Bentley it crosses into Surrey, flows through Farnham and then abruptly changes direction to the south (an elbow of river capture to geographers) to join the southern branch of the Wey from Haslemere at Tilford. After the confluence the Wey flows to Godalming and Guildford before joining the Thames at Weybridge. After Tilford it is a much deeper river and parts of it have been modified as the Wey Navigation. Some years ago, this society held a field meeting at Tilford and other stations downstream. Although arising on chalk in Alton, from Neatham near Holybourne and eastwards through Froyle the bedrock is Upper Greensand. Further downstream at Bentley the geology is Gault Clay (with numerous tributaries arising off gravels from Alice Holt Forest) and further east towards Farnham the Lower Greensand outcrops as the bedrock.

Northern Wey

Even close to the source, within the bounds of Alton, this chalk stream is rich in its flora and fauna with a wide range of species coupled with abundance. Several stretches of the river are managed for wild trout fly fishing, including the sites that we visited. Through Bill Stanford of the Baden Powell Fly Fishers (who is also on the committee of the Northern Wey Trust) we had access to a good stretch of private river bank. He kindly joined us for the morning to guide us to the best routes to negotiate fences, gates and river access points.

The day of the field meeting was hot and sunny and the ground was very dry so we concentrated our efforts on the freshwater fauna. Eleven members of the Conchological Society were present and also others from the Northern Wey Trust and Alton Natural History Society, a total of 18.
In the morning we were in Froyle (figure 1) and took a track opposite the Hen and Chicken to the river and after honing our skills at gate climbing (hinge end!) (figure 2) we worked a stretch of river at SU758422, searching in the weed (Stream Water Crowfoot), flints on the river bed, gravel and silt (figures 3 and 4). Living specimens of the land snails *Arianta arbustorum*, *Cepaea hortensis* and *Succinea putris* were found on the tall vegetation approaching the river whilst we waited our turn to go over the gate.

figure 2: Janet Ridout Sharpe tackling the gate.

figure 3: Working the River Wey, Froyle. (photo: Peter Topley)

figure 4: A "pair" of *Bithynia tentaculata* with freshly laid egg masses, River Wey at SU758422. (photo: Ron Boyce)

We then followed the river downstream to the bridge behind Shrubbery House (SU459422) where Graham Long took some river gravel samples and Janet Sharpe some leaf litter from the wooded area just across the bridge (on public footpath). Gravel samples were also taken by other members of the group at the main collecting places.

Next we took a path at the back of Shrubbery House walled garden where the group divided into two, one searching in a stretch of river, where it was also good to see Marsh Horsetail, and the other crossing a field to "Millenium Bridge" near a pumping station and it was in the latter site that the one living *Pisidium amnicum* was found by Rosemary Hill (figure 5).

figure 5: Live River Wey *Pisidium amnicum.* (photo: Peter Topley)

Returning to the cars and Hen and Chicken for lunch (see back cover), when the local members left us, we then drove in the direction of Farnham, past Bentley village, to a layby near the Bull Inn and the signposted turning for the Alice Holt Research Station (Forestry Commission). We took this lane as far as the bridge and site of the former Bentley or Turks Mill and followed the public riverside footpath downstream to Holt Pound. Our first collecting and access place was in a meadow before the large meanders (SU/80365 44234), then in a wooded stretch (figure 6) and finally out into another open meadow pasture at SU/80958 44386. The river in these locations was shallow enough to wade in with ordinary Wellington boots and had a range of microhabitats varying in depth, water speed, bottom material and presence or absence of water plants. This is a general feature of the northern Wey in its upper reaches, making it a good river in which to investigate freshwater life.

figure 6: Collecting in the river near Holt Pound.

As well as recording living molluscs *in situ* several of us took shell gravel samples to process later that resulted in some additions to the field list such as *Gyraulus (=Armiger) crista* and *Pisidium* species, so worth doing. In the past *G. crista* has been found in weed washings from the Shrubbery House section.

Results are shown in table 1. The total species count was 40, including molluscs from gravel samples and leaf litter. The river habitat produced 29 species, comparing well with the total of 18 for the Alton stretch of the northern Wey. However the more noteworthy species that do not occur in the Alton part of the river, *P. amnicum* and *Unio pictorum*, were not in a good state. I have known both of these species in the Wey since 1980 and at that time there was a good living population of *P. amnicum* in silt under the road bridge arches near Mill Court, just upstream from our first station. In recent years when collecting at Mill Court I have not been able to find them. Likewise the *U pictorum* shells found in the river opposite the Bull Inn and downstream were in the early 1990s fresher then they are now. On the field meeting we only came across very old eroded shells of single valves and broken fragments and nothing to indicate a living population.

In March 1999 a major spill of ammonia from an old ice cream factory that was being cleared on the Mill Lane trading estate in Alton severely polluted the northern Wey from the pollution source in the Caker Stream, just before its confluence with the Wey and extending down river for several miles (*Northern Wey Trust Newsletter Nos. 10, 11 and 12)*. Reports of dead fish in the river led to emergency calls to the Environment Agency who caught the workmen responsible, leading to prosecution. Various parts of the flora and fauna recovered from reservoir populations in the marginal vegetation, with the core of the pollutant being washed down mid-stream, but sensitive species like the larger mussels may not have survived. *Unio* is distributed by glochidia larvae that attach themselves to the gills and skin of river fish on which they are parasites for the early stages of the life cycle, before dropping off to live a normal bivalve life in the sediment. Infected fish being killed would have been a further set-back for the mussels. We need to work in conjunction with the fly fishers (who take their catch home to eat) to examine the present population of Brown Trout for this stage of the life cycle and also to get into serious wading gear to search suitable deeps where large mussels might still survive, being long-lived animals. Thank you to members of the field meeting for sending additional records.

The northern Wey is still a rich chalk stream as a whole, but my impression is that it has suffered from various pollution events – ammonia in 1999, untreated sewage discharge, oils, detergents and heavy metals from road run-off, yeast from the brewery in Alton and more than one spill of silt from building sites on the trading estates along the river. These have led to prosecutions by the Environment Agency

through calls to their hotline. Not that this is new as the Wey in Alton has over the centuries been used for discharge from tanneries, dye-houses, privies and paper works. However it supports a chalk stream fly fishery, has a range of different habitats and is worth working to improve its ecological status, for which regular monitoring of the flora and fauna is important. It was this stretch of river valley that Arthur Young (quoted by William Cobbett of Farnham) said was "the best ten miles in England". The Northern Wey Trust has a series of river wardens (the author being one) who have been regularly checking up on their own section of river over the last 15 years, showing changes in the river, both natural and seasonal, as well as catastrophes.

figure 7: *Bathyomphalus contortus*, River Wey.

figure 8: *Gyraulus albus*, River Wey. (photos: Ron Boyce)

table 1 (right): Collecting sites: **1** River Wey and bank from below Hen and Chicken to Shrubbery House Bridge 41/758422; **2** River Wey beyond Shrubbery House 41/76-42; **3** Millenium bridge and pumping station 41/76-42; **4** Fields opposite Bull Inn 41/80365 44234; **5** Wooded area between 4 and 6; **6** River in field before railway tunnel 41/80958 44388; **7** Leaf litter samples in wooded slope behind Shrubbery House bridge 41/759425. Key: S = shell only A = alive. (Janet Ridout Sharpe and June Chatfield)

Species	1	2	3	4	5	6	7
Acroloxus lacustris	S						
Aegopinella nitidula					A		S
Ancylus fluviatilis	A			A	A	A	
Anisus vortex	A			S	A	A	
Arianta arbustorum	A						A
Ashfordia granulata							A
Bathyomphalus contortus	A			S		A	
Bithynia tentaculata	A			S	A		
Cepaea hortensis	A						
Cochlicopa lubrica	S						A
Discus rotundatus	S						
Galba truncatula				S			
Gyraulus crista	S			S			
Gyraulus albus	A			A	A	A	
Hippeutis complanatus							
Lymnaea palustris	A			S	A	A	
Lymnaea stagnalis	A			S	A	S	
Monacha cantiana						A	
Nesovitrea hammonis	S						
Oxychilus draparnaldi							A
Oxychilus navarricus							S
Physa fontinalis	S						
Pisidium amnicum			A	S		S	
Pisidium casertanum	S						
Pisidium milium	S						
Pisidium nitidum	S						
Pisidium spp.	A					A	
Pisidium subtruncatum	S						
Planorbarius corneus	S				S		
Planorbis carinatus	S			S		A	
Potamopyrgus antipodarum	A		A	A	A	A	
Radix balthica	A			S	S	A	
Sphaerium corneum	S			S	A	S	
Succinea putris	A						
Trochulus hispidus							
Unio pictorum					S		
Vallonia pulchella	S						
Valvata cristata	S			S		S	
Valvata piscinalis	S			A	A	S	
Vitrina pellucida							S
Zonitoides nitidus	S						

Research Grant 2010

We are delighted to announce a Conchological Society Research Grant of £1000 to Amy Prendergast, of the Department of Archaeology, University of Cambridge, for:

"Shell growth and stable isotope chemistry of *Helix melanostoma*: a new climate archive for North Africa."

Her project aims to examine the use of stable oxygen isotope ratios in land snails to reconstruct past climate on the basis that these ratios vary with temperature; she will analyse living snails and plant samples from areas with different temperature regimes to test the method, and then apply it to snail shells from Haua Fteah, a cave site in Libya with *Helix* shells from occupation levels dating from 20,000 yBP to the Roman period.

British Shell Collector's Club

30th April 2011, 9am to 5pm:
Shell Convention
Theydon Bois Village Hall, Essex, CM16 7ER

Free admission. An opportunity to meet others with an interest in shells and to seek advice from experienced collectors. Many shell and shell related items for sale; auction.

Some other events in 2011:-
17th September: Shell Show, Chatsworth House, Derbyshire
29th October: Shell Show, Theydon Bois Village Hall

For further information see: www.britishshellclub.org.uk/

The spider and the belemnite

Phil Palmer

The interesting article on belemnites by Neale Monks (*Mollusc World* **20**:8-11, July 2009) had me searching my garage for a belemnite, collected decades ago and almost forgotten. It came from the Lower Oxford Clay, Jason Zone, at Stewartby about 5 miles SSW of Bedford.

Members of the Department of Palaeontology of the Natural History Museum were there to dig out a pliosaur exposed by a large drag-line excavator. My job was stratigraphy, assigning the pliosaur to a zone in the Oxford Clay, an easy task made even easier by considerable numbers of *Kosmoceras* ammonites on and around the pliosaur. After logging the section and collecting clay samples, I was free to explore older and abandoned parts of the pit.

The London Brick Company at Stewartby was exploiting a thick bed of bituminous shale which was partly self-firing and, requiring less fuel, produced a cheaper brick. To get this shale bed a considerable amount of overburden clay was removed and deposited in tidy rows of conical heaps, for a hundred yards behind the working face. The furthest and oldest of the conical heaps had weathered to rounded humps and I was curious to see how this raw weathered clay became colonised. I was thinking of plants.

A scatter of ragworts, umbellifers and crucifers came as no surprise, but the number of spiders was unexpected. One, larger than the rest, ran across my path and drew my attention to a nearly complete belemnite *Cylindroteuthis puzosiana* (illustrated by Neale MW 20, p.10). But this one was not broken and had a surprise hidden in it (figure 1).

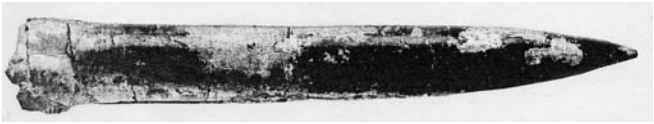


figure 1: A near complete belemnite 'guard' but without the forward extension of the pro-ostracum. Length 185 mm, diam. 24 mm.

Back home, while washing away the mud, a piece of shell fell off exposing the chambered phragmacone narrowing almost to a point. Impatience and a hair dryer allowed me to focus a hand lens on the point, revealing a shiny hemispherical dome: the protoconch (figure 2). The phragmacone, as Neale pointed out, is made of aragonite, an unstable form of calcium carbonate and therefore usually missing; but not this one. A lucky chance had filled the aragonite chambers with stable calcite, before the aragonite dissolved, leaving a near complete phragmacone with a calcite-filled protoconch right at the tip of the phragmacone.

Belemnite protoconchs, though rarely seen, are not unknown. I have a *Belemnopsis* from the Mid. Jurassic Fullers Earth Clay of the Fleet, Weymouth, Dorset, which has split along the central axis, through the phragmacone and the protoconch. But it was all preserved and only requires the experience to know what one is looking at. Also, Peter Doyle, top belemnite specialist, told me he had seen protoconchs in Liassic belemnites. So maybe it is not so rare, just knowing where to look and a bit of luck with aragonite to calcite conversion.

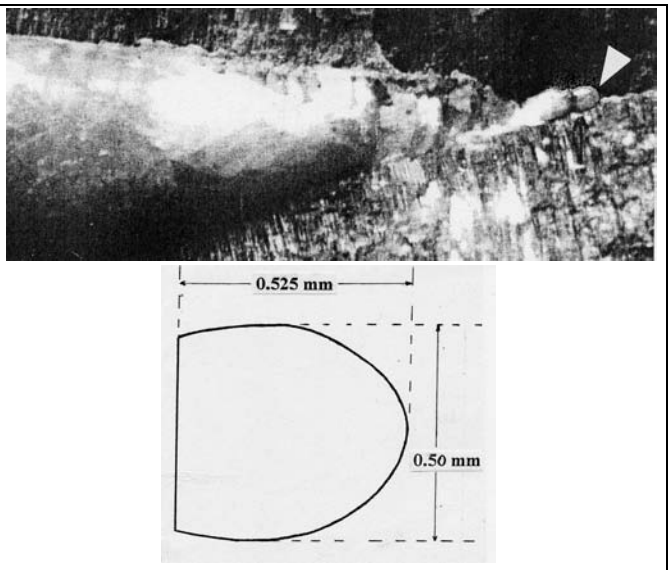


figure 2: The protoconch (arrow), lacking growth lines, was laid down as a single cap of shell while still in the egg. Part of the phragmacone, left of the protoconch, is broken off and attached to the inside of the piece of shell which fell off during washing. The aperture of the protoconch is marked by a narrow brown zone just before the first chamber was formed (c.x8). The drawing shows the dimensions of the protoconch made with a 10 mm eyepiece graticule, x100.

In figure 3 I have deliberately avoided the question of the number of arms since we have no evidence. But the ink sac, often present, puts the belemnite in with the coleoid cephalopods, while the internal calcareous shell relates it to the squids and cuttlefish. So the probability is that it had ten arms.

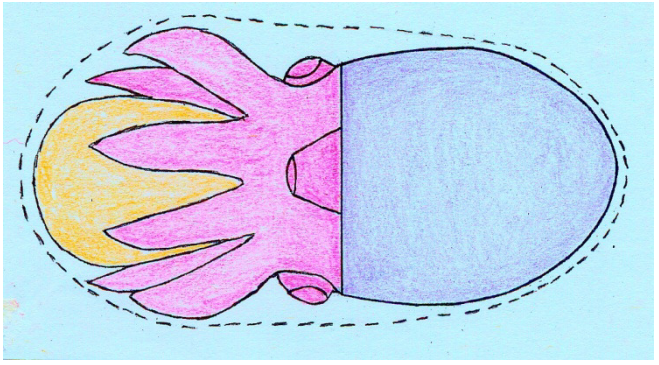


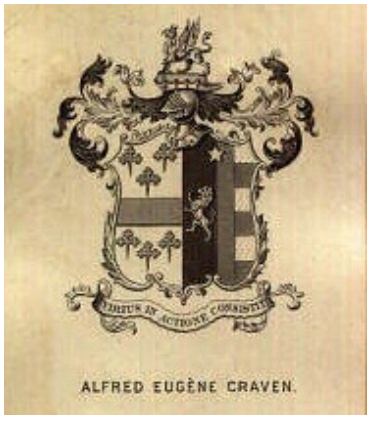
figure 3: A tentative and hypothetical reconstruction of the embryo while still in the egg. The colours are diagrammatic to differentiate between: blue for the shell, red for the animal and yellow for the yolk sac. The enclosing dashed line indicates the egg case. The animal at this stage would have been about 1mm long.

Recent Additions to the Society Website http://www.conchsoc.org/ *Pryce Buckle*

"Collectors in East Africa" by Bernard Verdcourt
Bernard Verdcourt[1] wrote 31 articles on Collectors in East Africa for the *Conchologists' Newsletter* over a period of 23 years (June 1979–September 2002.) The articles have now been incorporated into the website, starting at http://www.conchsoc.org/collectors_east_africa/collectors.php and can be accessed from our opening page and from the Resources and Site Map pages as well.

Each article deals with one eminent collector. Bernard gives the biographical details he has been able to discover, together with facts about the exploration of Africa and the adventures and hardships these early collectors had to overcome whilst collecting. They collected not only molluscs, but many also collected any other animal and plant material they considered interesting or thought might be new to science. In most cases, their collections were sent home for a specialist to describe and publish the results. A few collectors described and published their own collections when they returned home – there were not the facilities (nor the time) to do it in the field. Bernard's articles include lists of the molluscs described from the material collected, references for the published papers, together with much of historical interest.

Alfred Eugene Craven
During the time I was preparing the articles for inclusion on the website, I noticed that in 1979 Bernard had been unable to discover when or where A. E. Craven was born. I made an internet search for "Alfred Eugene Craven" that produced a number of results, including one[2] that revealed he was recorded in Burke's Peerage, along with some biographical details[3]. Alfred Craven was born on 21 September 1848, the son of Charles Craven and Harrietta Streatfeild *(sic)* and was christened in Brussels, Belgium, but I have been unable to establish whether he was born there. Alfred Craven was married twice and had two children by his first wife. He died on 6 January 1937 at age 88.



Another internet site[4] revealed a bookplate in the name of Alfred Eugène Craven (above). Perhaps a reader with knowledge of heraldry may be able to supply details of Craven's connection with the aristocracy from the image.

Indices to Journal of Conchology
I have been compiling the index for publication in each volume of the Journal since Volume 35 (1994-1996), but due to technical difficulties it is only from Volume 37 (2000-2003) that I have been able to produce a pdf file capable of being included on the website. The indices are available from the Site Map page, the Resources page, the left hand menus on the *Journal of Conchology*, the *Mollusc World* and the Publications pages, all of which may be reached from the Home page.

In *Mollusc World* 20 (July 2009) I outlined how an abstract of a paper published in the *Journal of Conchology* could be accessed from the online Index. At that time it was necessary to find the page number of the paper you wanted by using the Index, return to the list of abstracts and click on the title for that page, in order to arrive at the abstract you were seeking. Although using the Index in that way proved useful, it was rather time consuming, and it also confused some people.

I have now placed a link on the page number in the Index so that by clicking on it you are taken directly to the appropriate abstract. Links on the Index page numbers are coloured blue and are underlined. Please inform me of any broken links at webmaster@conchsoc.org. Page numbers that are not links are shown as normal black text - they do not have abstracts because they do not refer to full papers - they are present because the file is also used to produce the index for the printed version when the volume is complete. Indices with direct links to the appropriate abstract are now available on the website, covering the period 1988 to 2010 (Volumes 33 to 40). Abstracts were introduced in 1979 in Volume 30, and over time I hope to complete indices for the remaining Volumes 30, 31 and 32.

Until now, the website index has only been available upon completion of the volume - normally after three years. Having resigned as Treasurer, I now have a little more time available for the website, and, if possible, I intend to compile the website index soon after the parts are published. The index for parts 1, 2 and 3 of Volume 40 is now on the website complete with hypertext links to the abstracts.
I hope that these additions prove useful and will enhance your enjoyment of the website - it is there to be enjoyed, as well as to be a source of information.

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[1]Jane Reynolds, In conversation with Bernard Verdcourt. *Mollusc World* Issue 4, March 2004: 16–17.

[2]http://thepeerage.com/p23101.htm#i231009

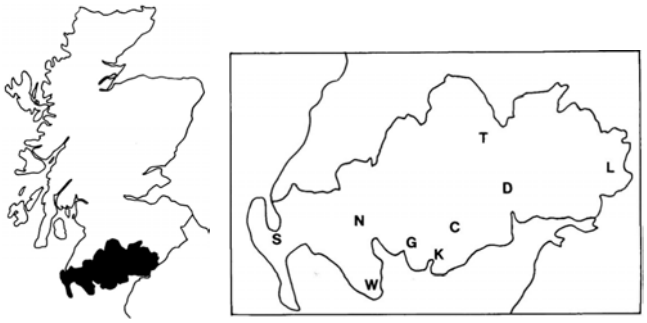
[3]Charles Mosley, editor, *Burke's Peerage, Baronetage & Knightage*, 107th edition, 3 volumes (Wilmington, Delaware, U.S.A.: Burke's Peerage (Genealogical Books) Ltd, 2003), volume 1, page 948.

[4]http://www.rare-books.com/bookplates.htm

Snailing in Dumfries and Galloway

Adrian Sumner

If you cross the border north of Carlisle, you're probably heading for Glasgow, or beyond to the Highlands and Islands. Or you might turn west for the ferries to Northern Ireland from Stranraer or Cairnryan. Either way, like so many people, you will just pass through Dumfries and Galloway without stopping, thereby missing an attractive, and from the naturalist's point of view, under-recorded part of Scotland.



map 1 (left): Map of Scotland, showing the position of Dumfries and Galloway (black).
map 2 (right): Map of Dumfries and Galloway, with principal places marked: C, Castle Douglas; D, Dumfries; G, Gatehouse of Fleet; K, Kirkcudbright; L, Langholm; N, Newton Stewart; S, Stranraer; T, Thornhill; W, Whithorn.

Dumfries and Galloway is the most south-westerly part of Scotland (see maps), coming further south than Hartlepool on the east coast of County Durham, and as a result has a relatively mild climate. It comprises the former counties of Dumfriesshire in the east, and Wigtownshire in the west, with the Stewartry of Kirkcudbright in between. From Portpatrick on the west coast, with views of Northern Ireland and the Isle of Man, it is some 80 miles to Dumfries, and going east from there to Langholm, near the eastern borders of the region, is about another 30 miles, so the whole distance from west to east is comparable to that from London to Bristol or London to Birmingham. From north to south the distances are shorter, and heading up Nithsdale from Dumfries to Sanquhar is about 25 miles, while Gretna to Moffat is over 30. However you look at it, is a big area.

The area is almost entirely rural, and apart from Dumfries (population 31,600), Stranraer (10,800) and Annan (8,300) there is nowhere with a population as large as 5,000. Smaller communities have had to specialise: Wigtown is Scotland's national Book Town, and Castle Douglas markets itself as a Food Town, although the demand for runaway weddings at Gretna has dropped away. Along the Solway coast and extending up Nithsdale and Annandale is good agricultural land devoted mainly to dairying, but inland it is mountainous, with moorland and extensive conifer plantations, much favoured by Red Squirrels (Ratcliffe 2007), though unfavourable for molluscs. There are also many lochs in the region, especially around Lochmaben, where most of them are SSSIs; Carlingwark Loch at Castle Douglas, and the lochs at Castle Kennedy (figure 1) near Stranraer, are also notable. All contain good populations of freshwater molluscs. Much of the Solway coast is low-lying with both sandy (figure 2) and shingle (figure 3) beaches, some of the former being calcareous with dunes. The vegetated shingle beaches of the region have been the subject of special surveys during 2010 under the auspices of Buglife. One of the shingle beaches is noted for its colony of *Vertigo angustior*, which I understand is still flourishing. Mudflats extend far out into the Solway and at Luce Bay, but beware, for the tide comes in very fast over these vast expanses!

figure 1: White Loch at Castle Kennedy, near Stranraer.

figure 2: Sandy beach at Port Logan on the west coast. The dunes here are home to *Cochlicella acuta.*

figure 3: Vegetated shingle beach at Balcarry Bay, Wigtownshire.

My first acquaintance with Dumfries and Galloway was back in 1976, on a family holiday with small children. My knowledge of conchology was then much more rudimentary than it is now, and I doubt if I added much to our knowledge of the area. Nevertheless, a glance at the *Atlas* (Kerney 1999) shows some surprising gaps even for some of the commoner species, and also a good number of records that are only pre-1965. Although much of the region is on acid

soils unfavourable to molluscs, inadequate recording is almost certainly the main reason for many of these gaps. Indeed, when I started recording more seriously in Dumfries and Galloway a few years ago, it quickly became apparent that it was relatively easy to get new records, especially for recently introduced slugs such as *Boettgerilla pallens*, or recent segregates. Even so, it can be quite hard work finding molluscs in some of the older deciduous woods (figure 4), where the calcifuge snail *Zonitoides excavatus* is one of the regularly found species. As anywhere, however, disturbed habitats around settlements can provide rich rewards.

figure 4: Dunskey Glen, a wooded valley near Portpatrick on the west coast.

figure 5: *Arion flagellus*

A weekend break at Gatehouse of Fleet in the autumn of 2006 showed that *Arion flagellus* (figure 5) and *A. distinctus* were present, both species that had hardly been recorded in the region. My wife and I enjoyed the weekend so much that we went back there the following spring for a whole week, which allowed much more snailing (as well as other activities!). We covered an area from Newton Stewart in the west, down to Whithorn and Wigtown, and east to Castle Douglas and Kirkcudbright, and it soon became clear that *Arion flagellus, A. distinctus* and *A. owenii* were pretty widespread and common. *B. pallens* turned up in several places, as did *Tandonia budapestensis* and *Deroceras panormitanum*, the last two both common and widespread introduced species in Britain, but not much recorded hitherto in Dumfries and Galloway. *Limax maculatus* was found

Figure 6: *Oxychilus navarricus* from Physigill Glen, on the coast south of Whithorn. (shell size: 8-10mm)

at Garlieston, a run-down little port near Wigtown, now enjoying a renaissance as a marina and resort. It was not all slugs, however. A popular place of pilgrimage is St Ninian's Cave, on the south coast not far from Whithorn. The vegetation by the path leading through the wood to the beach turned out to harbour good populations of two *Oxychilus* species that are uncommon in Scotland: *O. draparnaudi,* for which the *Atlas* marks only one other site in Dumfries and Galloway (although I have subsequently found it at a number of places); and *O. navarricus* (figure 6), which has been recorded for only three other sites in the whole of Scotland.

Of course, other conchologists have visited Dumfries and Galloway in recent years, and a particularly notable find was *Cochlicella barbara* at Monreith in Kirkcudbrightshire (Norris 2009). The presence of this Mediterranean species here, far to the north of its other British sites in the south, is testament to the mild climate of the region, though one wonders if it can have survived the two recent hard winters. *Balea heydeni*, only recently recognised as a British species (Gittenberger *et al.* 2006), was also identified in Kirkcudbrightshire in 1997 (Norris, 2010), and I have subsequently found it at Glenluce near Stranraer.

It wasn't until 2010 that I got down to Dumfries and Galloway again, encouraged by Mark Pollitt, who runs the local record centre (DGERC – Dumfries and Galloway Environmental Records Centre), and this time made several visits. Once again, common and widespread species of slugs that had only been rarely recorded in the region proved to be everywhere, from Stranraer in the west to Lockerbie in the east. A nice find was a single specimen of *L. cinereoniger* in a wood near Castle Douglas, apparently a new site for this scarce species. Rather surprisingly, I failed to find any of the much commoner *L. maximus* in 2010, although I had seen several in 2007. Further west, the "greenhouse" slug *Lehmannia valentiana* turned up at Drummore, the southernmost village in Scotland (figure 7), and a few weeks later at Glenwhan Gardens near Dunragit, a few miles east of Stranraer. The recent spread of this supposedly delicate slug is quite extraordinary. At Glenwhan it could potentially have been imported with plants when this garden was

figure 8: Drummore, south of Stranraer, the most southerly village in Scotland.

created in recent years. The isolated population of the Great Ramshorn Snail, *Planorbarius corneus*, could well have arrived in the same way. At Drummore (figure 8), on a vegetated shingle beach, was a large population of *Cernuella virgata*, apparently isolated by many miles from the next population. It had rained overnight and the ground was still very damp, and thousands of these snails were active.

It is always exciting to find the rare or unusual species, and Dumfries and Galloway certainly has these. But what has impressed me is the ease with which one can get new records; since 2006, of the 500 or so records of molluscs I have obtained, about two-fifths have turned out, by comparison with the *Atlas*, to be new to their respective 10-kilometre squares. This seems an extraordinarily high proportion, and a clear indication that the region is desperately under-recorded. The Society plans to start to remedy this in May 2011, when a field meeting is to be held in the region. On Day 1 it is hoped to visit some ancient woodlands that are also SSSIs in the Nithsdale area, not far from Thornhill and Moniaive. These woods are on base-rich soils, unusual in the region, and so we expect to find a particularly rich molluscan fauna there. The following day we plan to head towards the easternmost extremities of Dumfries and Galloway, first visiting Penton Linns near Canonbie. This site is notified for its fossil-bearing limestone, but once again should be rich in living molluscs. We end the weekend with a visit to Langholm, a bit further north, where riverside woods should provide much of interest.

When I used to attend international conferences, it was usual to provide a programme for accompanying persons, and although we are not planning any such events, there is plenty to see in the area for the non-conchologist: near Thornhill there is Drumlanrig Castle (http://www.drumlanrig.com/), which is one of Scotland's great country houses, belonging to the Duke of Buccleuch, while around Langholm (the "Muckle Toon") are many walks, and archaeological and historical remains, as well as a Tibetan monastery nearby (http://www.langholm-online.co.uk.). So why not bring a spouse, partner or friend with you and make a weekend of it!

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A mystery radula trail

Dear Mr.Topley,

I attach a picture taken in the fern House at Kew Gardens three weeks ago. I think it shows the foraging trail of a slug or snail, - the surface is a white-painted cast-iron column, coated with algae. The feeding mollusc has cleaned the paintwork very efficiently!

I am sure that your members should be able identify the species from the radula pattern (careful study reveals how the mollusc's feeding pattern is designed so that it ingests the maximum food, without foraging on previously cleared surface.) I think that the pic. shows an area approx.6" x 4".

I hope that the picture is of interest; you have my permission to use it in any way that you see fit.

Incidentally, I learned of your publication on 'Have I Got News For You' on television yesterday evening!

Yours Sincerely,
Peter Mason. 3rd December 2010

A comment from Roy Anderson:-
"The radula of non-marine molluscs is rarely examined nowadays....however… the shape and size of the marks left in the algae, could fit a large-ish slug species. I know there is a large population of *Striosubulina* and a few *Gulella* in the Palm House at Kew, but these are too small to be the mystery mollusc. My experience of hot-houses in Britain and Ireland, however, suggests the culprit might be *Lehmannia valentiana* This is no more than a guess, though." - *do members have any other ideas ? [Ed.]*

Finding *Doto koenneckeri*

Ian Smith

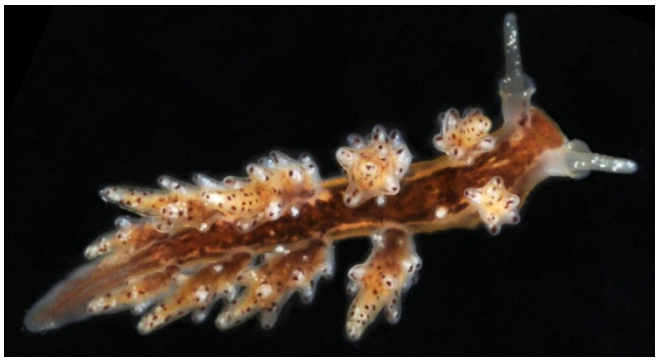

figure 1: *D. koenneckeri* (length 9 mm) Menai Strait, Anglesey.

It is surprising that such a distinctive species as *Doto koenneckeri* (figures 1 and 6) was aggregated with *Doto coronata* (figure 2) until 1976. The dark pigment spots on the cerata (outgrowths on the upper surfaces of the body) of *D.koenneckeri* compared with the red spots and red pigment on the inner face of the cerata of *D.coronata*, are among the features which distinguish these species.

figure 2: *D. coronata* (length 7 mm).

The only records of *D. koenneckeri* mapped by N.B.N. Gateway http://data.nbn.org.uk/ are from Scilly, Skomer, the Calf of Man and Lyme Bay. There are records in W. Ireland (Biomar), and from Norway to Spain (Thompson and Brown 1984). Most or all records are from divers, but it can be found on the shore

In August 2010, two specimens of *D. koenneckeri* were found at low water of a spring tide on the Menai Strait by inspecting the alga, *Halidrys siliquosa* (figure 3), a preferred attachment surface for the hydroid *Aglaophenia pluma*, the food of *D. koenneckeri*.

figure 3: *H. siliquosa*, Menai Strait.

The alga was found in the water's edge, but it also lives in deep pools low on the shore, and divers may find a belt of it growing just below the *Laminaria* zone. It is easily recognised by its long pod-like air bladders, which reveal internal compartments when cut lengthways (figure 4).

figure 4: Air bladder of *H. siliquosa* (length 60 mm).

If the alga is in water, the hydroid and any spawn of *D. koenneckeri* can be fairly easily seen If spawn is found, there is a good chance that the adult is nearby, but it is difficult to detect as it is so well camouflaged (figure 5).

figure 5: *D. koenneckeri* & spawn on *A. pluma*.

It may be possible to find the adult with the help of a hand magnifier if the alga and hydroid are placed in water, but it may be necessary to take a sample for examination at ×5 and ×10 under a binocular microscope. This especially applies at times when the slugs are 2 or 3 mm juveniles.
Thompson and Brown (1984) stated that the spawn had only been observed in May, but the Menai record shows that it occurs at least in August also. If no spawn is found, it is still worth examining a plant bearing the hydroid for juveniles.

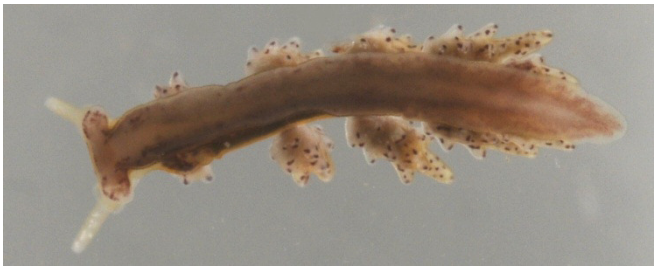

figure 6: Underside of *D. koenneckeri*.

Reference

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The search for the Lemon Slug

Rosemary Winnall

Field Meeting in the Wyre Forest 30th October 2010

'I've found one! Over here!' This call was music to our ears as we scurried across to examine the find! Yes, we did locate the Lemon Slug *Malacolimax tenellus* on our field meeting to the Wyre Forest. In fact we found quite a few!

The Conchological Society joined forces with the Wyre Forest Study Group (WFSG) for the day. The WFSG has been seriously recording *M. tenellus* since the autumn of 2008 when, during an autumn fungus foray, a single individual feeding on *Russula ochroleuca* started the widening search! Since then many records have been made and notes taken about weather conditions, associated fungi, behaviour and habitat. This species has been photographed in a variety of situations feeding on a wide range of fungi, in copulation, with its distinctive yellow slime, and moving across open beech leaf litter. It has been shown that Lemon Slugs are more readily found after dark on warm damp evenings in autumn when there is a wealth of fungi fruiting bodies on which they feed, often in the same habitat as *Limax cinereoniger*. However, it is better to search before the leaves come off the trees, as these tend to hide both fungi and slugs!

The Wyre Forest is 2,500 hectares (6,000 acres) of ancient semi-natural oak woodland with some conifer plantation within it, and there has been a long history of woodland cover. The woodland straddles the county boundary between Worcestershire and Shropshire and the rocks are mainly acidic sandstones, shales and clays from the Upper Carboniferous period. Occasional thin bands of Spirorbis limestone and a few base-rich flushes provide intermittent contrasting soil conditions, but Wyre does not have a rich mollusc fauna.

The Wyre Forest field meeting had been arranged to coincide with the fungi season but local weather conditions play a big part in the success of the search. Thankfully, although the main fungi season was over due to a series of nightime frosts, the weather had been warm and damp during the previous couple of weeks and there were a few fungi fruiting bodies around. So the Lemon Slug hunt was on!

figure 1: A pale *L. cinereoniger*, Wyre Forest.

The key was to look for fungi that showed evidence of grazing and then to make a careful search on and around the fruiting body. When we found the slug by this method, it was either feeding directly on the fungus, tucked up under the cap or lying close by amongst the leaf litter. We also checked damp rotten branches and logs lying on the ground, and this was occasionally successful even though there were no large fungal fruiting bodies present nearby. It was in this manner that we located the Ash-grey Slug *L. cinereoniger.* Interestingly one of the individuals we found was the pale one seen in figure 1.

figure 2: *M. tenellus* on *Rhizopogon luteolus*.

We were pleased to have Study Group mycologists along on the day enabling us to document the fungi that the Lemon Slugs were found in association with. The following were identified: Buttercap *Collybia butyracea*, Clouded Funnel *Clitocybe nebularis*, Brown Birch Bolete *Leccinum scabrum*, Purple Brittlegill *Russula atropurpurea*, Larch Bolete *Suillus grevillei,* Birch Polypore *Piptoporus betulinus* (on fallen trunk) and Woolly Milkcap *Lactarius torminosus*. To our surprise two rare fungi were discovered – Violet Webcap *Cortinarius violaceus* and Yellow False Truffle *Rhizopogon luteolus* and Lemon Slugs were found feeding on both of these species (see front cover and figure 2). There were cries of horror from the mycologists who had to watch their rarities being devoured before their eyes. On closer examination it was found that only the cap and peridium were being grazed, but they were only partly pacified! There was some discussion about whether the fungal spores would remain viable after being passed through the gut of a slug!

Other fungi species noted in association with *M. tenellus* in the Wyre Forest on previous occasions are Hairy Curtain Crust *Stereum hirsutum,* Candlesnuff Fungus *Xylaria hypoxylon, Peziza* sp., Sulphur Tuft *Hypholoma fasciculare,* Magpie Inkcap *Coprinus picaceus,* Deer Shield *Pluteus cervinus,* Tawny Grisette *Amanita fulva,* Common Rustgill *Gymnopilus penetrans,* Blusher *Amanita rubescens,* White Saddle *Helvella crispa,* Lilac Bonnet *Mycena pura, Trametes* sp., and Blackening Brittlegill *R. nigricans.* This demonstrates their catholic taste!

We visited three sites during the Wyre Forest meeting and these were reached by car with permission from the Forestry Commission. The first site was a planted beech wood at SO744 749. This yielded *Vitrea crystallina, L. cinereoniger, Zonitoides excavatus, Discus rotundatus, Euconulus fulvus seg., Oxychilus alliarius, Arion subfuscus* and nine individuals of *M. tenellus*.

The second area started at SO750768 and we walked up a north facing slope and valley under oak, birch and later pine. Four individuals of *M. tenellus* were discovered and other species were *Lehmannia marginata, D. rotundatus*, *Aegopinella pura, Nesovitrea hammonis, E. fulvus seg., A. ater* agg., *O. alliarius* and *L. cinereoniger*.

The last stop was a contrasting habitat at SO740761 with secondary birch and oak woodland with much lying dead timber (See front cover and figure 3). 10 Lemon slugs were found plus *Limax maximus, Arion sylvaticus, A. ater* agg., *N. hammanis, D. rotundatus, L. marginata*, *O. alliarius, Cepaea nemoralis, A. pura,* and *A. subfuscus*.

A successful day was celebrated with tea and cakes in the Wyre Forest Visitor Centre during which lists were compared and memories exchanged. Lemon Slug records were added for two new 1 km squares in the forest, but there are still several more to search!

Present:
Rosemary Hill, David Long, Ron Boyce, Rosemary Winnall, Susan Limbrey (left to right in figure 3) together with Harry Green, John Bingham, Denise Bingham and Ellen Pisolkar

figure 3: Some of the searchers for the Lemon Slug.
(photo: Harry Green)

2nd to 4th June 2011

The Yorkshire Naturalists' Union, iSpot, Opal, Scarborough Museums Trust, Scarborough Council, and many other societies and organisations, with the help and sponsorship of **Welcome to Yorkshire**, are organising a three day Bioblitz at Scarborough on the Yorkshire Coast.
Geological walks will be led by the Dinosaur Coast staff.

Wider surveys of garden **BIRDS & SLUGS AND SNAILS** will also take place. Further details from Adrian Norris at AdrianXNorris@aol.com and via the YNU website http://www.ynu.org.uk/

Outline Programme of Events

Thursday 2nd June
Low water: 11.30 High water: 17.30
Survey of North Bay
Meeting time: 9.30
Meeting point: Sea Life Centre car park, Scarborough TA035907

Friday 3rd June
Low water: 12.10 High water: 18.10
Survey of South Bay
Meeting time: 10.00
Meeting point: The Spa, Scarborough TA044878

Saturday 4th June
Low water: 12.50 High water: 18.50
BioBlitz Exhibition
10.00 to 16.00 The Spa, Scarborough TA044878
The aim is to record as many species as possible in the wide range of habitats available at this location. We will survey the wildlife of the rocky shore and rock pools, and dig to reveal the hidden creatures that burrow in the sandy shores. There will be botanical surveys to record cliffside vegetation, bird watching, mammal recording and invertebrate surveys to reveal the diversity of Scarborough's mini-beasts. The adventure will continue after dark with surveys for bats, newts and other nocturnal wildlife.

P. T. 'Terry' Wimbleton, 1938-2010

Kevin Brown

Terry Wimbleton at Portsdown Hill, Hants., March 2009. (Photo: Shirley Wimbleton)

Members and friends were saddened to hear of the recent death of Terry Wimbleton. Terry was well known in the Conchological Society, having been a member for fifty years and having regularly attended both field meetings and indoor meetings throughout that period.

Terry was an enthusiastic and observant field collector of both marine and non-marine shells, and contributed numerous records to the society's recording schemes. Through repeated visits to the same sites he was able to observe changes in occurrence over considerable periods of time; whether species' declines, spreading populations of invasive species or cyclical occurrences. He had built up a considerable collection of British and world wide shells, both marine and non-marine, part self-collected part purchased and also incorporating the collection of an earlier member, Harry Beeston (b.1865, d.1962; *J. Conch. 25(3):132*), everything meticulously labelled in his distinctive neat handwriting. Terry was always helpful in providing specimens for researchers, for illustration or for other collectors. His interests extended beyond shells to artefacts made from shells or mother-of pearl, and he was an enthusiastic 'car booter' in this quest.

At indoor meetings Terry displayed exhibits and, following the death of Tom Pain, willingly agreed to introduce the various exhibits – a duty he carried out with quiet efficiency. He was very knowledgeable about all things molluscan, but wore his knowledge lightly. The breadth of his knowledge enabled him to contribute to any discussion, and his pertinent comments and questions to speakers added greatly to meetings. Terry had served on the Conchological Society's council, and for some years he organised the circulation of the society's information display boards and posters.

Terry regularly worked as a volunteer on the shell collection at Portsmouth University, cleaning, identifying, labelling and re-ordering an extensive old collection. He had mounted public exhibitions of shells and shell artefacts from his own collection, including some exquisite models of living molluscs that he made to go with the shells, at Havant Museum and elsewhere, which proved very popular.

Outside the Conchological Society Terry was elected a Fellow of the Linnaean Society of London. He was also a member of the British Shell Collector's Club and served as president of the club from 2004 to 2007.

Born in 1938 at Southsea, Terry was educated at Court Lane School, Drayton, Portsmouth, from 1943 to 1953. Aged 16 he went to St. James' Hospital to start nursing training. After two years general nursing at St. Mary's Hospital he returned to St. James' as an S.R.N. since he wanted to specialise in psychiatric care. He rose to become director of nursing, and set up psychiatric community services which were ground breaking at the time. He became a district manager based at Havant Day Hospital, where he was also responsible for the day to day running of the hospital. He took early retirement at the age of 52.

Terry married his wife Shirley in 1959, having known her since he was 14. They had a daughter and three sons and also brought up a grandson.

Terry will be greatly missed by his many friends in the Conch. Soc. and we extend our sympathy to Shirley and the rest of his family. My thanks go to Shirley Wimbleton who, at a difficult time, willingly provided biographical information incorporated here.

Terry explaining his display of Mother of Pearl at a Conch. Soc. meeting in December 2003. (photo: Peter Topley)

In praise of limpets

June Chatfield

In his poem in *Mollusc World* 21, Peter Dance did not show much liking for the humble limpet. On the contrary, I rather like them and there is plenty of good educational mileage in *Patella vulgata* on marine field courses. This is particularly so when one focuses on how they live and what they do as living animals. However, Peter will find some allies amongst algologists (seaweed experts) as the field card for The Big Seaweed Search (http://www.nhm.ac.uk /seaweeds) gives limpets as enemies of seaweeds and the survey also asks for counts of limpets.

In wild weather limpets have to tolerate rough seas and the broad foot sole with its suction action together with the wide base of the conical shell enable them to hold on to the rocks. Only a sudden movement can dislodge them. The steepness of the cone is also an indicator of the degree of exposure with the steepest cones being found on exposed rough shores and on causeways with strong currents: those of sheltered shores are flatter, as are limpets generally in the almost tideless Mediterranean.

At low tide they hunker down and sit through the hours of dryness and hot sun and can you blame them for inactivity at times such as this (figure 1). Losing body water is dangerous for a mollusc. Limpets have homing instincts and usually return to the same spot for low tide. When attached for some hours to the same spot, carbon dioxide from the tissues dissolves in seawater to become a weak acid and this erodes the oval of rock where they rest, especially if it is limestone. The edge of the shell also etches into the rock as they nestle down to their resting place (figure 2). It is a common student project to paint numbers on the limpets and the same number of the limpet to check how far they may have moved.

Once covered by water and also while the rock is still wet when the sea has receded, limpets crawl around and feed by rasping micro-organisms and fine seaweed off the rock. The tough teeth on the scratchy tongue or radula often leave tooth-marks on the rock where it has been feeding (figure 3). Feeding grounds are sometimes seen as contrasting grey areas of rock surrounded by rock with a green veneer. And when the meal has been digested, out comes the waste in little pellets.

When limpets crawl in very small rock pools you can see the pair of tentacles on the head with eyes at the base and also round the edge, when under water in a pool, there are numerous small tentacles. These are extra surfaces that help the limpet to absorb oxygen from the seawater to augment the true gill. Look out for some of these features when you are next on a rocky shore.

figure 1: Limpets on the rocks exposed at low tide. Where limpets are numerous, seaweeds do not stand a chance.

figure 2: Oval scars on a rock where a limpet once had its home.

figure 3: Radula marks on a rock where a limpet has been feeding.

figure 4: Limpets on the sheltered shore of the Bristol Channel with growth of marine organisms on the shell. There are also elongate faecal pellets that are probably bulked up by the intake of silt with their food.

"On the spot" questionnaire: Nick Light

What do you do for a living? Retired but was a Chartered Accountant and a Charter Boat Skipper. Fishing is still my main hobby.

What areas of conchology particularly interest you? British marine shells.

How did your interest in molluscs begin? I married a conchologist and most of our holidays with our three children involved walking along isolated beaches and searching for sea shells.

When and how did you become a member of the Conchological Society? So long ago that I cannot remember. If I had to guess, 1990 when I was 35. I volunteered to examine the accounts and then found I had to join to do this.

In what ways have you been involved in the Society and its activities? I agreed to be the Hon. Examiner (check the accounts) and am now the temporary(?) Hon. Treasurer, though my first year in the job is nearly finished!

Do you have a memorable "conchological moment"? We were on holiday in Cornwall at Hayle many years ago and I found an unusual whelk type shell which I gave to Jan. It turned out to be a native of Tristan de Cunha and must have had a long journey by boat or on the tide! I have always wondered how it got here.

If you were marooned on a desert island and could take only one book with you what would it be and why? *The Making of Modern Britain* by Andrew Marr. I am a third of the way through and find it very interesting. It also has 450 fairly soft and very absorbent pages which I could put to good use when I had read it a few times!

If your house was burning down what shell (or shell related item) would you rescue first? I would save some of the shell books we have but breathe a sigh of relief at seeing the rest go.

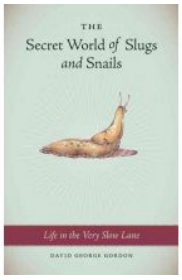
Do you draw any particular inspiration from historical figures in natural history and why? Charles Darwin. He was brave to sail off in a dodgy boat with few navigational aids into a pretty unknown world from which he might well not return. He was bright enough to think the unthinkable and stick to his views even though they were very unpopular in many quarters.

Where are your favourite locations for shell hunting? Porthcurno in Cornwall and Shell Bay on Herm in the Channel Islands as they are both beautiful beaches and remind me of family holidays.

Can you give us a mollusc-related anecdote? I am beginning to have trouble remembering my name so this is hard. I do remember taking a holiday with my father in law and the children in Prussia Cove in Cornwall many years ago. We collected many mussels and put them in the bath, having cleaned them. My father in law left a tap running slowly to purge them overnight. The following morning the estate manager came round as they were running out of water and thought we must have a leak! My father in law gave a nervous smile and said he suddenly had an urgent need to visit the bathroom!

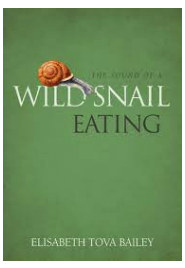
Words of advice to a budding conchologist It provides a lifetime of exercise and interest but it is much easier if you have a big house. Expect to meet many older and interesting, but quite unusual and by far away mostly friendly, people.

Mini Book Reviews



The Secret World of Slugs and Snails, by David G. Gordon. Sasquatch Books, Seattle, 2010. 150pp illustrated by Karen Fildes. ISBN 978 1 57061 611 2 £8.00

David Gordon's readable book takes a North American perspective on snails and slugs with many interesting facts and anecdotes. For example we are introduced to the jumping slugs of the genus *Hemphillia*, and the *Prophyson* taildropper slugs. A chapter entitled "The Seven Wonders of Snaildom" tackles subjects as diverse as the mysteries of slime to how snails sleep. There is also a chapter on how to share our gardens with slugs and snails (and control them).



The Sound of a Wild Snail Eating by Elisabeth T. Bailey. Green Books, Totness, Devon, 2010. 183pp illustrated by Kathy Bray. ISBN 978 1 900322 91 1 £12.95

Elizabeth Bailey, unfortunate victim of a paralysing virus, describes how the world of a humble snail became her daily companion. Her simply and beautifully written book describes how entering into the world of the snail enabled her to come to an understanding of her confined place in the world: a highly original, touching and intelligent account.

Peter Topley

Conchological Society - diary of meetings

Programme Secretary: *Ron Boyce, 447c Wokingham Road, Earley, Reading, Berkshire RG6 7EL*

IMPORTANT: Please remember to inform the leader if you are attending a field meeting. If you are held up in traffic or your public transport is delayed, it may be possible to ring the Programme Secretary on 0794 109 4395 on the day of the meeting for information on the location of the field site being surveyed.
Indoor meetings at the Natural History Museum will take place in the Dorothea Bate Room [Palaeontology Demonstration Room] at the end of Gallery 30, otherwise in the Angela Marmont Centre for Biodiversity, Darwin Building, for which you turn left instead of right at the tail of the Diplodocus, go past the dinosaur exhibition then down the stairs and turn left. Please note the earlier start times, and also the long indoor meeting in October with an early start time of 11.00 am. Please bring plenty of exhibits and demonstration material.
The Programme Secretary will be happy to receive any offers to lead field meetings or suggestions for speakers for indoor meetings.

Key to meetings
NHM = Natural History Museum, London, indoor meeting
FIELD = Field Meeting at outdoor location
WKSHP = Workshop on Molluscan topic
YCS = Yorkshire Conch. Soc. Event

FIELD - *Saturday 19th March*
Flitwick Moor and Folly Wood, Flitwick, Bedfordshire.
Phenacolimax major search.
Leader: Peter Topley (0118 935 1413), molluscworld@ntlworld.com

Bedfordshire's most important wetland and an SSSI, Flitwick Moor is a blend of fen, meadow, wet woodland and fragile peaty soil, supporting mosses, ferns and flowers. Although this is generally a low pH habitat, previous records have included *Phenacolimax major* and it will be useful to discover whether this species is still present. Meet at 10.30 am at the car park at the end of the small track at Folly farm, grid ref. TL 046354. Bring wellingtons and a packed lunch. There are no toilets. The site is 1 mile from Flitwick station which is on the Thameslink line from London. Detailed directions and a map are available on the BCNP Wildlife Trust website at http://www.wildlifebcnp.org/reserves/reserve1.php?reserveid=19

NHM – *Saturday 2nd April*
2.00 pm in the Dorothea Bate Room [Palaeontology Demonstration Room], preceded by Council meeting.

Annual General Meeting
Guest speaker Terry O'Connor (University of York)
Taking the long view: studying non-marine molluscs over the millennia

Abstract: For many years, archaeologists and other Quaternary scientists have made use of stratified assemblages of land and freshwater molluscs as proxy evidence of past environments. The environmental requirements of some species are quite well known from modern studies, allowing us to make inferences about degrees of vegetation cover and disturbance in the past. Much of this research has derived from the work of just a few people: Kennard, Kerney, Evans and Preece in particular. With the recent publication of only the second book wholly devoted to the study of ancient non-marine molluscs, this is an appropriate time to take stock. Has this field of research really moved on since Kennard's pioneering studies in the 1920s, when it was enough to list the species found together in an ancient sediment and to discuss where they would be found today? How reliable are our identifications of ancient molluscs? We have only the shells, with no means of checking identifications through dissection of soft parts. And what contribution can these Quaternary studies make to present-day mollusc research and conservation? Is it useful, for example, to be able to add the dimension of time to familiar distribution maps. Can collectors' records of species associations in particular habitats help us to refine our understanding of past environments?

YCS - *Saturday 9th April*
Joint meeting with Doncaster Naturalists. Don Gorge area.
Contact: David Lindley
(0113 2697047) (home), david.lindley3@btinternet.com

Meet at 10.30 am at the burial ground on Guest Lane, Warmsworth. Grid ref. SE 549013.

FIELD – *Sunday 17th April*
Titchfield Haven, Hampshire. Marine and non-marine meeting.
Leader: June Chatfield
(01420 82214) (home)

Titchfield Haven near Fareham has an interesting mix of molluscan habitats both marine, freshwater and land. It has a mud and sand bound shingle beach that is usually rich in dead shells, including the Quahog (*Mercenaria mercenaria*) that came into Southampton Water via dumped live clams from the transatlantic liners in the 1950s and these continue to thrive. The very low almost Spring tide will allow us to explore the shore for live records and also seaweed (including reds) for washing. Low tide is not until late afternoon and here there is the 'double Solent' tide caused by the Isle of Wight which retards the going out. Therefore we will use the time before lunch to explore the Titchfield Canal (freshwater) and surrounding wetland before following the tide out in the afternoon. There is a Visitor Centre on site with bookshop, refreshments and general facilities, entry is free but it does not have a car park. Parking is along the sea wall and it is less congested towards the west end of the beach. From the A27 follow the brown heritage signs to the Titchfield Haven Visitor Centre via the B3334 and then at Stubbington, right through Hillhead and the coast road to the Haven. Meet at 11.00 am at grid ref. SU 534024. We will lunch somewhere on the sea wall and anyone arriving just for the marine part of the day will find us easily on the shore. Wear suitable warm and waterproof clothing, footwear with a good grip and bring pond nets, trays etc. for freshwater work in the morning. High tide (4.7 m) is at 11:20 BST and low tide (0.5 m) at 17:00 BST.

YCS – *Saturday 14th May*
Leeds and Liverpool Canal
Contact: David Lindley
(0113 2697047) (home), david.lindley3@btinternet.com

Meet at 10.30 am at the main car park in Gargrave, grid ref. SD 932543.

FIELD – *Saturday 21st – Sunday 22nd May*
Woodland sites in Dumfries-shire (see also article on page 21)
Leader: Adrian Sumner (01620 894640) (home) ,

The Dumfries and Galloway region of Scotland is generally very much under-recorded, and we hope to remedy this to some extent by visiting various woodland sites in Dumfriesshire, most of which are, unusually for this area, on base-rich soils.

On 21st May, meet at 10.00 am at the lay-by near Stenhouse Cottage next to Stenhouse Wood SSSI (NX 797931) on the minor road that turns off north-west from the road between Tynron and Moniaive. In the afternoon we shall move on to Chanlockfoot SSSI (NX 802990). On 22nd May, we move to the east of the county, to the Penton Linns SSSI (NY 433773) near Canonbie. Meet at 10.00 am in the lay-by at Penton Bridge over the Liddel Water on the B6318 road. This site is designated for geological reasons, but being on limestone is potentially profitable for molluscs. In the afternoon we shall move on to Langholm, where there are some interesting woodlands by the River Esk. There is parking near the centre of the town at NY 363849.

Come dressed for the weather and with suitable stout footwear, and bring packed lunches. Detailed maps for the first three sites are available from the Scottish Natural Heritage information service website (http://www.snh.org.uk/snhi/), while details of the walks around Langholm are on the Langholm Walks website (http://www.langholmwalks.co.uk/); we shall probably start with Walk no. 2.

Places to stay near Thornhill can be found from the Visit Southern Scotland website (http://www.visitsouthernscotland.co.uk/), while the Langholm website (http://www.langholm-online.co.uk/) lists accommodation in and around Canonbie and Langholm.

FIELD – *Saturday 11th June*
Haugh Woods, Herefordshire
Leader: Harry Green
(01386 710377) (home), harrygreen_worcs@yahoo.co.uk

Haugh Woods are about 350 ha in extent and are situated on the Woolhope Dome about 5 miles southeast of Hereford. This is a limestone area nationally important for butterflies and moths but in which molluscs are under-recorded. From Hereford, take the B4224 towards Ross-on-Wye. At Mordiford turn left just after the 'Moon' pub, then follow the signs for Haugh Wood and Woolhope. The main car park is about 2 miles along this road on the left hand side. There are no toilets.

Meet at this car park, grid ref. SO 591365, at 10.30am. Please contact the leader beforehand in case of any change in the meeting point.

FIELD – *Saturday 9th July*
Kew area. Freshwater meeting
Leader: Adrian Rundle (0208 878 6645) (home)

Meet at Kew Gardens Railway Station (London Underground, District Line, Richmond branch and the North London Line) (map reference TQ 192767) at 12 noon. The low tide is late in the day (about 18:20 h) so we will look at two local *Balea biplicata* sites first and then make our way to the River Thames. There is an exposure near Chiswick Bridge of a subfossil deposit (about 300 years old) on the foreshore near low tide mark that contains an interesting assemblage of freshwater molluscs. *Corbicula fluminea* is now well established in the area and has a variable shell morphology. Specimens should be easy to find.

FIELD – *Friday 29th July-Monday 1st August*
YNU/YCS Malham Tarn meeting. Conchological Society members welcome.
Leader: Terry Whitaker (t.whitaker1@btinternet.com)

YCS - *Saturday 3rd September*
Joint meeting with YNU Coastal Section
Contact: David Lindley
(0113 2697047) (home), david.lindley3@btinternet.com
Meet at 10.30 am in the car park in Skinningrove, grid ref. NZ 713201. Please note some upper shore work will take place.

FIELD – *Saturday 17th September*
Wyre Forest. Slugs and fungi. Joint meeting with Wyre Forest Study Group
Leader: Ron Boyce (0118 935 1413) (home)
and Rosemary Winnall
(01299 266489) (home) (07732 203393) (mobile)

Meet at 10.30 am at the Wyre Forest Visitor Centre, Callow Hill near Bewdley (DY14 9XQ), grid ref. SO 750740, for further studies on the distribution of slugs within the Forest and their relationship with fungi.

FIELD – *Monday 26th – Friday 30th September*
South Connemara, Galway, west coast of Ireland. Marine meeting.
Leader: Julia Nunn
(028 9039 5257) (work) (028 9181 7710) (home)
jdn@cherrycottage.myzen.co.uk

This field meeting will visit some old favourite shores (e.g. Dogs Bay, Lettermore) and some new sites. These will be mainly in south Connemara, but it is anticipated that there will be at least one day in the northern part of the area, and weather permitting a boat excursion to shores on one of the off-islands. It may be possible to arrange diving for anyone interested. The convenient spring tide times during the week enable easy arrangements for self-catering accommodation (Saturday to Saturday) in the Roundstone area where we will be based.

YCS - *Saturday 1st October*
Settrington area, VC62.
Contact: David Lindley
(0113 2697047) (home), david.lindley3@btinternet.com

Meet at 10.30 am in the village centre, grid ref. SE 834703, for 1 km recording.

NHM – *Saturday 8th October*
11.00 am in the Angela Marmont Centre for Biodiversity, Darwin Building.
Please note the earlier start time and changed venue. No Council meeting.

Please bring plenty of exhibits and demonstration material. There will be a lunch break at about 13:00 h. Lecture to start at 14:00 h.

Members are encouraged to bring specimens of any Mollusca for identification. Binocular microscopes will be available if needed.

Guest speaker at 2.00 pm
Rory Mc Donnell (National University of Ireland, Galway)
Tagging and tracking a protected slug: Population dynamics of Geomalacus maculosus *in southwest Ireland*

NHM – *Saturday 2nd October*
2.00 pm in the Angela Marmont Centre Centre for Biodiversity, Darwin Building.
Full day meeting of Council only.

INDOOR – *Saturday 12th November*
Regional meeting in Bath
Contact: Ron Boyce (0118 935 1413) (home)

Meet from 10.00 am onward at the Bath Royal Literary & Scientific Institution, 16-18 Queen Square. BRLSI has an important shell collection including a wide range of rare North American freshwater mussels some of which may be extinct. Several talks are being arranged. The venue is associated with Leonard Jenyns who was a friend of Charles Darwin and described several new mollusc species.

WKSHP – *Saturday 26th November*
The annual workshop held in Woking offers Members the opportunity to receive tuition on identifying difficult groups. Bookings to Judith Nelson (01483 761210) (home)

NHM – *Saturday 10th December*
2.00 pm in the Angela Marmont Centre Centre for Biodiversity, Darwin Building, preceded by Council meeting.

Guest speaker at 2.00 pm
Jan Light (Dorset}
Blogging a way along the Normandy Coast

For Sale

A library containing publications on molluscs and relevant zoological and marine biological texts.

The publications include all aspects of malacology and are worldwide in content.
The library consists of c.200 books; 18 serial publications – including 6 complete or long malacological journal runs, 200+ monographic publications – including 6 complete or long malacological journal runs, 200+ monographic publications, 45 theses (most in printed form) and c.6000 malacological scientific papers which include many major works. As such it forms a comprehensive source of information on all aspects of malacology.

Should anyone be interested, in whole or part, a listing of the contents can be obtained from John Allen.
Email: jallen@udcf.gla.ac.uk

Lunchtime for weary conchologists... See inside, page 16.... (Photo: Rosemary Hill)

About the Conchological Society

The Conchological Society of Great Britain and Ireland is one of the oldest societies devoted to the study of molluscs. It was founded in 1876 and has around 300 members worldwide. Members receive two publications *Journal of Conchology* which specialises in Molluscan Biogeography, Taxonomy and Conservation and *Mollusc World*, our magazine for members. New members are always welcome to attend field meetings and indoor meetings before joining.

How to become a member
Subscriptions are payable in January each year, and run for the period 1st January to 31st December.
Ordinary membership £33.00, Family/Joint membership £35.00, Institutional membership (UK & Ireland) £47.00
Institutional membership (Overseas) £50.00, Student membership £15.00
Payments in sterling only, to the membership secretary (contact details are on our web site). For UK residents we suggest payment by standing order, and if a UK tax payer, please sign a short statement indicating that you wish the subscription to be treated as Gift Aid. It is no longer necessary to sign a formal declaration. Another simple and secure way of paying for both UK and overseas members is by credit card online via PayPal from http://www.conchsoc.org/storefront/seesubs.php. Overseas members may also pay using Western Union, but a named person has to be nominated, so please use the Hon Treasurer's name, Nick Light.

How to submit articles to Mollusc World:
Copy (handwritten, typed or electronic) should be sent to the Editor at the address below. If sending electronic copy using e-mail please include a subject line "*Mollusc World* submission". When emailing several large file attachments, such as photos, please divide your submission up into separate emails referencing the original article to ensure receipt. Electronic submission is preferred in Microsoft Word, but if other programs (e.g. Works) are used, please indicate the program used with the accompanying e-mail. Images and Artwork may be digitised, but we recommend that a digital image size 200Kb- 1Mb (JPEG preferred) be sent with your submission. For line art we recommend that you send hard copy, all originals will be treated with care and returned by "snail-mail". Authors should note that issues of the magazine may be posted retrospectively on the Conchological Society's web site.
Please send articles to:
Peter Topley, c/o The Hon. General Secretary, Miss R.E. Hill, 447b Wokingham Road, Earley, Reading RG6 7EL (or alternatively Peter's address may be found in the member's guide); email: molluscworld@ntlworld.com.

Advertisements in Mollusc World
We are pleased to invite advertisements, provided they are in line with the Conchological Society's charitable objectives and responsibilities. Typical examples might include books and other publications, equipment, services and collections of (or individual) shells. The latter will be vetted on a case by case basis and only accepted if there are no ethical problems. Advertisements of shells for sale from commercial shell dealers will generally not be accepted. A nominal charge will usually be made for advertisements and will be required from commercial advertisers. Charges per issue are currently £20 per 100 cm^2 space for a boxed advertisement or £1.00 per line for a text only advertisement. Any requests for advertisements should be sent to the Editor by the normal route; information on preferred methods of payment will be given at the time.