Mollusc World

Issue 26 July 2011

Molluscs in Transylvania

Snail habitats and behaviour

In Scilly with 'Porcupine'

THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

From the Hon. Editor

Informal competition for the magazine cover photo

The attractive image on this issue's cover of a form of *Helix pomatia*, taken in Romania by Robert Cameron (see page 12), is typical of the excellent front cover pictures we have had recently for Mollusc World. I would like to help continue this trend by inviting members to submit photos for an informal 'Cover Photo Competition':

- Format guide: 'Portrait'; image size c.800Kb–2Mb (JPEG preferred).
- Subject guide: anything mollusc-related! – animals, shells, fossils, applied, field trip/museum activities.
- Do not fill the entire field (allow space for 'headlines').
- 'Simple' backgrounds are better.
- Images should be copyright free at the time of submission.
- Select and send your best picture to me at molluscworld@ntlworld.com (or by post – address in member's guide) by 30th September 2011.
- I will select the best of any images received to be displayed at the NHM meeting on 8th October where attendees will be able to vote for their favourite image!

The winner will receive a small 'token' prize and their winning picture on the front cover of the November Magazine. (Other images may be used subsequently at the Editor's discretion).

The process of revising the Conchological Society's web site continues and as resources allow, you will be able to revisit searchable back copies of the magazine . This will also go some way towards reducing the need to publish regular indexes of contents. Torsten Vronski's article on page 27 includes a table, the full version of which is available on our web site via the published link.

Finally I wish everyone successful recording/shelling for the remainder of the season. Please continue to send in any news or interesting stories.

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).

Contents

 ISSN 1740-1070

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

Thanks go to Vicki Harley for proof reading and Janet Ridout Sharpe for editorial assistance.

Printed by The Lion Press, 19 Market Square, Sandy, Bedfordshire, SG19 1EH.

Front cover: Helix pomatia at Fenes, Transylvania, Romania (Photo: Robert Cameron).

Images of live *Philine punctata*

Ian Smith

Images of the distinctive internal shell of *Philine punctata* appear in several books and websites, but the only published coloured image I have been able to find of a living animal was painted over 150 years ago by Joshua Alder (figure1). The photographs included here may be of further help in identifying live specimens.

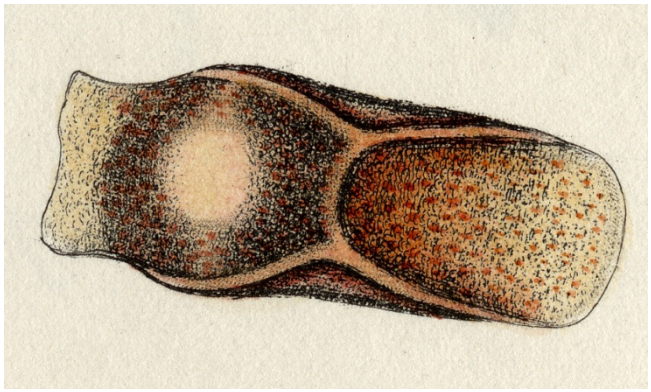


figure 1: *P. punctata.* Illustration from Forbes & Hanley 1848–53, Vol. 1, plate UU. (image: Peter Topley)

The most complete description I could find of the colour of the living animal is in Forbes and Hanley (vol.3):
"It is of a darker colour than its congeners, being tinged and speckled with reddish brown on a yellowish ground".

Figure 2 is of *P. punctata* found under a rock on the shore of Weddel Sound, Orkney in 1975. It was sent to T. E. Thompson who identified it and described its radula (Thompson, 1976).

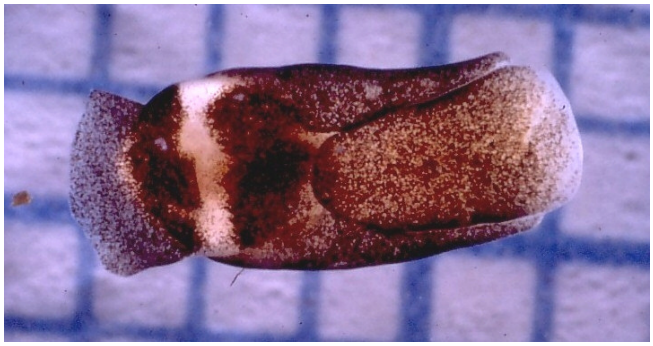


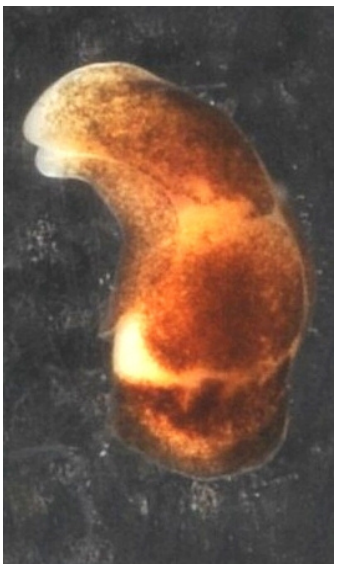
Figure 2: *Philine punctata*, 4.5 mm, Orkney.

Figures 4 & 5 are a dorsal view and a partial lateral view of a specimen found in 2010 among organisms scraped from rocks on the shore of the Menai Strait near Penmon, Anglesey.

The Orkney and Penmon specimens both had a light transverse band on the mantle, and Alder's painting shows a whitish blotch in the same area. There was a tear in the mantle of the Penmon specimen which exposed the shell when found (figure 3), but after a few days in sea water in a refrigerator the tear appeared to have closed (figures 4 & 5). The abrasion on the shell (figure 6) may be due to this damage.

Identification of this species from British waters should be possible from its body shape and dark colour as the bodies of all other described British *Philine* are white, whitish, buff or pale yellow (Thompson). Some have tiny brown blotches or specks of brown pigment, but none has the general brown appearance of *P. punctata*.

figure 3: *P. punctata*, Penmon. Showing exposed shell through a hole in the mantle.



figures 4 & 5: *Philine punctata*, 5 mm, Penmon, Anglesey.

Identification was confirmed by examination of the shell which had the diagnostic rows of unconnected impressed dots (figure 6, below).

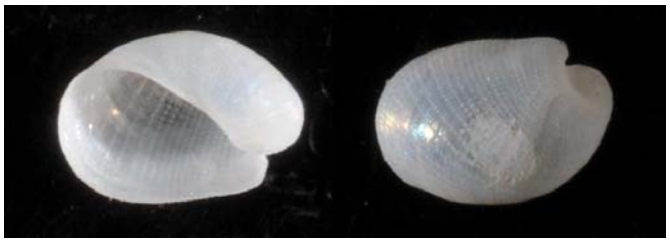


figure 6: Shell of *Philine punctata,* 1.8 mm, Penmon, Anglesey.

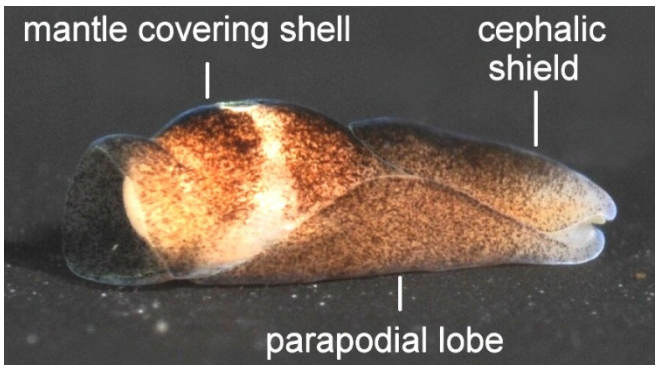


figure 7: *P. punctata*, 4 mm. Britannia Bridge, Caerns. April 2011.

References

Forbes, E. & Hanley, S. (1848–53) *A History of British Mollusca and their Shells*. Vols 1–4 London.

Thompson, T.E. (1976) *Biology of Opisthobranch Molluscs 1.* London.

The homing instinct of *Cornu aspersum*

Ruth Brooks

My fascination with snails began when I was four years old. Even at that young age, I was fascinated by their clever means of locomotion, sliding along on their own river of slime; by their eyes, which disappeared down into the hollow tube of their tentacles when I touched them. Their shells, particularly, caught my imagination. What fun it would be to have my own little house that I could disappear into when my parents called me to go indoors at bed-time!

For many years afterwards snails were out of sight and out of mind, and remained so until, in 1994, I finally settled in my present house in Devon. For the first time I had my own garden and was growing my own food! It was then that these cute little creatures, with their clever design and attractive shells, suddenly revealed their true colours. I rapidly learnt that gardens and snails do not mix. They had voracious appetites for my favourite flowers – lupins and delphiniums – and for my precious vegetable seedlings. They loved the Devon soil: a rich, heavy clay which was wonderful for brassicas but also for slugs and snails. The previous owners had landscaped the garden using large amounts of stonework – perfect hiding places for Molluscs. The plentiful rainfall kept them active and their energy level was terrifying – far surpassing my own. I just couldn't keep up with them: I was soon exhausted by my futile efforts to protect my plants (figure 1).

figure 1: The author in the rain collecting snails in her garden.

Every spring, I planted out the seedlings that I had lovingly nurtured in my green-house; and every spring, within two days, they would be shredded to bits by snails and slugs. I had expected slugs to behave in this reprehensible manner, but somehow imagined that snails were more considerate. I felt quite betrayed by my childhood pets.

From then on, I changed from peaceful snail fancier to snail-murderer. I went through many stages of shameful snail-bashing. First stop were the blue metaldehyde pellets, but I hated removing the slimy green corpses from the soil. I began to worry what the pellets were doing to the wildlife in my garden: to birds and worms, and just as importantly, to the organisms that kept the soil healthy.

Very soon, I turned to organic gardening: this seemed a sensible compromise. I was still killing snails, but in a more sustainable way: beer traps would at least provide a happy death. By such double-think, I salved my guilty conscience. Yet my snails refused to die, merely gulping the beer as an aperitif before their main meal: my lettuces. Nor could I bear to crush them by stamping on them, as my tutor on an organic gardening course advised. I decided that all this killing was wrong, so I spent a fortune on barriers such as grit, gravel, egg shells, copper tape, drain-pipe moats, and Vaseline to smear on the pots. The list was endless, but my patience and time and finances were not. Moreover, the main problem was that none of these seemed to work. The snails were too devious, happily whizzing up my flower pots over the slippery Vaseline surface as if I had provided them with some extreme sport.

There had to be another way that would suit my snails, my garden and me, enabling us all to live peacefully together. By this time, I knew that the garden snail, *Cornu aspersum* was the main culprit. I began to collect them all up and take them away to a piece of nearby wasteland, about quarter of a mile away. This I did on a more or less regular basis for two or three hours a week. Over the years I had heard amazing anecdotes of snails returning from distances of up to three miles. Now I wanted to find out for myself if these stories were true.

I started to mark them with red nail varnish, putting a small blob on each shell, before releasing them on the waste ground. I never saw them again. This was good news for my vegetables, but by now I was curious: I wanted to know whether their disappearance from my garden was due their having to 'home' over such a long distance, or whether they had been eaten by predators. I decided that I needed to tackle this problem more scientifically. I would remove the snails to a much nearer patch of waste ground, just beyond the end of the cul-de-sac where I lived. This would give them a sporting chance of returning home. By this time, the spirit of scientific discovery had far superseded my concern for my blitzed lettuces. Bizarrely, I was almost hoping they would return!

I persevered with my very unscientific experiments, working by increments of a few metres to a final release point of up to 30 m away. But my options were limited: short of chucking them over the neighbouring fences, there were not many nearby places to dump them. Moreover, at this stage in my scientific career I was totally ignorant about the importance of controlling for different variables such as terrain, and weather conditions.

My career as amateur scientific sleuth would have come to nothing, had it not been for an incredible stroke of luck. I was a keen listener of the BBC Radio 4 programme, Material World (MW). One day, in December 2009, I heard on the programme that the MW team were running an event called So You Want To Be A Scientist (SYWTBAS), designed to expose amateurs to the wonderful world of scientific research. I entered with my idea: to find the homing distance of the common garden snail, *C. aspersum*. To my delight, the judges liked my idea. I was selected as one of four finalists.

The producer, Michelle Martin, warned me that the competition would involve 'a lot of hard work.' Little did I suspect *how* much. By the end of the summer my brain was totally stretched and wrung out. The main challenge for me was trying to mould my scatty, unscientific thought processes into some semblance of linear, logical order.

Fortunately, help and support were on hand in the form of Dave Hodgson, the mentor assigned to me by the Material World team. Dave is a terrestrial ecologist and statistician, lecturing and researching at the University of Exeter's Cornwall campus: the Centre for Ecology and Conservation.

One fine day in early May 2010, Dave and Michelle came down to Devon to check out my snails, my garden, and me. We discussed how we would proceed with the experiments.

At this stage, my total ignorance of the scientific method was revealed: I did not even know what a data-set was. However, what I had realized by this time was that before measuring homing distance, it was first necessary to prove that snails did in fact have a homing instinct. To do this, we had to establish a 'home' for the snails: i.e. a small area about 1 metre square in which to place plants attractive to snails: a large basket of *Surfinia* and a pot of *Hosta*. Once the snails had populated their new home, I collected a sample of snails from elsewhere in the garden, preferably from the opposite direction to the home base.

figure 2: Getting ready for the 4th instinct experiment in neighbour Sue's garden.

Then, in the middle of a large tin tray, chosen for its smooth surface (figure 2), I marked a large circle with all the compass directions (N, NE, etc.). Now the fun began. I hunted for the little pioneers which would make Mollusc history. The home snails were either hiding in the petunias or hostas, or in their 'shelter' about a metre away – in this instance, a clump of day lilies. The 'away' snails were collected from 8 m away – a patch of *Phygelius*, another shrub with tall leaves. The tray was placed exactly between the two collection points; each sample was marked with two different colours of nail polish (figures 3 & 4), and then set down in the centre of the tray and released.


figure 3: Marking snails for my 5th instinct experiment.


figure 4: C. aspersum exploring kitchen roll before the 5th instinct experiment.

This was the hardest part, because I also had to track their initial direction of travel to see if there was a correlation between this and where they ended up. The snails were moving so fast that I could hardly keep up with them: as soon as I marked their exit point with a cross on the periphery of the circle, another couple of snails had hot-footed it to the other side. They all scarpered across the smooth surface like bats out of hell. To complicate matters further, they piggy-backed – presumably to save mucus – and thus a pagoda of two or three snails would leave the circle at the same time. (Scientifically, how was I to record this, I wondered?) Then, annoyingly, three or four would remain curled up in the centre, refusing to move; I had to hang about for hours to make sure they didn't scarper the minute I went inside to make myself a cup of tea.

However, the results were worth the hassle. From my first instinct experiment, 8/14 snails, originally collected in the 'home' patch, returned 'home'. None of the 'away' snails set up camp in the home patch. In the 'away' location, 9/26 snails were recovered, plus 1 from the home base. Many snails were found to have returned to their original bases, and there was an almost complete absence of 'cross-over' between the two locations.

In my second instinct experiment, 8/10 'home' snails were recovered, all from their home base; and 7/ 8 snails were recovered from 'elsewhere', but only one of these was found in the home patch.

At this point in the experimental process, I was dragged screaming and kicking into the scary world of statistics. I had to get my head round the p-value (probability value), derived from Fisher's Exact Test. P-value is based on a null hypothesis: that is, that snails do not home: i.e. that they are no more likely to travel home than to move away. The alternative hypothesis postulates that snails tend to move towards home. As Dave explained: 'The probability of getting a result so biased in favour of the homing instinct hypothesis, if the null hypothesis is true, is only 2 in 1,000, or 0.2%; so we can be confident in rejecting the null hypothesis.'

It was necessary to do three further instinct experiments to ensure that these were not just weird snails. The findings from two of these experiments showed strong evidence in support of homing, but none of the three produced such startling results as the first two. This was due mainly to a heat-wave in mid-summer: snails disappeared into cracks and crevices to aestivate. Even so, I was learning a lot about variables such as weather, barriers, time of day, and how they affected our experiments.

The research was now opened up to the public, who were encouraged by the MW programme to take part in a national on-line experiment called The Great Snail Swap. Neighbours were invited to find snails from a location in their own gardens, and then, with each sample marked in a different colour, to swap them over – and then release them in the opposite location. There was an on-line questionnaire to record when the first snail returned to its original base, and drop-down options to record the different variables, for example, weather on the day of collection, and barriers (such as wall, fence, or building).

Once more, the results from this questionnaire were weighted in favour of the homing theory, with returns of up to 30 m reported. But it was very disappointing that in spite of repeated reminders on the Material World programme during the summer, few listeners bothered to take part. Maybe British reserve triumphed over scientific curiosity, and neighbours just didn't fancy getting too chummy.

One experiment which proved to be a resounding success took place at my local school, St. John's. I had spoken to the staff, in particular to Rachel Azzopardi, the Year 4 teacher, and asked if St. John's could be the pilot in a series of school experiments that could be 'rolled out' nationally. Rachel was very enthusiastic and prepared an excellent lesson plan, explaining the scientific method, as well as all the interconnected disciplines of science which would be involved: maths, compass directions, ecology, maps, and snail anatomy and behaviour. One sweltering day in mid-June – the hottest day so far – 30 children, aged between 8 and 9, assembled in a quiet, separate area of the school playground. Here, a number of compass circles had been marked on the tarmac, which sizzled with the heat (figure 5). The pupils had already collected a sample of *aspersas* from their gardens, and marked them with a wondrous array of different designs and markings, one for each child. They were divided into small groups, each with a scribe to take notes. With mounting excitement, the snails were released in the centre of their circles. First, the children watched 'their' snails to see in which direction they were heading and to see if it correlated with their homes. The next half-hour was organized chaos. Children ran around with watering cans to cool the tarmac and the snails, which struck off in different directions (figure 6). Some, their owners affirmed, were heading straight home. A few, unfortunately, got splatted in the excitement (the snails, not the children). The findings from this experiment were interesting. At least three of the snails made it home, according to the testimony of the more reliable members of the class. One almost called in at the local Spar shop, another tried to cross Totnes Bridge. As one member of the class lived 12 miles away in Torquay, it was no surprise that this child's snails found the journey too much of a challenge.

figure 5: Keen young scientists at St. John's watching their snails leave the compass circle.

figure 6: St.Johns - the snails decide on direction a.

As a scientific experiment, the results might be inconclusive – but as an educational experiment it was superb. It was a joy to watch the class. Every child was fully engaged, active, and concentrating well, besides learning much more fascinating science than is usually possible to pack into an afternoon's teaching. It was the perfect example of the 'outdoor classroom' in operation.

The summer ended with the SYWTBAS competition final, in September at Aston University. I was indeed fortunate to win, as the other three finalists all had interesting projects and gave excellent presentations. I certainly could not have succeeded without the help of Dave, Michelle, and the Material World team, who were always on hand with reassurance and support.

The results of our research have been very satisfactory. We have found strong evidence in support of homing instinct, and homing distance up to 30 m. On a practical level, this suggests that gardeners could take their snails away to a distance of approximately 100 m – just to be on the safe side! We also learnt that snails are faithful to their feeding and resting sites, but many disappear, and others replace them. Future experiments could explore population size and abundance.

More research on homing needs to be done. This is currently happening under Dave's direction at the Centre for Ecology and Conservation in Cornwall, where experiments are taking place using an increased testing distance. Also at the centre, there has been a very interesting development from the instinct experiments that took place on this site in July, 2010. Six months later, new returning snails were found back at their original locations, suggesting a very long journey home – and reminding us once again that all experiments must happen at a snail's pace, and that patience is a virtue.

The implications of our research go well beyond the establishment of a homing distance for *C. aspersum*. Our findings open up much wider ecological issues. It gives us gardeners choices as to how we deal with unwelcome garden 'pests.' We can choose to be kinder to the wildlife in our garden, including the micro-organisms in the soil, by choosing alternative methods of snail disposal. Best of all, we can feel happier in ourselves in that we are helping to maintain the tiny eco-system that is our garden. The next step in my own scientific journey is to disseminate my findings to a wider audience: hence, this article in my new favourite magazine. In collaboration with Dave, I also hope to publish our findings in a scientific journal. I have discovered that the scientific process has no ending: my simple question about homing instinct in snails has opened up new questions, new opportunities and new discoveries. Aren't snails amazing!

figure 7: BBC News – Dave Hodgson, Cameraman Martin, and Pallab Ghosh filming in Ruth's back garden.

Clathrus confused - notes on some *Epitonidae* records

Graham Saunders

I first encountered *Epitonidae* (the wentletraps) in the early 1950s. Two were given to me by an elderly lady who had found them on the beach at St Ives and I found another on sand flats at the Naze end of Walton-on-the-Naze. The Cornish shells were small but chunky dove grey shells with white ribs and the other was a conventional adult *Clathrus clathrus* (Linne, 1758). In days of innocence, the shape was a thing of wonder. In later years I bought and traded specimens and found living material in drift lines and dredgings. I read the available literature and, as time went on, fell prey to the illusion that I had a reasonable understanding of the more frequent species.

In the mid 1980s I lived by Portland Harbour and discovered that just once a year, usually during the weekend before the BSCC Show, then in Spring, a live '*Clathrus*' could be found in the vicinity of the old torpedo pier. A couple of times I brought them along as live exhibits. The animals were highly distinctive and the upper surface of the foot was decorated with a bright violet outline of a spear head on a white background. I have found no reference to this in any description of the animal. This was observed on three torpedo pier specimens and one from nearer the Naval Air Station. A more recent specimen was dredged off the Lulworth Banks but this had an orange and black animal. The four shells were within normal range of variation of conventional *C. clathrus* but the offshore specimen, while of a similar size and shape, was a more robust shell with wide varices and rich dark colours (figure 2). At the time I speculated on whether this could be a *clathrus/turtonis* hybrid.

There is a short stretch of rocky beach on the Portland causeway where another form of *Clathrus* washes ashore (figure 3). These are all bigger and heavier than any of the live specimens. When fresh, they are more colourful. They do not compare well with *C. turtonis* yet neither do they seem to be the usual race of *C.clathrus* though of course, as members of the same genus, there are naturally common characteristics. The latest shell found is presumably part of this population but it is a big, wide, heavy shell with thirteen varices on the body whorl. If I saw it in isolation without the data, I would automatically assume it to be exotic as we just do not have anything that should look like this so this is the point where I must re-evaluate all my opinions.

Several authorities assume that European Epitonids change sex with age and there is evidence that some do. Some exotic Epitonids appear not to change and are sexually dimorphic. The sexes have different shell shapes from an early stage. It is not just a matter of size though males are smaller and more numerous. Can we have a situation where pollutants arrest the change of sex, leaving an adult to grow large in an unnatural shell shape? This raises more questions than it answers.

Are we sure that *C. clathrus* (Linne, 1758) is a valid recognisable species? Some Continental authorities have discarded the taxa on the grounds that it is a composite species and are using plain *Epitonium commune* (Lamarck, 1822) for our population! Other authorities believe they can perceive consistent differences between Atlantic and Mediterranean populations. Based on personal observation I find this implausible (one specimen from Newport Wales and one from Ston Croatia both look the same to me), but I retain serious doubt that all the shells I have assumed to be *C. clathrus* are all one and the same species. Are there two or more? Alternatively, it may be that none of the experts who have published on the family actually had access to enough data and specimens to enable them to appreciate the potential range of shape size and colour within one species.

There may be someone out there who knows all the answers but has not published. Genuine experts are thin on the ground and the task is limitless. Your observations are more important than the actual shells you collect so if you see something of interest, please **please** record and report it, if possible with photographs. This does not just apply to *Epitonidae*!

figure 1: *C. clathrus*, intact but dead shell buried in beach Portland Harbour side of causeway. Height 33 mm. Photo: Alan Fell

figure 2: *C. clathrus*, dredged offshore in maerl. Height 26 mm. Photo: Alan Fell

figure 3: *C. clathrus*, fresh dead, 60 m south of figure 1 specimen. Height 33 mm (protoconch missing). Photo: Alan Fell

Papillifera papillaris (Müller, 1774) on Brownsea Island, Dorset

Janet Ridout Sharpe

When *Papillifera papillaris* was found at Cliveden House, near Maidenhead, in 2004 (Ridout Sharpe, 2005, 2007) this was believed to be the first record of this clausiliid snail in Britain. The species is well known for its anthropogenic dispersal from Italy to many other places around the Mediterranean from antiquity onwards (for example, see Menez, 2007; Mienis and Gümüş, 2007). However, its presence in Britain is some 966 km (600 miles) from this circum-Mediterranean distribution, with (as yet) no known localities between southern England and the south of France. Some earlier, rather obscure, British records of *P. papillaris* had been attributed to either erroneous identification (in Dorset) or perhaps short-lived colonies (in Edinburgh) that are no longer extant (Dance, 2008), leaving Cliveden as the only verified British locality. Then, in August 2010, the National Trust issued a press release to announce that *P. papillaris* had been found on Brownsea Island in Poole Harbour, Dorset.

Owned by the National Trust, Brownsea Island is one of the few locations where red squirrels (*Sciurus vulgaris*) are still to be found in the wild in England, and the island is managed as a nature reserve with the northern half leased to the Dorset Wildlife Trust. The south-east corner of the island is occupied by Brownsea Castle, which has undergone several incarnations, first as a Tudor fortress built in 1545 and most recently as a large Victorian mansion built in the 1890s, which is currently leased to a retail company for use as a staff hotel and so is inaccessible to the general public.

Correspondence with the National Trust revealed that the snail could be found living on the boundary wall of Brownsea Castle (figure 1). Tom Walker and I paid our first visit to Brownsea on 17 September 2010 to look for it. The wall curves inland from the landing quay for about 100 m before it reaches the Castle gates. With a bit of practice, it was quite easy to spot and photograph the snails *in situ* on the wall (figure 2). Most were found nestling in crevices (figure 3) where the mortar had eroded away but some had ventured into the open (figure 4), perhaps to feed on lichens. A few snails were found on the brick façade of one of the houses opposite the Castle wall; the latter also sported a thriving population on its inner, south-facing side where it bounds the garden of the National Trust tearooms.

The timing of the National Trust press release is a mystery because, two years previously, publication of the discovery at Cliveden had prompted the following blog from Chris Thain, Reserve Manager for the Dorset Wildlife Trust on Brownsea Island, on Aydın Örstan's website 'Snails Tales' (Örstan, 2008) on 28 August 2008:

"I read news of the 'discovery' of Papillifera papillaris *with interest. In the UK it has, in fact, been known from Brownsea Island, Dorset since 1993. It is also thought to have originated here from importation of stone and statuary from Italy in the late 19th century. Identification was confirmed in 1993 by Michael Kerney at the Natural History Museum, London."*

Subsequent correspondence with Chris Thain revealed that the snail had been spotted by the Head Gardener at Brownsea Castle, Steve Teuber, in 1993. Steve had consulted with Kevin Cook, Chris's predecessor at the

figure 1: The public face of *P. papillaris* on Brownsea Island: the Castle wall.

figure 2: Tom Walker photographing snails *in situ* on the Castle wall.

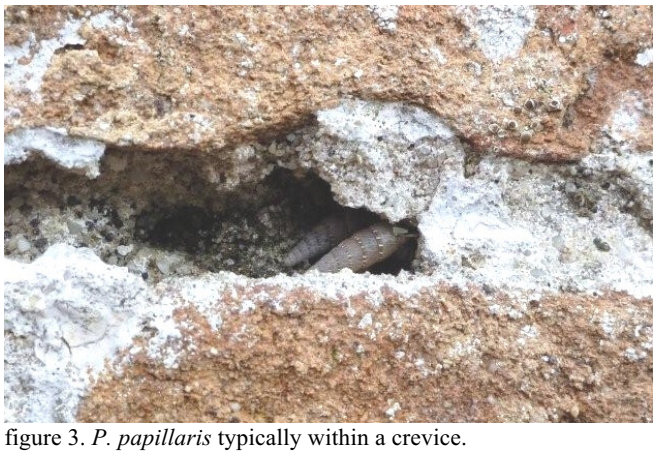


figure 3. *P. papillaris* typically within a crevice.

figure 4: ... and on the surface of the wall.

Dorset Wildlife Trust, who sent some specimens to Mike Kerney. Chris Thain kindly provided a photocopy of Mike Kerney's reply, dated 23 August 1993:

"Thank you very much for sending the clausiliids found living at Brownsea Castle. They are ... Papillifera papillaris*. This is a very common snail around the western Mediterranean, in rocky ground, walls, etc. It would be interesting to know how it arrived in Dorset. My guess would be that it will not survive a hard winter, but one never knows with these introductions ... I can't find any record of the species previously established in Britain. Would you be prepared to write a paragraph or two on your find for publication in the* Conchologists' Newsletter*? It is nice to have discoveries of this kind placed somewhere on permanent record. May we keep the three specimens for the collection here?"*

This letter confirms that *P. papillaris* was recorded on Brownsea Island in 1993, 11 years before its discovery at Cliveden and 17 years before the National Trust press release. Unfortunately neither Kevin Cook nor Mike Kerney was able to place the record in the public domain and the existence of the 'Brownsea snail' remained known to very few. Adrian Norris, the Society's non-marine recorder, had no information at all about this find until the media interest following the National Trust's press release. However, Tom Walker, with the aid of Jon Ablett of the Mollusca Section at the Natural History Museum, was able to locate a small plastic zip-bag in the Museum's collection containing three specimens of *P. papillaris*. The bag contained two labels: a hand-written one with the legend '*Papillifera* 40/031877. K. Cook, 19 Aug. 1993 (see file)' and a printed label to the effect that the snails were 'Removed from Dr M. Kerney's room on his retirement, 2003'. No specific identification or locality is given, but the reference to Kevin Cook and the date undoubtedly identify these shells as the Brownsea specimens.

Following the precedent of *P. papillaris* at Cliveden, it seemed most likely that the snails had been introduced to the gardens of Brownsea Castle on imported statuary during the vogue for Italianate gardens in the 18th and 19th centuries. Having obtained kind permission from the lessee to visit Brownsea Castle gardens and also to consult the garden records in the Castle archives, Tom Walker and I visited Brownsea Island again on 29 October, this time accompanied by Peter Dance and Brian Hammond. We were given a warm welcome by Steve Teuber, who allowed us to roam through the gardens (figure 5) looking for snails. *P. papillaris* was very widespread and had colonised walls throughout the Castle grounds. Steve was able to show us the exact spot where he had first discovered the snail back in 1993 (figure 6), on a rather non-descript low brick wall in the 'working' area of the gardens. But where had the snails come from? The gardens were conspicuous for their lack of Italian statuary.

The Castle archives and the official guide book (National Trust, 2006) present an interesting history of Brownsea Castle. At least three of its owners had established Italianate gardens. The first was Sir Humphrey Sturt (1725–1786) who inherited Brownsea Island in 1765 and set about rebuilding the castle on a grand scale. He is said to have spent over £50,000 just on establishing the ornamental gardens. The Hon. George Cavendish-Bentinck (1821–1891) owned the island from 1873 until his death, and he is reported to have filled Brownsea Castle with a spectacular array of Italian

figure 5: Brownsea Castle and part of the gardens.

figure 6: The 1993 findspot in the Castle gardens.

Renaissance sculpture. Finally, Charles and Florence van Raalte bought the island in 1901 and soon afterwards laid out a formal Italianate garden in the grounds of Brownsea Castle. However, not all of Brownsea's owners led charmed lives and nearly all of the Italian statuary was auctioned off in 1857 and again in 1927 to pay off debts. Today very little remains of the Italianate splendour of the past – except for *P. papillaris*. The snail appears to be more or less confined to the Castle grounds, although Steve Teuber believes that it has increased its range over the 17 years since he first discovered it. There is certainly a flourishing and at present unthreatened colony on Brownsea Island, which may be slowly expanding as a result of global warming.

But when was it introduced? It had been assumed that it arrived at Brownsea during the latter part of the 19th century when George Cavendish-Bentinck was importing Italian sculpture. This would have made it a near contemporary of the Cliveden snail (1896) with a slight claim to precedence (1873–1891). However, there are some hints to suggest that it may have been on Brownsea Island for a century longer than its 'rival' at Cliveden.

Peter Dance's (2008) research brought to light a hand-coloured engraving which appears to represent *P. papillaris*, with its distinctive crenulated suture and pinky-brown colour, in 'A descriptive catalogue of the British Testacea' by Maton and Rackett (1807). The accompanying text identifies this shell as *Turbo bidens* Linnaeus (as *P. papillaris* was then known) and as a specimen from the collection of Richard Pulteney (1730–1801), which was then housed by the Linnean Society but was auctioned in 1863 and is now lost. Pulteney described the shell as 'a Dorsetshire shell', although the authors of the 1807

catalogue considered that he was mistaken since 'notwithstanding a most diligent search' they had been unable to find it for themselves. Tom Walker tracked down the Natural History Museum's copy of Pulteney's 'Catalogues of the birds, shells, and some of the more rare plants of Dorsetshire' published in 1799, but the description of '*Turbo bidens*' is ambiguous and appears to combine elements of both *P. papillaris* ('the sutures ... elegantly crenated' and found 'in the chinks of old walls') and *Cochlodina laminata* ('shells three-quarters of an inch long ... common in woods, upon trees, and on moss'). This entry was omitted from the second edition, which was revised by Thomas Rackett and published in 1812 after Pulteney's death.

Clausilia bidens (= *Turbo bidens*) was included by Mansel-Pleydell (1885) in his list of the land and freshwater molluscs of Dorset, but under the heading 'Spurious' with a note to say: 'Figured in the Linnean transactions as a Dorset species, but doubtless erroneous'; in his later, more comprehensive catalogue (Mansel-Pleydell, 1898) he omits it completely. Kennard and Woodward (1926) dealt the final blow by synonymising Pulteney's *Turbo bidens* with *Marpessa* (now *Cochlodina*) *laminata*.

So the only evidence we have to suggest that *P. papillaris* may have been introduced to Brownsea Island by Humphrey Sturt in the 18th century is a pretty little drawing of a lost shell, identified by Richard Pulteney as *Turbo bidens*. For the next 200 years or so no one was prepared to accept that Pulteney may have been right, but there are some other clues to a possible 18th century origin for this snail on Brownsea Island: its widespread distribution within the Castle grounds compared to its more restricted distribution at Cliveden, and a reference in the Castle archives to the fact that Cavendish-Bentinck's Italian stone carvings were mostly of Venetian origin, and so outside the natural range of *P. papillaris* in peninsular Italy and adjacent islands. Richard Pulteney might possibly have collected his 'Dorsetshire shell' from Sir Humphrey Sturt's garden in the late 18th century, which could explain why later collectors on mainland Dorset were unable to locate this species. If this assumption is correct, the Brownsea Island colony was established nearly 250 years ago and is more than twice as old as the colony at Cliveden House.

Although the 'Cliveden snail' is becoming established in the literature, it may seem more appropriate to dub it the 'Brownsea snail'. However, the National Trust has launched a campaign to survey the grounds of its other properties with Italianate gardens and members of the public have been invited to search for *Papillifera papillaris* country-wide, so there is a chance that further colonies will be found. It is even possible that the sale of garden ornaments from Brownsea Castle transported snails to new sites. To avoid any potential rivalry between different locations for naming this species in the vernacular, might I suggest 'Pulteney's door snail' instead?

Acknowledgements

My grateful thanks are due to Peter Dance, for raising the possibility that *Papillifera papillaris* might have been present in Dorset in the 18th century; to Judy Faraday of the John Lewis Partnership Archives for supplying information about the history of Brownsea Castle and in particular the auction records of 1857 and 1927; to Steve Teuber, for giving so freely of his time to show us around the Castle gardens and talk 'snails'; to Chris Thain, who responded to my enquiries with such enthusiasm and arranged access to the Castle for us; and not least to Tom Walker for his support, which included research at the Natural History Museum and driving us down to Poole Harbour (and back) twice.

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Snail shell piles

Graham Long

A lady contacted me who encountered an unusual mollusc feature whilst out walking near Winchester.

She says: "There was one big pile of empty shells and then several smaller piles. They were all the same species of snail (*Cornu aspersum*) (see picture). One big pile consisted of approximately 30 shells and then there were several smaller piles, of about 40 shells in total, at the side of a 4–5 metre stretch of path, near to the vegetation. They were found north of Twyford Down, parallel to, and very near to the motorway. Grid reference SU 489 275."

It might just be an example of children playing while out on a walk, but does anyone have a better idea?

Sluggish

There'll be many who will call me 'mug'
For I find I cannot love the slug!
These humble molluscs – slimy creatures
Change their shape, this hides their features.
Perhaps I need more education
To study them with fascination?
I think that I would like to know
How tiny slugs to adults grow.
What do they eat and what do they drink
As they skate about on nature's rink?
What are their virtues and their sins
When in our gardens or near our bins?
To learn their anatomical diversity
Would one have to go to university?
A simple diagram would suffice
To educate me would be nice!
Of their love life I have read a lot,
Romantic creatures they are not!
I hope some keen 'Slugophile'
Will write my ignorance to resile.
More knowledge could bring appreciation
By those who lack 'slug fascination'.
But to study them in detail to perfection
Does one have to house a 'wet collection'?
So I'll hope to learn a whole lot more
And forget the dislike I felt before.
Until then I'll just wait and see
How interesting a slug *should* be!

Thora Whitehead
Queensland, Australia

A sluggish reply from a limacophile

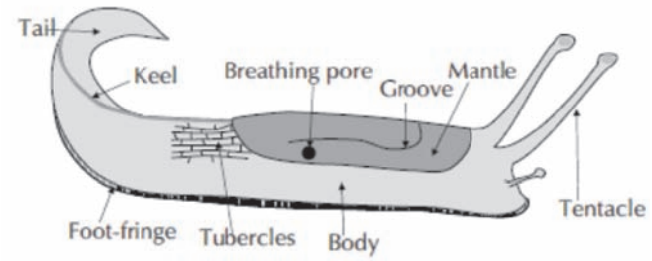
Thora Whitehead's poetic plea for enlightenment about slugs demands a response. So, here are some thoughts, verse-by-verse.

The beginning of this poem reminded me of a comment by the late Stella Davies, then suffering from trouble in her ageing joints. She told me she would love to be a slug: not a snail, a slug. Why? Slugs have no skeleton and never a need for hip replacement. Without a shell they can change shape and move through very small gaps. You cannot love a slug more than to wish to be one.

How do slugs grow? Generally at a remarkably unsluggish pace. Put some hatchling slugs in a jar with a loose fitting lid, a damp substrate and a supply of food – fungus, carrot or other vegetable scraps will do for most species. Watch and wait. Growth can be very rapid. Generally they grow by increase in size without any accompanying change of shape (not that shape is very easily definable in creatures that lack any rigid structure). It is worth noting that it is difficult to quantify precisely the size of a slug. Length varies according to posture; mass and volume can vary considerably with water content.

What do they eat? Again, watch them in the wild and in captivity. Some do attack garden flowers and food crops. Most individual slugs may be pests but most species (in the UK, at least) are not major pests. Compare species compositions in the vegetable garden, the flower garden and the compost heap. Try feeding captive slugs with different foods (including fresh vegetation, decaying vegetation, fungus, lichen, algae, decaying animal matter, animal droppings). Just be careful not to mix *Limax maximus* with slugs of any other species (except when investigating its diet).

Anatomy? Here is a diagram of a general purpose slug – not all slugs have all the features labelled:



Most slug species do not have the lateral symmetry that we normally expect in an animal; this is because they have evolved from snails with coiled shells – a clear case where lateral symmetry is impossible. You may just be able to see the vestigial shell in some species – under the skin, opposite the pneumostome.

Not romantic? At one extreme, *Arion ater* shows an extreme reluctance to indulge in any sexual machinations with other individuals – being a hermaphrodite does help perpetuate such an antisocial species. Several species do have long courtship rituals, often involving moving in ever-decreasing circles, possibly following a sexually attractive scent trail, until they meet for copulation. *Tandonia budapestensis* is reputed to remain in a copulatory embrace for up to 18 hours. I have not had the patience to watch this for more than about 18 seconds, so cannot confirm it directly. But 18 hours? Can you really call that unromantic?

Is it necessary to have them in captivity to study them? Not absolutely. Individuals of some species, such as *Limacus flavus* and *Limax maximus*, can be identified individually by their markings – keep a library of digital images to allow you recognise them. *Limacus flavus* has strong homing instincts and often associates closely with human habitation. It is an ideal subject for study. Find which stone it roosts under and, thereafter, follow its perambulations night after night.

How interesting are they? Certainly they may not be as strikingly attractive as a brimstone butterfly, nor sing like a nightingale but they are under-studied and have ecology and behaviour very different from many other species. There are many simple questions which can excite the imagination. Why does the tree slug, *Lehmannia marginata*, have to climb to the tops of trees to feed even though it requires taking on a heavy water load to compensate for evaporation and slime-trail production? Why is the mucus of *Arion subfuscus* non-sticky and makes human skin feel rejuvenated when it is rubbed in? Does *Arion ater* prefer dog droppings to *Hostas*? Are the little mites which scurry over the surface of larger slugs parasitic, symbiotic or mutualistic?

I was once told that you do not judge great works of art; instead they judge you by your reaction to them. Being a philistine, I would not know about art. However, replace 'great works of art' by 'slugs' and I know you have the truth.

Chris du Feu

Travels in Transylvania

Beata Pokryszko and Robert Cameron

figure 1: Robert explaining sieving to students from Sibiu. (Photo: Beata Pokryszko)

Transylvania probably conjures up visions of Dracula for most people, but there is more to it than vampires or the notorious Vlad the Impaler. It is the northern and western part of Romania, bordered by the curve of the Carpathians, first south from Ukraine, then turning west to the Serbian border. The mountains are quite high (up to 2600 m), and the lower slopes are forested and very similar to those further north. It connects the fauna and flora of northern Europe to the much richer environment of countries bordering the Mediterranean. Romania as a whole has a rich land snail fauna (c. 300 species including slugs), with many species not found further north.

Having worked together for many years examining forest snail faunas in Central Europe, we have long had an itch to see what lay beyond our south-easternmost samples, in the tiny bit of Ukraine that holds that bit of the Carpathian Mountains where the range turns south into Romania. We had found a steady turnover of snail species from west to east along the northern Carpathians; what would happen as we turned south? Several possible visits had to be cancelled for one reason or another, but in 2009, at last, we were able to make the trip, thanks to the help from our Romanian colleagues Ioan 'Meo' Sirbu and Voichita Gheoca, both working at the University of Sibiu. They were with us for some of our journeys, and gave us a firm base in Sibiu; indeed we were given great hospitality.

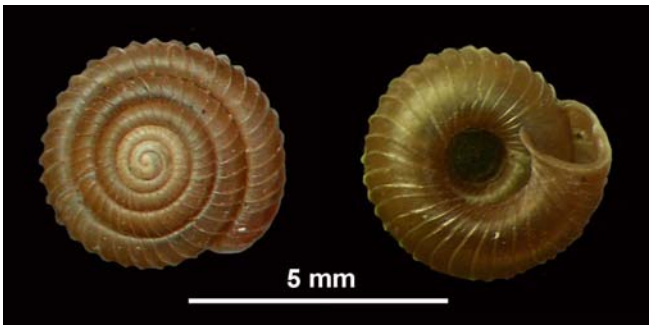


figure 2: *Spelaeodiscus triarius*, Lotru valley.

Meo did all the essential things before we set off, especially getting permits for collecting in the numerous National Parks that we wanted to visit. Then we set off on what was to be a 3000 mile, one-month round trip to and from Wrocław in Poland. The car was essential, but the roads do not encourage fast driving! From Sibiu we visited first the forests in the Lotrului Mountains just to the south, where Meo was running a field course. We were roped into the teaching (figure 1), and also got the students to sample snails. They picked up the idea very quickly, and after a short session we were presented with very many specimens, including the smallest species. Among our finds here were two species new to us: *Spelaeodiscus triarius* (figure 2), a small species supposedly restricted to caves, and *Cochlodina cerata* (figure 3), also unfamiliar to us northerners. At least we could identify these ourselves. Some others were mystifying, and we only identified *Laciniaria exalta* (figure 4) with help from Miklos Szekeres. Miklos also dealt with the immensely variable *Clausilia dubia* (figure 5). It is still hard to believe these two specimens are the same species. Most of the species unfamiliar to us were clausiliids.

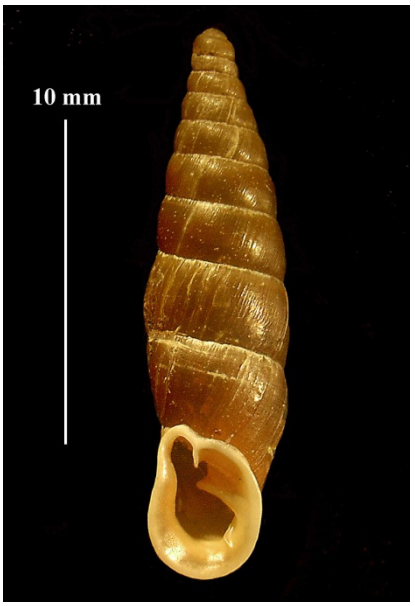


figure 3: *Cochlodina cerata*, Lotru valley.

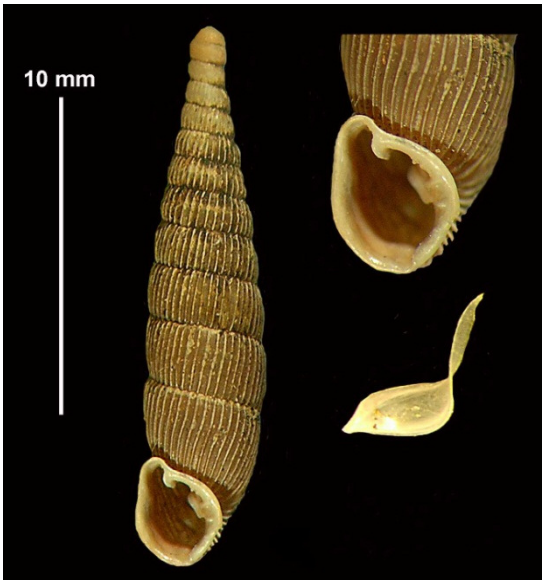


figure 4: *Laciniaria exalta*, Lotru valley.

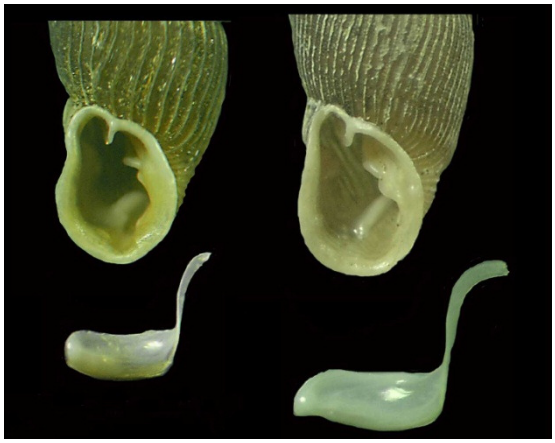


figure 5: Mouths and clausilium of specimens of *Clausilia dubia.* Left: from Bistra; Right: from Fenes.

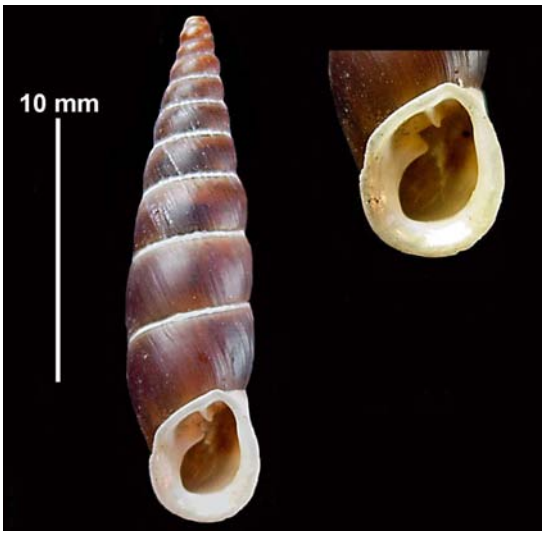


figure 6: *Alopia livida*, near Predeal.

figure 7: *Mastus venerabilis,* near Predeal.

Then to Predeal, near the Bucegi National Park, and our first taste of limestone. Meo absolutely declined to come with us, and we soon saw why: this is the top tourist resort, and the area was packed (queues for the ski lifts to the summits certainly deterred us from taking the easy way up). Fortunately, not many others disappear into the forests. This was the only place where we encountered *Alopia livida,* (figure 6) a remarkable dextral clausiliid. There are many endemic *Alopia* species, but they tend to occur in the high mountains, and not in the lower forests. Besides the dextral *Alopia,* there was another surprise on the coiling front, the abundant, sinistral enid *Mastus venerabilis* (figure 7).The faunas were very rich. After that, and still on our own, we went west to the Retezat National Park, again limestone in places, but all rather high up, and rather dominated by managed conifer forests. This is really off the beaten track and definitely self-catering! (figure 8).

figure 8: Beata cooking at Retezat.

After that, Voichita was able to join us, and we visited the Apuseni National Park, the famous Bicaz gorge (limestone again) where we found *Vertigo angustior* atypically sitting in a forest, several other places in between, and finally the Maramures Mountains in the north, only a few miles away from our earlier sampling in Ukraine. Indeed our sampling took us right up to the border (figure 9), escorted by a very smartly-dressed border guard complete with umbrella (it was raining). From there it was a short journey to Voichita's family home near the Hungarian border, saying goodbye, and starting the long drive home.

figure 9: Sample site at the Ukrainian border.

Altogether we sampled 43 sites, running along most of the mountain chain, but stopping short of the Banat region close to Serbia (famous for its rich fauna and flora). What did we find? There were 83 snail species in our collections overall. Sites held between 20 and 40 species, very similar figures to those found further north. Most species were familiar to us, and one feature to emerge is that these forest faunas are very similar to those from further north, and there is no obvious trend for north–south change. Our 83 species are a small proportion of the total Romanian fauna and few of them are endemic. This is in marked contrast to Poland or Britain, where sampling a few forests can give you more than 50% of the nation's snail fauna. There are many endemic species

in the region, but most are open rock or high mountain dwellers. Nevertheless, there are some impressive species we do not see further north.

The largest of these is *Drobacia banatica* (figure 10). It is known from warm and humid Pleistocene deposits more to the north-west: Slovakia, The Czech Republic, Poland and Gemany, as a component of the so called banatica fauna. Now, it is restricted to parts of Hungary, Ukraine and Romania. In places, it was abundant, but it is missing from some parts of Romania for no obvious reason. Even those species that should be familiar sometimes look "odd", like the very large *Helix pomatia* (front cover). We are told that they are all really that, but there are many described subspecies.

We only scratched the surface. While there are books on the fauna, especially Grossu's monographs, there must be much more to discover about distributions, and probably some undescribed species too. Malacologists are thin on the ground (Voichita is the only one we know of working on land snails). Hungarians take an interest, but there is plenty of scope for others, and, by our experience, making the local contacts is fun and very worthwhile.

figure 10: *Drobacia banatica*, Lotru valley.

Tale of a snail trail

Robin Robins

We used to have a typical London garden, with a small rockery just outside the patio doors, where lived and lurked many snails (*Cornu aspersum)*. We also had a proper complement of thrushes, amphibians and the odd hedgehog, to help us keep the snaily population down. So I would collect up the snails and throw them down the garden into the middle of the lawn, where I imagined that natural justice would prevail.

My mother – long gone now – would nag at me: "They`ll find their way back – I know they will – they follow their slime trails!" I argued that they could hardly follow their slime trails back when they had flown economy class to their place of execution.. Like every child worth its salt, I was determined to prove my mother wrong.

In the gloom of the night, I collected up all the snails I could find in the rockery, put a Tippex dot under each shell, and placed them carefully at the opposite end of the lawn. Then I went to bed, feeling smug and secure. Four days later, the snails were all back home in the rockery.

Intrigued, I marked off an area two yards square in each corner of the garden. In each area, I collected up all the snails I could find and gave them their own team strip – a blue, yellow, green or red enamel painted dot under the shell. Then I took all four teams to the middle of the lawn, and mixed them thoroughly. Four days later, the snails were all back home in their own corner.

Cease-fire on snail extraditions was instantly called, and I started a monthly check on the numbers of dotty snails in each corner. My mother remarked that it was not only the snails which were dotty. By and large, the snails kept tightly to their own spot. One moved house when I transported a big flower tub to another corner, I suppose because its home ground remained the same – and I found another at the opposite end of the garden. Even in a small, London plot, that seemed amazingly intrepid!

During the winter, the snails slept peacefully, sealing up their front doors against the cold. I wondered if hibernation would spoil their homing instinct, so in Spring I went to look for the teams. Yes – the numbers had dropped a bit, but the majority were still there, smiling sleepily at me when I picked them up. Funny though – there were a few fully-grown but unmarked snails in each corner. If they were so strongly homing, where could they have come from? I came to the conclusion that I had missed them during my initial search, and marked these, and a whole lot of new juveniles, with two dots of the team colour, to differentiate them from last year`s batch.

I could hardly give up now, could I? For the next two years, I fostered the snails in the manner of a keeper at a wildlife park. They were rounded up, counted, recorded, and new ones were marked with the appropriate number of coloured, enamel dots. Then I patted their shells and set them free to graze unpelleted and unpersecuted.

One of the remarkable things was that some snails would live so long – when we finally moved to Hampshire there were still a fair number of the original ones, marked with a single dot, together with the two and three dot ones of subsequent years. I wonder if the new owners are still finding spotty snails, even now?

Our Hampshire garden is twice the size of our London one, and the bottom boundary is marked by a pretty little river, which separates us from a field. I haven`t repeated the snail experiment, but I have changed my disposal tactics in the light of superior knowledge. While I am gardening, I collect slugs and snails up in a bucket, and at close of play I throw them over the river. I am perfectly sure that snails don`t swim, although my neighbour swears they don`t need to – they just take a longer route by walking downstream to the bridge. I am perfectly sure that neither option is open to them – but then again, I was perfectly sure that they wouldn`t find their way home after flying down the garden! Perhaps another experiment is called for...

Testacella in the Garden

June Chatfield

Testacella , or the Shelled Slug, has a distinctive way of life living buried in the soil where it feeds on earthworms. Unlike the internal shell plates in the mantle at the anterior end of some slugs such as limacids, the shell plate of *Testacella* is attached to the tail on the outside. Most *Testacella* that I have found have been in my Alton garden, but before Conch. Soc. members start placing orders, I have to point out that their occurrence is sporadic and unpredictable. However they are more likely to be found on the surface after very wet weather or under objects such as flower pots on earth. It was whilst I was moving pots around looking for specimens of any snails to take into a school in autumn 2009 that I came across the two illustrated examples that were different colours, perhaps polymorphic forms (figure 1). From the apricot-coloured foot sole I identified them as *T. scutulum* (figure 2). The species distinction between *T. scutulum* and *T. haliotidea* seems to hinge on the colour of the foot sole, the lateral grooves combined before the junction with the shell in *T. scutulum* and close together in *T. haliotidea* as illustrated in Cameron, Jackson and Eversham 1983. The latest Non-marine Atlas (Kerney 1999) has explanatory notes and does suggest that the two species may not be distinct in view of their identical distribution and habitat. What effect do the so-called species differences have on the animals' daily function underground? Another difference outlined in Ellis's *British Snails* (1926) refers to the penis sheath having a flagellum in *T. haliotidea* but not in *T. scutulum.* What difference does that make to its functioning? Some DNA work is clearly needed to sort this out. Both of these species are clearly different from the grey-brown *T. maugei* that occurs in Wales and the west country, where I have encountered it twice in Cardiff in the 1970s.

A particular feature of *Testacella* is its diet – earthworms – a departure from that of most other slugs. Slugs, however are not a true taxonomic group, being derived from several different snail families that have undergone shell reduction. On one occasion, when digging the vegetable garden in my Alton garden in May 2005 I brought up an earthworm that had a yellow end and I looked at it more closely, thinking that I had chopped the worm in half and exposed the intestine. Not so, it was a *Testacella* with its mouth wide open in the process of trying to eat an earthworm several times its own size. I went in to find a camera to record this but the two had by then separated (figure 3). In the great age of Victorian microscopy the tiny pointed radula teeth of *Testcella* that grip the slippery worm were something unusual to study.

figure 1: *T. scutulum* from an Alton garden showing the normal and the pale form.

figure 2: *T. scutulum* showing the apricot-coloured foot sole.

figure 3: *T. scutulum* with earthworm to which it was attached.

figure 4: *T. scutulum* crawling with the body expanded.

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Marine Recorder's report 2010

Jan Light

I thank everyone who has submitted records during 2010. Some 138,400 records from Britain and Ireland have now been digitised. I would like to thank Steve Wilkinson for his help with data input during the year.

The nudibranch *Cuthona amoena* has been recorded from Sea Area (SA) 23, Anglesey, for the first time. Ian Smith found a juvenile specimen, confirmed by Bernard Picton, near Menai Bridge in the Straits on Anglesey, in August 2010. Also in August, and new to SA 23, two specimens of *Doto koenneckeri* were found at low water springs on the Menai Straits. The animals were found by inspecting the alga *Halidrys siliquosa* for their food, the hydroid *Aglaophenia pluma.* This identification was also confirmed by Bernard Picton.

I'm grateful to Ian for flagging a record for *Okenea elegans* from SA 22, Cardigan Bay which is new to the Census. The sighting was reported on the Seaslug Forum by Anthony Gilbert and Maureen Collins, from a dive site in Bardsey Sound, Lleyn Peninsula. The specimen was on red alga attached to a hard substrate ledge at a depth of 8 m. In recent years the Seaslug Forum website, which has reported seaslug sightings from around the world, has been a useful source of UK records. Unfortunately it was closed down, as an active forum in June 2010, over funding issues, but the archive remains accessible on the internet.

During the autumn and winter, Ian Smith undertook extensive and systematic field work to try and ascertain the extent of *Assiminea grayana* colonisation in the tidal stretches of the rivers and estuaries of the Dee, Mersey and Clwyd. He found the animal, often living in abundance (thousands per m^2), at some 30 six-figure grid referenced sites. A full article is in preparation for *Mollusc World.* The species was found to be particularly well established on the Dee where Ian found it at almost every station he examined. Searching in the Conwy estuary failed to reveal the species.

Julia Nunn has reported three nudibranch records as new to SA 29A Antrim: *Jorunna tomentosa* and *Doto maculata* (Bernard Picton) and *Diaphorodoris luteocincta* (Claire Goodwin) as well as the neogastropod, *Trophon truncatus,* alive (Bernard Picton).

Truncatella subcylindrica has now been recorded on the seaward coast of Portland, Dorset by Malcolm Storey, 1st May. At East Weares, SY70607238, which has an exposed eastern coastal aspect, there are two old man-made tidal lagoons that were originally used for salt production. They now leak and are tidal and are separated from the sea by shingle bars (although storm waves sometimes break over them). The smaller of the two pools is about 6 m by 4.6 m and full of rocks covered in *Pelvetia*. It has a gently sloping, zoned beach which is very sheltered because it lacks wave action. The *Truncatella* were found under stones among a small ring of saltmarsh with seedling *Salicornia.* White *Lasaea adansoni* were associated with the habitat.

Subsequently Steve Trewhella found *Paludinella littorina* living in this habitat on 5th September. Prior to that, in July, he had found the species living underneath large boulders on the seaward side of the shingle bars which separate the lagoons from the open sea. He has uncovered two further sites for *Paludinella* in Dorset. Snails have been found under rocks in a boulder field adjacent to Charnel Bay, Kimmeridge SY90157900 and also at Chapman's Pool SY95557660. Here the snails' area of colonisation extends rather lower on the shore (into the zone of *Ascophyllum*) than is usual.

In my report for 2008 I highlighted Steve's find of an unfamiliar chamid bivalve cemented to a plastic fishbox thrown up on Chesil Beach. I had identified this as *Pseudochama gryphina*, a Mediterranean species. On January 1st 2010 Steve found a second chamid on some plastic flotsam beached on the Chesil Bank. (It took him an hour with mini drills and blow torches to extract it!) Steve believes most of the flotsam he finds on Chesil emanates from the western Atlantic and I recommended he send both the chamid specimens to Graham Oliver in the BioSyB department at Cardiff Museum. Dr Oliver reports: "I have now examined both shells that you sent to me and find that both shells have the attached valve coiling clockwise and therefore both belong to *Chama*. Recent papers suggest that the coiling may vary within a species and that the genus *Pseudochama* is of little value. I have compared your shells with *Chama gryphoides* from the Mediterranean and am unable to distinguish them. I would however be similarly unable to separate them from the American *Chama congregata*. I would suggest that they are not *C. (Pseudochama) gryphina*; shells in our collection are always coiled anticlockwise, are thinner and the cemented valve is deeply cupped. Being attached to flotsam often suggests a Gulf Stream origin and one might expect these shells to come from the western Atlantic, I have not looked in detail at surface ocean currents which might point to such an origin or to a Mediterranean source. Clearly if you found them attached to our shores then the Mediterranean origin would be assumed." Both Chesil specimens have been imaged and can be accessed via the Museum's Marine Bivalves of the British Isles website: http://naturalhistory.museumwales.ac.uk/britishbivalves/browserecord.php?-recid=478.

In January Jim Logan highlighted an unusual stranding in Dumfriesshire. About 20 *Scaphander lignarius* shells, some with dead animals attached, were washed up on a beach in Luce Bay near Stranraer. *Scaphander* usually occur as beached finds in ones and twos. Whilst this report was in preparation a notification was posted on the 'conchology-uk' bulletin board. During January 2011 hundreds if not thousands of these shells were found in the same area. An estimate of density was 20 to 60 shells per m^2. One possible explanation that connects the two events is the extremely low air temperatures at the time of the strandings.

Anna Holmes of Cardiff Museum has notified a first east coast record for the galeommatid *Coracuta obliquata.* Samples being processed at the Museum, from Silver Pit, east of the Humber, yielded live-collected specimens. In 2006 *C. obliquata* was recorded from Carmarthen Bay in the Bristol Channel, providing the first British record in 100 years and the first live record in British waters (Holmes *et al*., 2006. *J. Conch. Lond*. 2006 39 (2) 151).

I thank John Fisher for regular submissions, particularly from Cornwall. John examines large samples of shellsand, often from honey-pot sites, and derives long lists including several rarely recorded species. Amongst these was a single shell of *T. subcylindrica* from Silverstrand, east of Barra, north Galway Bay. This disjunct record extends its known

distribution northwards; currently there are several sites south of Galway. His very notable record is for *Glossus humanus,* a sublittoral species with records from only 17 Sea Areas most of these being shell rather than live occurrences. Several living animals were trawled by commercial trawlermen west of Scilly (50˚ 02'N 07˚ 11'W) in July 2010. This is a new sea area record (SA19 Scilly Isles).

David Fenwick, a wildlife photographer working in Cornwall, discovered a new colony of *Pholas dactylus* in March 2010 near Par Beach, Cornwall (SX 08828 52420). The animals were found at the foot of a rock outcrop on a low spring tide. The siphons were protruding from holes in the shale bedrock. There were many holes containing dead shells (figure 1), but David did extract one pholad to confirm the identity (figure 2).

figure 1: *P. dactylus*, Par Beach, Cornwall. Holes and dead shells.
(photo: David Fenwick)

A fresh, articulated specimen of *Mactra glauca* was washed in at a site known as the Cup and Saucer at Fort Grey on Guernsey in June 2009, found by Troy Waterman and reported to me by Richard Lord in 2010. According to Society records the species was last recorded alive on Guernsey in 1922.

On Jersey Paul Chambers reported that *M. glauca* has expanded its range to include Les Minquiers and the south coast of Jersey (off Green Island). Paul knows the local shores well and cites finds of *Capulus ungaricus, Scrobicularia plana* and *Lyonsia norvegica* as unusual and noteworthy.

Jujubinus striatus is a locally abundant trochid in the Channel Islands but rare on British and Irish coasts. It is known on the Isles of Scilly and participants on the field meeting to the islands in September were glad to find the species living on St Martin's. It has a close association with the marine grass *Zostera marina* and was found near the *Zostera* beds around White Island.

I would like to conclude on a personal note by remembering Terry Wimbleton who died last year. Over the years Terry was a regular and careful contributor of records to the Society's marine scheme. He patrolled his patch, a stretch

figure 2: Live *P. dactylus*, Par Beach, Cornwall.
(photo: David Fenwick)

along the north Solent coast, regularly, and came to know his sites and their species assemblages very well. Something new would readily catch his eye and would need to be checked. Terry's enthusiasm for molluscs and their shells was infectious. He was an active participant with local organisations, something of a conchological ambassador, and I have no doubt his voluntary efforts with museums and the like are missed.

British Shell Collector's Club

17th September 2011: Derbyshire Shell Show, Chatsworth House, Derbyshire

29th October 2011, 9am to 5pm:
Shell Show
Theydon Bois Village Hall, Essex, CM16 7ER

The club Shell Show takes place from 9.00am to 5pm. Admission is free. Bring a friend. It is an opportunity to meet other members and to seek advice from experienced collectors. Members are encouraged to create display tables for the prize competitions for categories such as One Species, British Marine, Caribbean or in specialities such as Shell art, shell postage stamps. Marine, freshwater and land specimens are shown.
Many shell and shell-related items for sale.

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

How should we define the 'habitat' of molluscs?

Keith Alexander

It is a remarkable fact that our understanding of the habitats of terrestrial molluscs has advanced little since Boycott's (1934) exemplary account. The term 'habitat' effectively means 'where they live' but is more often used to refer to vegetation types or other landscape or land-use features. Is the habitat of a particular species 'woodland' or the very precise conditions which occur very locally within woodland? Are permanently moist conditions more important than closed canopy?

Tony Wardhaugh (2011) has written a very interesting and useful account of the actual habitat of *Spermodea lamellata*. It is exclusively a ground-living species, living in deep leaf litter (generally of at least 10 cm or more) overlying deep, soft, loamy soil. The sites remain moist throughout the year but are rarely very wet. It is not found in shallow leaf-litter overlying drier or compacted soils, nor in the rapidly-decaying leaf litter from tree species such as ash, sycamore or hazel. It therefore has a high dependence on undisturbed ancient semi-natural woodland, although is tolerant of partial clear-felling and replanting in managed woodland. This is precisely the sort of information that we need to know if we are to successfully promote its conservation.

figure 1: an uncut compartment in St John's Wood, County Rosscommon.

I have recently been carrying out a detailed survey of the invertebrates in St John's Wood Nature Reserve in County Roscommon, Ireland. This ancient semi-natural woodland occupies 110 ha and has developed over Carboniferous Limestone overlain by sandy clay, with acid soils in places (Rackham, 1995). It has had a long, albeit erratic, history of exploitation as coppice with standards. This is a two-storey woodland management system where among cut trees or 'coppice' some trees are left to grow as larger size timber, called 'standards'. The National Parks and Wildlife Service have recently reinstated this style of management in a few compartments. Most remains in non-intervention management for the time being (figure 1). Part of the brief for the study was to assess the impacts of current woodland management practices, such as coppicing, ride creation or non-intervention, on invertebrate assemblages.

At the start of the project I drew up a list of the more desirable molluscs which might be expected, in order to make sure that I carried out survey techniques which might increase the chances of detecting them if present. The selection was broadly chosen from species known to have a preference for native woodlands and which are included in the Irish Red List (Byrne *et al*., 2009). *S. lamellata* was therefore on my list but was not found. Reading Tony Wardhaugh's account suggests one key reason why it was not found – no pockets of deep leaf litter were encountered, although patches may have been overlooked. Despite lying over limestone, the soils in the least disturbed parts of the wood are actually as much as 9 cm deep and remained permanently moist throughout the field season. Suction sampling here revealed a large population of *Leiostyla anglica* in the leaf litter but that species was not found anywhere else in the wood. The deeper moister soils and the relatively thin leaf litter were sufficient for *L. anglica* but not for *S. lamellata*. Leaf litter depth was not measured but was probably no more than 5 cm deep.

The habitat requirements of *L. anglica* are known not to confine it to ancient woodland across much of Ireland, but have these requirements been properly defined? Byrne *et al*. (2009) state that it is common in wet, shaded habitats on neutral to base-rich soils, although they admit that towards the west coast it occupies acid coastal heath and can be found around gorse in rough pasture. However this is about vegetation and land-use alone, whereas what we really need to know is how these relate to key habitat requirements in terms of humidity regimes and stability. The St John's Wood population appears to be very restricted in distribution but is this due to the relatively undisturbed nature of those areas? They are still of a coppice with standards structure and have clearly been actively exploited in the past. Maybe soil depth is important here, helping to maintain permanently moist conditions despite the underlying limestone?

figure 2: *Z. subrufescens* on hazel re-growth in St John's Wood.

The other two Irish Red List species found in St John's Wood were very different in their distribution. *Zenobiella subrufescens* (figure 2) was present more or less throughout the woodland, being mainly found amongst the ground vegetation, on the foliage of shrubs and even into the lower canopy of trees. Only empty shells were found in the leaf litter. Its presence above soil level might suggest that it

figure 3: hazel re-growth in cut-over compartment of St John's Wood.

would be intolerant of active woodland management, but it was found to be common on hazel re-growth in the recently cutover coppice compartments (figure 3). It clearly has the capacity to rapidly re-colonise cleared areas. Byrne *et al*. (2009) merely describe it as an old woodland relict species threatened by habitat destruction. But the St John's Wood coppices demonstrate that habitat destruction is not the issue – rather the permanent loss which might be brought about by grubbing the wood out completely. This may seem a fine point but the presence of *Z. subrufescens* in this reserve might have been used to justify non-intervention, whereas active coppice cutting has proved beneficial to a wide range of the other invertebrates in the wood, and has no detrimental impact on the *Zenobiella* population as a whole. The wood also has a past history of livestock grazing, so *Zenobiella* is also tolerant of a certain amount of grazing – a fact which needs to be appreciated.

The third Red List species found was *Limax cinereoniger* (figure 4). Interestingly this was only encountered in two of the most recently cut-over compartments. The reasons for this are not clear and may relate more to increased light levels and the improved ability of the surveyor to see the slugs! But the opening of the canopy actually stimulates the development of ground vegetation and so may actually increase soil moisture and humidity at ground level. Byrne *et al*. (2009) state that this species is found in old, minimally disturbed, broadleaf woodlands or on cliffs with relic woodland vegetation on western coasts. Again, this might be used as a case against restoration of active management in St John's Wood, but – as I found – this species is certainly tolerant of coppice cutting, if not favoured by it. It too is tolerant of certain levels of grazing.

figure 4: *Limax cinereoniger* in a cut-over compartment of St John's Wood.

This account is not intended as a criticism of the Irish Red List – this has provided a much-needed framework for promoting mollusc conservation in Ireland. My intention is to draw the attention of mollusc conservationists in general to the need to provide precise and carefully worded accounts of the habitat requirements of molluscs, to be realistic about the potential responses to changes in land management, and not to fall into the trap of using vegetation and land-use terms loosely. My examples come from a particular vegetation type with a history of exploitation by people, but the principles are clearly applicable to all situations, to all mollusc habitats.

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Snails in a Venice fish market

Graham Long

Following June Chatfield's note on the National Escargot Day in Mollusc World 24, I thought that members might like these photos that I took in 2006 in the fish market in Venice. Several of the stalls had bins of live escargots – mostly *Theba pisana* but with some *Eobania vermiculata* and possibly other species mixed in.

It was really quite amusing: fish lie dead on the slab but the snails were intent on escape. The stall holders were constantly recapturing them on their way out of the market!

"On the spot" questionnaire: Robert Cameron

What do you do for a living? Retired but was Professor of Evolutionary Biology at Sheffield University.

What areas of conchology particularly interest you? Land molluscs, and especially species diversity in faunas; also the shell polymorphism in *Cepaea* species.

How did your interest in molluscs begin? I was a keen birdwatcher, and as a student thought of research on birds. Forty minutes with my eventual supervisor (Professor Arthur Cain), and I emerged with a project on *Cepaea.* A little later, I constructed a primitive key to land snails for a field course where I was an assistant. By then, I was hooked!

When and how did you become a member of the Conchological Society? 1967. Near the end of my PhD studies, when it was clear that I was becoming a committed Conchologist.

In what ways have you been involved in the Society and its activities? Over the years, I have sent in many records to the non-marine recording scheme, written articles for *J. Conch*, the *Conchologist's Newsletter* and *Mollusc World*, and given some talks at Society meetings. Most recently, I have been on Council, and chair the Conservation and Recording Committee. Outside the Society, I have run many identification courses, and produced keys and guides.

Do you have a memorable "conchological moment"? A moment of (quiet) triumph. On holiday on Sark, I entered a small damp wood, saw a fallen log on swampy ground, thought "that is just the place for *Leiostyla*", turned the log, and there it was (the first record for the island). But I have made plenty of bad guesses since!

If you were marooned on a desert island and could take only one book with you what would it be and why? If I knew which island, and it had a snaily monograph, that would be it. Otherwise, pass!

If your house was burning down what shell (or shell related item) would you rescue first? Actually, not a shell (I have a huge, rather disorganised collection), because there is nothing unique. Prosaically, it would be my computer, because it has all my unpublished molluscan stuff.

Is there a shell or mollusc that eludes you ? No particular species, but I have found that when I search, I often find more species than shown by previous records, but miss the really rare ones.

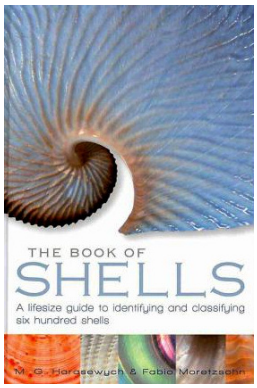
Do you draw any particular inspiration from historical figures in natural history and why? It has to be A. E. Boycott, though Cyril Diver comes a close second. Boycott asked all the right questions (i.e. the ones that interest me), and came to conclusions which have stood the test of time without the sophisticated analyses used today. Both he and Diver were 'amateurs' in both senses: they were not paid to be conchologists, and they were motivated by scientific curiosity.

Where are your favourite locations for shell hunting? I am lucky; I have been to many exciting places here and abroad, and it is hard to choose. It would always be a forest. Just now, I would put the Azores at the top of the list: sufficiently known for most identification to be straightforward, sufficiently unknown to give a chance to find something new, good climate (for snails) and excellent company.

Can you give us a mollusc-related fact or joke? It takes about 40,000 *Punctum pygmaeum* to make one *Helix pomatia.* That is the difference between a mouse and a rhinoceros.
A cartoon: A road with a great string of slugs behind a snail. First slug to second slug: "Bloody caravans!"

Words of advice to a budding conchologist? Meet others with the same interests. You learn far more from other people than any amount of books.

BOOK REVIEW: *The Book of Shells* by M.G. Harasewych and Fabio Moretzsohn



2010, A&C Black. 656pp, Hardback, £35.
ISBN-13: 9781408125274

Written by two American academics, this book commences with brief introductory sections covering: "What is a Mollusk?", "What is a Shell?" and shell collecting. The piece on how a shell forms is one of the clearest I have seen.
The bulk of the book looks at 600 worldwide marine shells – mainly bivalves and gastropods, with a few chitons, scaphopods and cephalopods. The number of species covered seems limited compared to other volumes, but each species is treated on a full page allowing greater depth of coverage. Most species shown are familiar, but with a good selection of the less familiar; many more micros than usual, species with Arctic or Antarctic distribution and from abyssal areas or hydrothermal vents, some recently described species, and two – *Exilia blanda* and *Daffymitra lindae* – known only from the holotypes. All good to see.

For each species as well as scientific and common names we are given details of size range, distribution, abundance, depth, habitat and feeding habit, with details of operculum for gastropods and byssus for bivalves. There is also a detailed description of each shell and a distribution map, though the latter are not always clear particularly for those species with limited distributions.
A short, informative and authoritative, paragraph discusses each species, variously covering, among other things, biology, ecology and habitat preference, nutrition, human usage, geological history and much more. To give a few examples: *Pisania pusio* is "almost always found in pairs, rarely more than 1 ft (30 cm) apart from each other". *Megathuria crenulata*'s "haemolymph ('blood') has promising biomedical applications, therefore several companies are currently investing in its aquaculture." "*Gaza* have been observed to swim by flapping their broad foot to escape predators". "*Macleaniella moskalevi* is the deepest-dwelling known mollusc. It has been collected at depths of 28,200 ft (8,600 m)". *Cyrtopleura costata* "is harvested commercially in Mexico and Cuba. Because of its rapid growth, it has potential for aquaculture". "If touched *Lima scabra* detaches some sticky tentacles to delay the predator" while it swims away to escape. *Turbinella angulata* "is an important food source in the Bahamas, where it is known as the Pepper Conch". *Gemma gemma* "can occur in densities of 83,333

clams per sq yd (100,000 per m^2)". The strength of this volume lies in these detailed accounts, which contain a wealth of information. Each species account is accompanied with a colour photograph of the shell. Most shells are shown at natural size, many with additional enlarged images to enhance details particularly of sculpture, while larger species are depicted in reduced images with a small section at natural size – the latter I found unhelpful. Micros are depicted both at natural size and in SEM enlargements. A few of the images are rather artistic – the spire end views of *Bathybembix bairdii, Olivancillaria urceus* and *Harpa costata* do not particularly aid identification, while the coloure of some plates overemphasises the red spectrum. I wish that more species had been shown in both dorsal and ventral views (gastropods) or with interior and exterior views (bivalves) to make better use of the available space. For example reading that "*Periploma planisculum* has a spoon-shaped projection of the valve right under the umbones, called a chondrophore..." would have been made clearer with an interior image shown.

Appendices include a good glossary, a four page 'evolutionary classification of the Mollusca' (which will be superfluous to most general readers), a two page list of resources; part bibliography, part list of useful web sites and web contacts for selected national and international organizations – though these tend to be more academic organisations, all of which could usefully have been enlarged. Finally there are separate indexes for common and scientific names.

There are many identification guides to shells on the market, some even much smaller and cheaper volumes – covering considerably more species. If you simply want to identify shells this is not the best volume to begin with. If however you want to learn about shells then this is an excellent starting point. I certainly found much of interest, but more in the text than the illustrations.

Kevin Brown

Scilly on the spot

Ron Boyce

We were on a joint meeting on the Isles of Scilly with the Porcupine Marine Natural History Society, about 40 of us altogether (see back cover), enough to fill a chartered boat each day so that we could match our travel timings to the tide times. There were not many conchologists in the group; Celia Pain, John Llewellyn-Jones, Rosemary Hill and myself in a small cottage, Janet Sawyer in the Star Castle, Julia Nunn (also in Porcupine) in a B&B at the far end of the bay, and Shaun and Theo Tamblin under canvas in the garrison. Angie Gall of Porcupine had arranged for laboratory accommodation in the Scillonian Club where microscopes, lamps, specimen dishes, laptops and a projector could be installed; this turned out to be rather crowded, but people were very friendly and were happy to identify seaweeds, crabs, starfish, normal fish, sea spiders and other strange creatures for us.

Normally when you stand on a shoreline and look seawards, what you see is mostly water, but here there are other shorelines in the distance or even close at hand and the place has a different feel from mainland shores.

The day before I arrived, a group from Porcupine surveyed Porth Loo on St Mary's and found 40 species of molluscs live including the sea slugs *Aplysia punctata* (figure 1), *Berthella plumula, Elysia viridis* and *Hermaea bifida.*

figure 1: Sea Hare, *A. punctata*, in the laboratory.
(Photo: John Llewellyn-Jones)

Our first boat trip on 8 September was to Tresco, where we first had a look at strandlines to the north of Carn Near. I didn't find this shoreline particularly species rich (though Celia found 10 species of micromolluscs there), so I went along the south coast to look for weed samples that might contain some interesting animals. I also sneaked off for an hour to look round the famous Abbey Gardens, where they have recently constructed a rather splendid shell grotto masquerading as a rain shelter (figure 2).

figure 2: The shell grotto in Tresco Abbey Gardens.

Near Appletree Point, Rosemary and Julia found live *Gari costulata,* Rosemary found *Gafrarium minimum* and Julia found live *Arcopagia crassa* and *Chauvetia brunnea*. and Theo found *Sepia orbignyi*. Several people found sea slugs (*Archidoris pseudoargus, E. viridis, H. bifida* and *Polycera quadrilineata).*

That evening I spent some time separating the Mollusca from a large range of other creatures which were eventually taken along to the lab in case they were of any interest.

The following day we went to St Agnes and initially spent much time searching the vegetation opposite the Gugh for land molluscs, where four of us found live specimens of *Cernuella virgata, Lauria cylindracea, Cornu aspersum, Cepaea nemoralis, Oxychilus alliarius, Cochlicella acuta* (figure 3) and *Lehmannia valentiana.* After walking across the island and consuming a very welcome farmhouse icecream at Troy Town farm, Rosemary and I reached the

far shore at Periglis where, dismayed by the size of the boulders and how far it was between us and the shore, we headed towards an area where we saw some fishing boats, and worked that. Many of the Porcupine group could be seen on Burnt Island in the distance; Julia was over there and found three live *Turbonilla lactea*, which she was rather pleased about, and vaious Porcupine members found the sea slugs *A. pseudoargus* and *E. viridis.*

figure 3: Two *C. acuta* on St Agnes, Isles of Scilly.

Then we joined Janet Sawyer under the shade of a tamarisk tree, ate our sandwiches and chatted in the almost Mediterranean sunshine about our experiences on previous visits.

On the Friday we visited St Martin's Flats and recorded a very long list of shells. Julia and Rosemary both found live *A. crassa* here, and Julia also found live *Gari tellinella.* As on other parts of the island, the sand here consists mainly of coarse granite particles rather hostile to small shells, yet we managed to find intact rather delicate items like the internal shells of juvenile sea hares *A. punctata*. Judith Oakley found the sea slugs *A. pseudoargus, E. viridis* and *B. plumula* on English Point.

The following day we went to St Martin's again but this time went to the opposite more exposed shore close to White Island which can be reached at low tide. The inner bay here had a rather nice *Zostera marina* bed (figure 4), where Julia and Rosemary both found live *Jujubinus striatus*. Julia found live *C. brunnea* on White Island. It was noted that *Cingulopsis fulgida* was the superabundant mollusc on red seaweeds on this side of the island rather than *Rissoa parva* which was dominant on the more sheltered coasts.

figure 4: Rosemary Hill working the *Zostera* bed between St. Martin's and White Island.

Sunday was not an official part of the Conchological Society meeting. There was no boat trip and the tides were late, so Rosemary and myself went for a walk along the west coast of St Mary's as far as Halangy Down to have a look at the Neolithic village site. After lunch we made our way to Pelistry Bay and worked the shore just north of Toll's Island. We had a shell of *C. brunnea* from this site. The sea slugs *A. pseudoargus* and *B. plumula* were found by Porcupine members on the other side of the island, and Theo Tamblyn found a shell of *Ovatella myosotis* on the island.

One of our Society members had mentioned to John Llewellyn-Jones that snails similar to *Ovatella* had been found in the vicinity of Hugh Town. John asked one of the locals, and this chap actually knew where the animal was! A quick look in the appropriate spot just below the Battery revealed several live examples which were taken and photographed (figure 5).

figure 5: *O. myosotis* from the Battery, St Mary's, Isles of Scilly.

It was fascinating to note some of the differences in mollusc communities compared with the mainland; Julia commented that there were essentially no *Littorina littorea* present, with its niche taken by superabundant *Osilinus lineatus* and low numbers of *Littorina saxatilis*, with its niche taken by *Littorina compressa* with its classic yellow with black lines. I asked David Reid (of London's Natural History Museum) later about the absence of *L. littorea* and whether it was due to the granite particles in the substrate. He thought the reason was that the ocean currents were in the wrong direction for adequate larval recruitment. Janet Sawyer noted a great increase in *Dosinia exoleta* and thought that the fauna was less diverse than in previous years. We did find 108 species, however.

The journey back was the biggest surprise. We arrived at the airport to find the place crowded. The company we had flown with from Exeter store all their aircraft at Newquay, and the airport there was fog-bound. John and Celia left on the last helicopter to Penzance before the fog closed in, and by mid-afternoon the situation was no better. We were then transferred to the Scillonian ferry, on which we sailed back to Penzance and were returned to Exeter by taxi, only to miss the last train home. Fortunately we were able to telephone from the airport to book overnight accommodation, and we eventually arrived back home at noon on the following day having forfeited our return train tickets.

Who said conchology isn't an adventure?

Grateful thanks are expressed to Angie Gall of the Isles of Scilly Wildlife Trust for arranging such a successful meeting for us, and to all the members of the party for supplying the information on which this article is based.

In Search of Big Eye

Malcolm Symonds

Neritina labiosa Sowerby, 1836 (figure 1: 1a–e) is a little known species despite being one of the largest freshwater nerites. The shell is rather similar in shape to *Neritina asperulata* (Récluz, 1843) (figure 1: 2a–e) and to *Neritina petitii* (Récluz, 1841) (figure 1: 3a–e) but it can be readily distinguished from these and all other species of *Neritina* by its operculum. On the inner side, in place of the usual peg-shaped lower apophysis, there is a distinctive series of 5 to 8 serrations. No type locality was given with the original description but subsequently Sowerby (1849: 514) referred to this species as being from "Island of Luzon, Philippines". It has also been recorded from northern Celebes, Amboina, Java and the Solomon Islands (Delsaerdt, 1998). Within the Solomons it appears to have a restricted distribution. Neither Haynes (1993) nor Starmühlner (1976), both of whom surveyed various rivers in the Solomon Islands, found *N. labiosa* and Delsaerdt only reported it from two rivers, the Ndoma and the Mataniko both of which are in Guadacanal.

In March this year I spent a week in the Solomon Islands with my wife; three days on Malaita Island and the rest of the time in Guadacanal. This gave me an opportunity to check some of the rivers and record the various nerites found in them. The area is something of a hotspot for fresh and brackish water Neritidae with over 20 species present. Most of the rivers I inspected in Malaita proved to be rich in nerites with some species, such as *Neritina roissyana* (Récluz, 1841) and *Clithon corona* (Linné, 1758), abundant. I did not, however, find any trace of *N. labiosa* which I was particularly hoping to see.

In Guadacanal my initial efforts were hampered by heavy rain the day before we arrived which had turned the rivers into brown, raging torrents. Indeed my first attempt to reach the Ndoma River from Honiara was frustrated by an intervening river where the ford on the main road was far too deep for the taxi to cross. Fortunately the river levels soon returned to normal and the water cleared. When I eventually reached the Ndoma a couple of days later the river proved to be rather disappointing compared to those of Malaita; I only found *C. corona* and *Neritina pulligera* (Linné, 1767) and there was no sign of *N. labiosa*. The other river from which Delsaerdt recorded this species, the Mataniko, flows through the capital, Honiara. Like many rivers in large towns it is littered with rubbish and appears, at first sight, to be an unlikely home for molluscs (figure 2).

On closer inspection, however, I found *N. roissyana*, *C. corona* and *N. auriculata* Lamarck, 1816 to be common in the tidal part of the river. Prompted by this I decided to check the river higher up. I found a suitable spot about two kilometres from the mouth with clear water flowing over stones, rocks and submerged logs. *Clithon corona*, *Clithon squarrosus* (Récluz, 1842) and *Clithon olivaceus* (Récluz, 1843) were abundant and several species of *Neritina* were present including *N. asperulata* and *N. petitii* but not *N. labiosa*. However local villagers confirmed that a nerite answering the description of *N. labiosa* could be found there; they know it as Big Eye (figure 3).

figure 2: Mataniko River from the Town Bridge, about 0.5 km from the mouth (tidal).

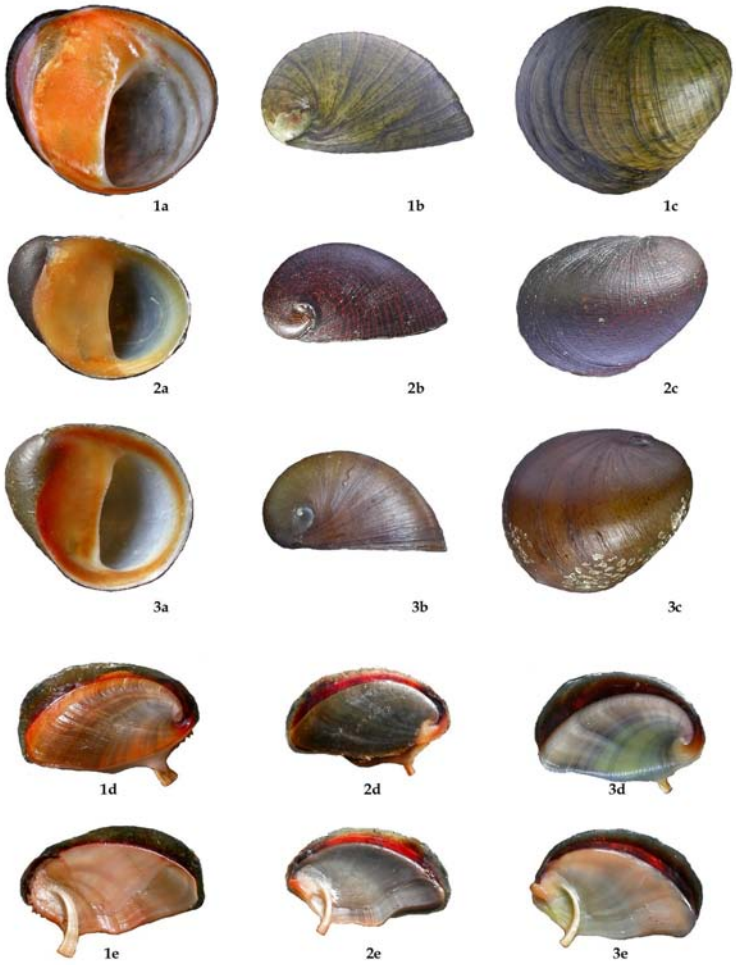
figure 3: Mataniko River about 3 km from the mouth, where *N. labiosa* is found.

The following day we were due to fly back to Brisbane in the early afternoon. Encouraged by my wife's desire to see more of the river, I decided to make a final attempt to find Big Eye. We went further up river before making enquiries. We were told that Big Eyes are delicious to eat and are very popular locally; they are nocturnal and best found by torchlight, being almost impossible to find during the day. This may well be an example of adaptive behaviour; certainly it appears to be the case with *N. pulligera* which is also eaten locally. Although not uncommon, all the *N. pulligera* which I found in the Mataniko River were completely hidden from sight on the undersides of submerged trunks of fallen palm trees. In other countries, however, where *N. pulligera* is not eaten by humans, it is active by day and in Malaysia I have seen considerable numbers crawling over rocks just below the surface. As we were due to leave in a few hours there was no possibility of searching the river at night and that will have to wait for a future visit. However one of the women eventually took pity on me and went off to her village, returning a few minutes later with a handful of empty Big Eye shells. Fortunately one still had its operculum inside and from this I was able to confirm that Big Eye is indeed *N. labiosa.*

figure 1 (left) *Neritina* from Mataniko River, Honiara, Guadacanal, Solomon Islands.

Key: a. apertural, b. apical, c. abapertural views, d. operculum outer side, e. inner side.

1a–e: *N. labiosa*: Height 36.5 mm, width 38 mm. Operculum length 22 mm.
2a–e: *N. asperulata*: Height 21.5 mm, width 22 mm. Operculum length 11.5 mm.
3a–e: *N. petitii*: Height 21 mm, width 21.5 mm. Operculum length 12.5 mm.



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Non-Marine Recording – Activity and Highlights 2010

Adrian Norris

This year, a significant threshold has been reached with the non-marine database. Although not all of the old records have been uploaded into it yet, sufficient information is now available within the records to enable the NBN to have been supplied with a copy of the database for inclusion in the data network. A total of 157,351 records covering all of the counties of England, Scotland and Wales were passed over to the NBN. A further 180 fossil and 2,796 post-2000 Yorkshire marine records have also been supplied to the NBN via Steve Wilkinson. The 79,308 Irish records in the database are being dealt with separately by the Irish and are not included in the data being uploaded onto the data network. A total of 239,635 species observations are now included within the overall database. I would like to take this opportunity to thank all of our members, and non-members, who have kindly supplied data. It is interesting to note that over 1,200 names of recorders are now in the database.

Two of the more interesting records relate to *Cochlicella barbara* which has been recorded from St Agnes, Isles of Scilly and Shell Island near Harlech. The specimens found on St Agnes match those recorded from near Monreith (Vice County 73) in 2008, as well as the description of this species in Kerney and Cameron, 1979. However, subsequent examination of the dead shells collected at Shell Island in North Wales, suggest that we may be dealing with two separate species, as the specimens from Shell Island are much smaller and proportionately more conical. Live material is urgently required for dissection to establish the true status of all of the records of *Cochlicella barbara* in Britain. The official records of *Cochlicella barbara* now list only seven sites from seven vice-counties: however, the NBN Network lists a number of other sites for which we have no information.

Two alien Vice County (VC) records are reported officially for the first time, *Papillifera bidens* from Brownsea Island (VC9) and *Helix lucorum* from Wimbledon Chase (VC14).

This report includes the two Irish records of *Pupilla pratensis* recently reported from the Republic of Ireland in counties Laois (Leix) (H14) and Westmeath (H23) (*I. Nat. J.* **30**:(2):148).The second species new to Ireland is *Corbicula fluminea* which has been recorded from numerous sites along the Barrow navigation in Co. Carlow (H13) (*I. Nat. J.* **30**:(2):147-8). A recent record of *Omphiscola glabra* from Co. Waterford (H6) re-establishes this species as part of the Irish fauna, having been declared extinct in Ireland in 2009.

In an attempt to ratify the status of a number of segregate records I have included those new VC records which have been submitted by experienced and known recorders.

I have also included a number of new VC records of *Balea* species based on the examination of material held in the Leeds City Museum collections. Figure 1 shows the present

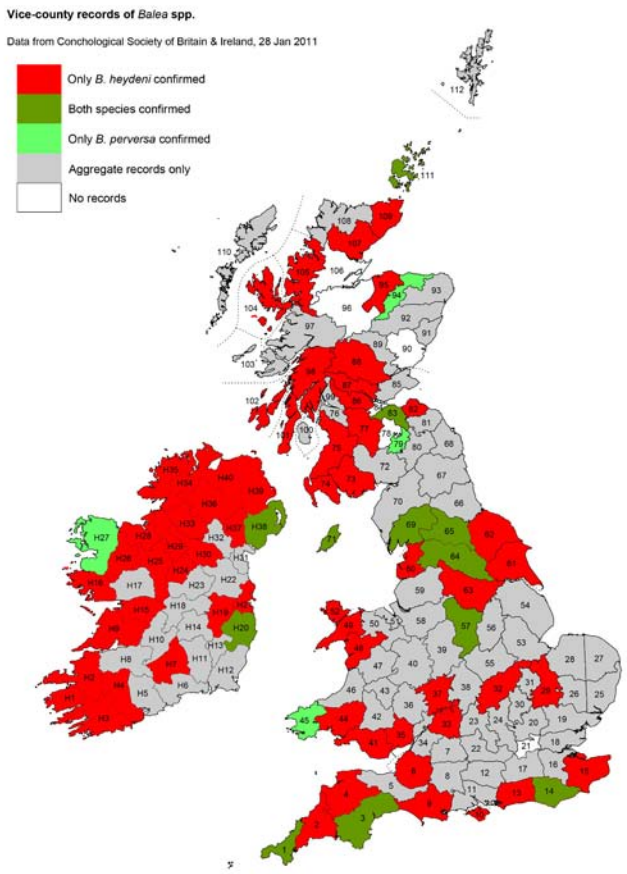

figure 1: distribution of *Balea* species by vice-county, both aggregates and segregates.

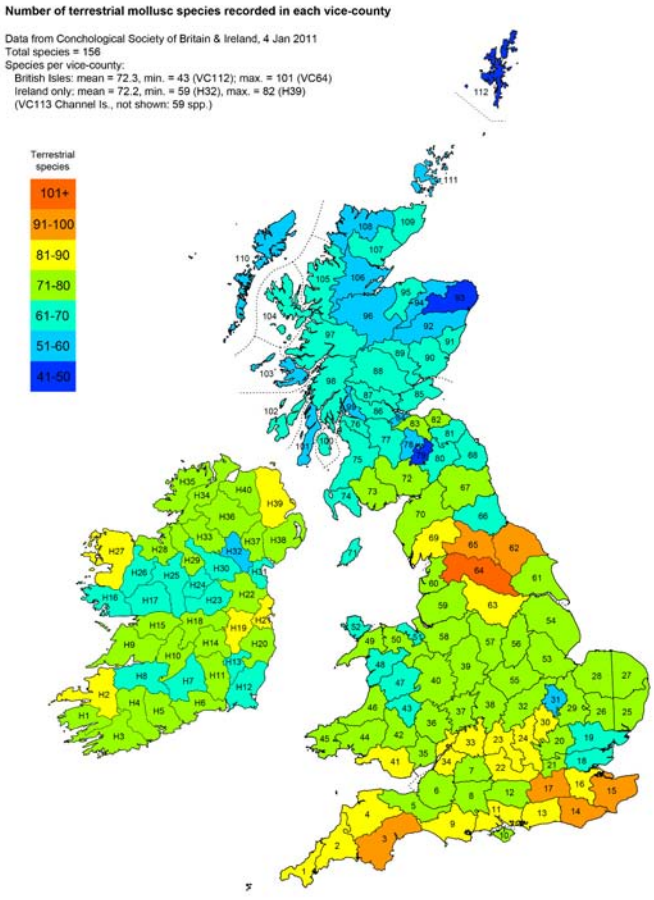

figure 2: number of species recorded per vice-county.

VC distribution based on both those accepted records forwarded to me and the Leeds Museum records. The old aggregate records show *Balea* to be almost ubiquitous, but a re-evaluation of the material held in other museums and private collections is required to establish the true distribution of these two segregate species. Irish records for the two *Balea* species suggest that *Balea heydeni* is widespread, but the true distribution of *Balea perversa* ss in Southern Ireland is still unclear.

West Cornwall (VC1): *Cochlicella barbara*, St Agnes, Isles of Scilly (SV8808) 10.09.2010 Paul Sterry, Conf. Martin Willing; *Myosotella denticulata*, Lelant, St Ives (SW548374) 01.04.2009 Tom Walker; *Balea perversa* ss, Pothgwarra to St Leven (SW3721) 23.03.2004 Keith Alexander

East Cornwall (VC2): *Columella aspera*, Dunmere & Park Woods (SX043683) 13.07.2001 Keith Alexander; *Cochlicopa lubricella*, Parson's Cove, Fowey East (SX1651) 24.08.2006 Keith Alexander

South Devon (VC3): *Euconulus fulvus* ss, Beacon Goyle near Honiton (SY124933) 15.03.2009 Tom Walker; *Arion circumscriptus* ss, *A. distinctus*, Blackbury Camp (SY1892) 23.10.2010; *A silvaticus*, Chase Wood, Holne SX7271) 24.10.2010 Keith Alexander; *A. fasciatus,* Thomas Cleave Wood (SX7988) 14.03.2009 R. Boyce

North Devon (VC4): *Limacus flavus* ss, Bideford (SS442270) 31.03.2005; *Euconulus fulvus* ss, Kipling Tors (SS4228) 23.07.2008 Keith Alexander

North Somerset (VC6): *Balea heydeni*, Lansdown, Bath (ST7368) 29.06.1969 E.B.Rands, Det A.Norris

South Wiltshire (VC8): *Cochlicopa lubricella*, Porton Down (SU2435) 18.08.2005 Keith Alexander

Dorset (VC9): *Mysotella denticulata*, Quarry, Portland Bill (SY676684) 09.03.2009 J. Fleming Conf A. Norris; *Papillifera bidens*, Brownsea Island (SZ03128770) 17.09.2010 Tom Walker

North Hampshire (VC12): *Cochlicopa lubricella*, Greywell (SU722513) 24.05.2005, *Physella acuta*, River Whitewater, North Warnborough (SU7340052321) 30.04.2009 all Tom Walker

West Sussex (VC13): *Physella acuta*, Washington (TQ12281304) 05.10.2010 C.M. Drake

East Sussex (VC14): *Helix lucorum,* Wimbledon Chase (TQ5216) 10.2009 Phil. Palmer; *Balea perversa*, Eastbourne (TV69) 1900 A.G. Stubbs, Conf A. Norris

Berkshire (VC22): *Euconulus fulvus* ss, Great Copse, Farley Hill (SU746656) 01.05.2007 Tom Walker

Oxfordshire (VC23): *Euconulus fulvus* ss, Mapledurham Woods, Reading (SU677766) 03.04.2005; *E. alderi* ss, Culham Bridge, Sutton Courtenay (SU5087094866) 01.04.2009 both Tom Walker

East Gloucestershire (VC33): *Euconulus fulvus* ss, Dorvel Wood (SO90) 13.02.2000 Keith Alexander

West Gloucestershire (VC34): *Euconulus fulvus* ss, Soudley Ponds, Forest of Dean (SO662113) 11.06.2005; *Gyraulus laevis*, Westbury Court, Westbury-on-Severn (SO718138) 15.06.2005; *Physella gyrina*, Cannop Ponds, Parkend (SO608099) 11.06.2005 all Tom Walker; *Limacus flavus* ss, Little London (SO704184) 06.10.2001 Keith Alexander

Monmouthshire (VC35): *Arion fasciatus, Milax gagates,* nr Pontypool (ST328986) 19.01.2010; *Unio pictorum*, St James Pool (SO15530788) 23.05.2010 both C. Owen

Herefordshire (VC36): *Arion silvaticus*; Brockhampton Dingle (SO6855); *A. circumscriptus* ss, Brockhampton Park Estate (SO6856) 11.06.2000; *Limacus flavus* ss, Colwell Orchards (SO7642) 10.06.2009; *A. distinctus, Euconulus fulvus* ss, Cwmmau Moors SSSI (SO2851) 10.06.2000 all Keith Alexander

Worcestershire (VC37): *Euconulus fulvus* ss*, E. alderi* ss, Avon Valley SSSI (SO9142) 18.05.2010; *Balea heydeni*, Broadway (SP1037) 06.07.2010; *Limacus flavus* ss, Pipershill Common SSSI (SO958650) 10.10.2007 all Keith Alexander

Glamorgan (VC41): *Balea heydeni*, Kenfig Burrows (SS7981) 05.07.2009 Keith Alexander; *Arion fasciatus*, Aberbargoed (SO157005) 17.01.2010 C. Owen

Carmarthenshire (VC44): *Balea heydeni*, Carmel NNR (SN6016) 08.07.2009 Keith Alexander

Pembrokeshire (VC45): *Balea perversa* ss, North Cliff, Tenby (SN1301) 1897 A.G. Stubbs Conf A. Norris

Merionethshire (VC48): *Balea heydeni*, Torrent Walk (SH7518) 13.12.1990 C.R.C. Paul; *Cochlicella barbara*, Shell Island (SH5526) 4.2008 Carl & Craig Ruscoe, Conf A. Norris

Caernarvonshire (VC49): *Arion subfuscus,* Great Orme (SH769838) 21.05.2010; *A. ater* ss, Great Orme (SH753840) 22.05.2010; *A. distinctus, Balea heydeni* Bryn Pydew (SH818798) 23.05.2010; *Lehmannia valentiana, Planorbis carinatus* Bodnant Gardens (SH7972) 24.05,2010 all Conch Soc Meeting Det A. Norris

Anglesey (VC52): *Balea heydeni*, Cors Goch NNR (SH5081) 26.05.2010 Rosemary Hill

Leicestershire (VC55): *Euconulus alderi* ss, Lockington Marshes (SK4849) 16.03.2010 Keith Alexander

Nottinghamshire (VC56): *Columella edentula* ss, Sherwood Forest (SK6268) 23.09.2009; *Limax cinereoniger*, Sherwood Forest (SK5967) 12.08.2009 both Keith Alexander

Derbyshire (VC57): *Balea perversa* ss, Tideswell (SK1575) 06.08.1929 John Armitage, Conf. A. Norris; *B. heydeni*, Castleton (SK1582) 08.1910 George H. Taylor, Conf. A. Norris

West Lancashire (VC60): *Balea heydeni*, Bolton-le-Sands (SD4869) 05.2004 Carl Ruscoe

Mid-west Yorkshire (VC64): *Balea perversa* ss, Swindon (SD865540) 02.07.1978 L. Lloyd Evans, Conf. A. Norris

North-west Yorkshire (VC65); *Stagnicola fusca*, Kiplin Hall Lake (SE2797) 28.05.2010 A.Norris, Det. R. Carr.

South Northumberland (VC67): *Euconulus fulvus* ss, Whitley Bay (NZ3575) 07.07.2005 Keith Alexander

Westmorland with North Lancashire (VC69): *Balea perversa* ss, Grasmere (NY3307) 28.08.1932 Fred Taylor, Conf. A. Norris

Isle of Man (VC71): *Balea perversa* ss, Douglas (SC37) 06.09.1909 Fred Taylor, Conf. A. Norris; *Balea heydeni*, Douglas (SC37) 09.1880 Edward Collier Conf. A. Norris

Dumfriesshire (VC72): *Arion silvaticus* ss, Lochmaben (NY079833); *Euconulus alderi* ss, Lochmaben (NY08023) 11.05.2010 both A.T. Sumner

Kirkcudbrightshire (VC73): *Deroceras panormitanum*, Mid-Kilton (NX759601) S.J. Gregory; *Arion ater* ss*, A. distinctus*, Carlingwark Loch, Castle Douglas, (NX767615) 23.05.2007; *A. circumsciptus* ss, St Ninian's Cave (NX431362) 27.05.2007; *A. owenii*, Gatehouse of Fleet (NX606561) 24.05.2007; *Tandonia budapestensis*, Creetown (NX475587) 28.05.2007; *A. silvaticus* ss*, Euconulus alderi* ss, Taliesin Community Wood (NX7955) 23.05.2010 all A.T. Sumner

Wigtownshire (VC74): *Milax gagates*, Garlieston (NX479461) 27.05.2007; *Arion ater* ss*, A. distinctus*, Whithorn (NX442396) 27.05.2007; *Euconulus fulvus* ss, (NW999552), *Boettgerilla pallens*, North of Lochans (NX069573) all 09.09.2010; *Lehmannia valentiana*, Drunmore (NX136367) 11.09.2010; *A.* ss, nr Auchneel (NX037625); *Balea heydeni*, Glenluce Viaduct (NX191573) all A.T. Sumner; *Mysotella myosotis*, Balcarry (NX191556) 15.09.2010; *Cecilioides acicula*, Barsalloch (NX341427) 16.09.2010; *Pupilla muscorum*, Shore Cottage (NX275492) 15.09.2010 all R.W. Marriott & B. Colville.

Lanarkshire (VC77): *Balea heydeni*, Fiddler Gill SSSI (NS8446) 16.08.2010 Keith Alexander

Peeblesshire (VC78): *Acanthinula aculeata*, Plora Wood (NT348366) 08.04.2010 A.T. Sumner

Selkirkshire (VC79): *Balea perversa* ss, Caddonfoot near Galashiels (NT4434) 09.1973 A. Norris

Roxburghshire (VC80): *Arion owenii*, Tweedbank (NT526347), *A. flagellus*, Nutwood, Melrose (NT548339) both 03.06.2010 A.T. Sumner

Berwickshire (VC81): *Pupilla muscorum*, Coldingham Bay (NT918663) 27.06.2010; *Arion circumscriptus* ss, *A. silvaticus*, Eyemouth (NT942636) 26.04.2010; *Planorbis carinatus*, Netherbyres, Eyemouth (NT943634) all 26.04.2010 A.T. Sumner

East Lothian (VC82): *Euconulus fulvus* ss, Aberlady (NT4680) 1995; *Arion distinctus*, Aberlady (NT465802) 1996, *A. silvaticus*, Aberlady (NT471801) 17.04.2008; *Balea heydeni*, Hailes (NT5775) 17.06.2007 A.T. Sumner Conf. A. Norris

Midlothian (VC83): *Balea perversa* ss, Duddingston Sandy, Edinburgh (NT2872) 09.1932 A.R. Waterston Conf. A. Norris; *B. heydeni*, Roslin (NT2763) 26.12. 2003 B. Colville

West Lothian (VC84): *Arion flagellus*, Linlithgow (NT0277) 02.08.2003 Chris du Feu; *A. owenii*, Bathgate (NS975690) 28.10.2010 A.T. Sumner

Fifeshire (VC85): *Arion circumscriptus* ss, Kinross (NO116033) *A. ater* ss, Loch Leven, Kinross (NO128024) 27.07.2010; *Limacus maculatus*, harlestown (NT069836) 21.09.2010*; A. silvaticus*, Town Loch, Dumfermline (NT102894) 22.04.2010 all A.T. Sumner

West Perthshire (VC87): *Balea heydeni*, Kippenrait Glen (NN8000) 17.08.2010 Keith Alexander.

Mid Perthshire (VC88): *Balea heydeni*, Aberfeldy (NN8649) 11.08.1969 E.B. Rands, Conf. A. Norris; *Arion owenii*, *A. flagellus*, Tyndrum (NN3230); *A. ater* ss, Tyndrum (NN343291); *Boettgerilla pallens,* Tyndrum (NN333287) 02.07.2010 all A.T. Sumner

Angus (VC90): *Arion distinctus*, Montrose (NO7157) 18.05.1992; *A. ater* ss, *A. circumscriptus* ss, *Lehmannia valentiana*, Trottick Ponds, Dundee (NO4033) 30.05.2010; *A. distinctus*, Balgavies Loch (NO531501) 27.03.2010; *Limacus maculatus,* Brechin (NO609596) 28.03.2010 all A.T. Sumner

Kincardineshire (VC91): *Planorbis planorbis*, Maryculter near Aberdeen (26.10.2010) S.P. Dance, Conf. A. Norris; *Tandonia budapestensis, Boettgerilla pallens,* Banchory (NO697952) 04.05.2005; *Arion flagellus*, Inverbervie (NO8372) 26.03.2010 all A.T. Sumner

Banffshire (VC94): *Arion distinctus*, Dufftown (NJ3240) 09.09.1989; A.T. Sumner; *Balea perversa* ss, Inchrory, Strath Avon near Tomintoul (NJ1805) 25.07.2003 B. Colville

West Inverness-shire (VC97): *Arion distinctus*; Fort William (NN0174) 19.05.1992 D.E. Bolton; *A. owenii*, Fort William (NN085768) 27.05.2002; *Boettgerilla pallens*, Silver Sands of Morar (NM676920) 04.07.2010; *Euconulus fulvus* ss, Corpach (NN085768); *Tandonia budapestensis*, Corpach (NN086768) 06.07.2010; *A. ater* ss, Corpach (NN096770) 04.07.2010 all A.T. Sumner

Kintyre (VC101): *Balea heydeni*, Keil Point (NR6707) 16.08.1970 E.B. Rands, Conf. A. Norris

South Ebudes (VC102): *Balea heydeni*, Bruichladdich, Islay (NR2660) 23.08.1970 E.B. Rands, Conf. A. Norris

West Ross (VC105): *Balea heydeni*, Poolewe (NG8680) 26.07.1968 E.B. Rands, Conf. A. Norris; *Arion ater* ss, Plockton (NG799332); *A. distinctus*, *A. silvaticus*, *Deroceras panormitanum*, *Lehmannia valentiana*, Plockton (NG805338) all 29.05.2010 A.T. Sumner

East Sutherland (107) *Cochlicopa lubricella*, Brora Beach (NC895029) 23.07.2010 Tony Wardhaugh

Waterford (H6): *Stagnicola fusca,* Fulaght Fia, Clonea (X305944) 11.06.2009 R. Anderson

Carlow (H13): *Corbicula fluminea*, R. Barrow, St Mullins (S72973778) 13.04.2010 P. Sweeney Conf. E. Moorkens.

Leix (H14): *Pupilla pratensis*, Clonaslee Eskers (N270122) 2008 E. Moorkens & I.J. Killeen, Conf. T. von Proschwitz

Dublin (H21): *Cochlicella lubricella*, Luttrellstown House (O0537) 23.09.1981 R. Anderson

Westmeath (H23): *Zenobiella subrufescens,* Whinning Wood, Portlick (N0548) 14.05.2010 Keith Alexander; *Pupilla pratensis*, Waterstown Lough (N101459) 2009 E. Moorkens & I.J. Killeen, Conf. T. von Proschwitz

Longford (H24): *Balea heydeni,* Cashel Wood (N0060), *Zenobiella subrufescens,* Culnagore Wood (N0258) 14.05.2010 Keith Alexander

Roscommon (H25): *Balea heydeni,* St John's Wood NNR (N0055) 14.04.2010; *Limax cinereoniger*, St John's Wood NNR (M9959) 09.06.2010; *Oxychilus draparnaudi, Euconulus fulvus* ss, St John's Wood NNR (M9856) 10.05.2010 all Keith Alexander

Cavan (H30): *Dreissena polymorpha*, Killykeen Forest Park (H344065) 24.10.2010 R. Anderson

Snail employed as fire hydrant sign in a hotel in Lillehammer (Norway) (Photo: Bas Payne)

Observations on the marine bivalve fauna of the Farasan Islands, Saudi Arabia

Torsten Wronski

Introduction

The Farasan Islands are located in the Red Sea about 40 km off the Arabian coast, opposite the town of Jizan in the extreme southwest of Saudi Arabia. This archipelago is situated on the remarkably shallow Farasan Bank and comprises more than 300 islands, islets and shoals of which only three (Farasan Kebir (400 km²), Qummah (15 km²) and As Saqid (160 km²) (figure 1)) are permanently inhabited. Geologically, the Farasan Islands consist of an originally more or less uniform flat fossil coral reef that rose 0–30 m above sea level during the late Pliocene to early Pleistocene (McFayden, 1930).

figure 1: Aerial image showing the sampling location at Abu Tok on As Saqid Island, Farasan Archipelago. A shallow bank, consisting of algae beds and reefs, connects As Saqid to Safrah Island. In the background Khur Abu Tok, Saghir ar-Ryaq and Kabir ar-Riyaq Islands which connect to Safrah Island by a coral reef.

Tectonic processes led to shattering and uplift. The water around the islands is less than 100 m deep and various marine habitats are represented including sea grass beds, mangroves and vast areas of fringing reefs. The high salinity of the water surrounding the Farasan Islands is a consequence both of the hot climate and the absence of any freshwater input. The surface temperature ranges, according to season, from approximately 25˚ to 31˚C. Temperature declines with increasing depth to about 21.5˚C at 700 m where it remains remarkably constant. The normal tides are small, with peak tides of about 0.5 m, but there are seasonal and geographical long-term variations in water level over longer periods (Bemert and Ormond, 1981). The seasonal tides, and the pattern of prevailing winds and currents, are influenced by monsoons in the Indian Ocean. During the winter the prevailing winds are from the south, and are responsible for the numerous molluscs found on southerly oriented beaches, especially on Farasan Kebir.

The marine and coastal environments are generally in a healthy condition and the level of human exploitation is low. There are, however, localized impacts arising from unsustainable fishing practices, tourism development and oil pollution. Water quality is expected to decline and water use is expected to increase rapidly in the near future. The region is regarded as having a high conservation value because of the diversity of marine habitats and their importance for marine mammals, turtles and seabirds, and the small artisanal fishery. In view of this, it was decided in 1988 to establish a marine protected area around the Farasan Islands (Gladstone, 1994, 2000, 2000a).

This region of the Red Sea is poorly documented and the marine malacofauna has not been studied. This article presents a preliminary species list of bivalve molluscs inhabiting the coastal waters of the Farasan Islands. Previous records of marine molluscs from Saudi Arabia's Red Sea coast were published by Sharabati (1981). Dekker and de Ceuninck van Capelle (1994) carried out a survey of Yemen Red Sea shells collected during the Tibia-1 expedition in 1993. The most northern sampling locality (Zahrat Ashiq island) of their study area was about 50 km southeast of the area sampled in this study. Dekker and Orlin (2000) provide a checklist of all known marine molluscs of the Red Sea and adjacent areas. The findings of this study are compared to those of Dekker and de Ceuninck van Capelle (1994), Dekker and Orlin (2000) and the OBIS Indo-Pacific Molluscan Database (Rosenberg *et al.*, 2004).

figure 2: A mangrove stand at Kharij as Sailah, growing in the deep crevices cutting into the coral rock of which the entire Farasan Archipelago consists.

Methods

Bivalve sampling was carried out from 27 March to 18 October 2009, at 18 localities on Farasan Kebir, As Saqid and Qummah islands. The shore in the study area is comprised predominantly of coral fringe reefs, lagoons and long sandy beaches. Occasionally there are small bays with *Avicennia* spp. or *Rhizophora* spp. mangroves (Kharij as Sailah, Khor Kandrah, Khor Farasan) (figure 2) or macro-algal beds and reefs off the shore line (Qummah, As Saqid West (figure 5)). The location of the sampling sites, their habitat type and species richness are shown in figure 4.

figure 3: *Atrina vexillum* (length c.22cm) Qummah Island (Farasan Archipelago).

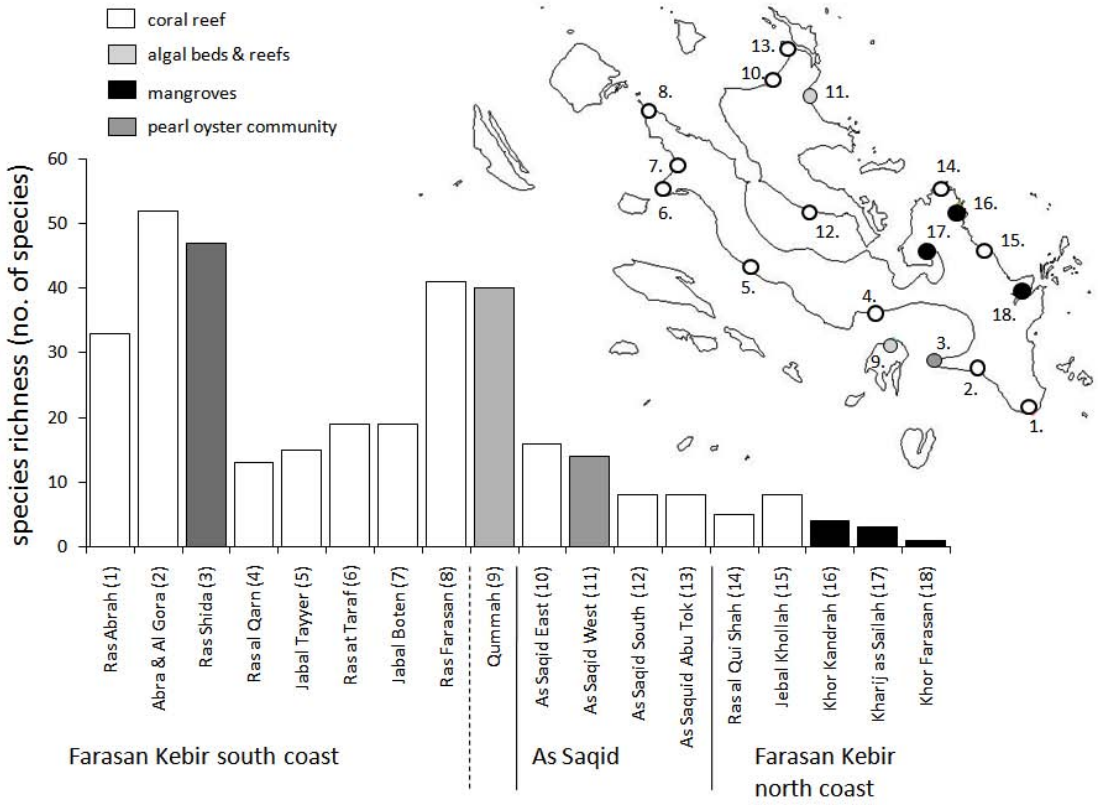

figure 4: The 18 sampling locations on Farasan Kebir, As Saqid and Qummah Islands, showing their habitat type and marine bivalve species richness.

Most shells were gathered by beach-combing (e.g. figure 3). When possible, the high and low water tide lines were inspected, and intermediate lines as far as they were marked by drift material. The sampling effort at most (10) sites was limited to 1 h; this was increased to 2 h at five sites (Ras Farasan, Ras al Qarn and Jabal Boten on Farasan Kebir; Qummah Island; and As Saqid West) and to 3 h at one site (Ras Abrah on Farasan Kebir). However, a disproportionate amount of time was spent at places with many shells and/or fine material. At Abrah and Al Gora Beach (south coast of Farasan Kebir) where shells were extraordinarily numerous due to the predominant wind direction and the open coast line, the sampling time was 31 h. At Ras Shida, where pearl divers leave their by-catch, the sampling time was 21 h. Bivalves were also found by searching rock surfaces and by turning over stones embedded in sand or in rock pools. Occasionally, observations were made or samples were taken while snorkelling. Collecting methods did not include SCUBA-diving or dredging, and the search range was limited to the supra-littoral zone down to 2 m below the low water mark.

Species of boring or endo-symbiotic bivalves were collected from pieces of dead coral, sponges or submerged wood. Old and bleached shells that were brought from deeper waters by trawl, pearl and artisanal mollusc fisheries in former times were not included in the survey. Living specimens were determined on the spot and released afterwards; dead shell material was determined at the King Khalid Wildlife Research Centre (KKWRC), Thumamah, Saudi Arabia.

Bivalve species were determined using the following references: Sharabati (1984); Delsaerdt (1986); Oliver (1992); Dekker and Goud (1994); Bosch *et al.* (1995); Oliver and Chesney (1997); Vidal (1997); Oliver and Zuschin (2000); and Rusmore-Villaume (2008). The systematics and nomenclature used here predominantly follow Rosenberg *et al.* (2004).

figure 5: A shallow, sandy lagoon showing the sampling location at As Saqid West. Mangrove trees growing at the beach while farther outside algae beds and reefs fringe the lagoon.

Results and discussion

In total, 117 species of marine bivalves in 31 families were recorded during this study (table 1). Two species (*Chlamys livida*, *Lima lima*) are not listed by either Dekker and de Ceuninck van Capelle (1994) or Dekker and Orlin (2000) but are listed in Rosenberg *et al.* (2004).

According to Dekker and Orlin (2000), *Chlamys livida* is synonymous with *Chlamys superficialis*, but following Oliver (1992) the latter species has a microsculpture limited to the right valve and the anterior ear of the left valve lacks reticulate scaling. Since Rosenberg *et al.* (2004) separate these two species, and since in the samples collected during this study these characteristics could be distinguished, this article treats them as two species.

Two *Lima* species are listed in Dekker and Orlin (2000): *Lima vulgaris* and *Lima paucicostata*. The latter is considered a synonym of *L. lima* (Oliver, 1992). Since *L.*

lima is the older name it is given priority. Other authors (e.g. Sowerby and Morris in Sharabati, 1984) distinguish *L. paucicostata* and *L. lima* on the basis of the number of ribs. The number of ribs varies between 11 and 18 in the material cited by Sharabati (1984) and until more material is examined it appears not justified to assign specific rank to *L. paucicostata* (Oliver, 1992).

Dekker and Orlin (2000) synonymise *Spondylus groschi* with *Spondylus marisrubri* but consider *Spondylus spinosus* a distinct species, being a senior synonym of *S. zonalis* and *S. linguafelis*. Contrary to that, Oliver (1992) considers *S. spinosus* a synonym of *S. marisrubri* but lists *S. zonalis* and *S. linguafelis* as distinct species for the Red Sea. Since the taxonomy and nomenclature of Red Sea spondylids remain unresolved, this article follows the classification of Dekker and Orlin (2000) and two *Spondylus* spp. are recognised for Farasan (*S. groschi* and *S. spinosus*).

Notwithstanding the above, this study produced no new bivalve records for the Red Sea. This is not surprising, given that the marine mollusc fauna of the Red Sea is among the best studied in the world. The checklist of Dekker and Orlin (2000) includes 420 bivalve species for the Red Sea, whereas Dekker and de Ceuninck van Capelle (1994) list 231 bivalve species for the Red Sea coast of Yemen. The OBIS Indo-Pacific Molluscan Database (Rosenberg *et al.,* 2004) reports only 62 bivalve species from the Red Sea and 27 from Saudi Arabian waters. The compilation of Saudi Arabian marine molluscs provided by Sharabati (1981) quotes about 100 mollusc species for the Red Sea and the Arabian Gulf together. With 117, this survey has increased the number of bivalve species recorded for Saudi Arabia by more than three-fold.

As might be expected from a coastline surrounded by tropical coral reefs, the number of bivalves found along beaches with fringing reefs (84 species) was considerably higher than on beaches with fringing mangroves (7 species. In the other two habitats considered, i.e. the pearl oyster community (Ras Shida) and the macro-algal beds and reefs (Qummah and As Saqid West), 46 and 25 bivalve species were found, respectively. These data confirm the species richness of bivalves on coral reefs but also emphasise the species richness of bivalves on secondary hard substrates such as oyster and mussel beds (Mohammed, 1976; Dharmaraj and Chellam, 1983). Relatively high species richness was found at Ras Abrah, Abrah and Al Gora beach, and Ras Farasan (Figure 1). These locations neighbour fringing coral reefs and are relatively exposed to winter winds and currents which deposit large numbers of shells on south-facing beaches. Bivalve species richness was similarly high on Qummah Island (macro-algal beds and reefs) and at Ras Shida, where pearl divers have deposited the remains of biofouling molluscs growing on pearl oyster beds.

Species richness is usually referred to as the number of species present in an ecosystem or a certain location. In practice, measuring the total species richness in an ecosystem is considered impossible, except in very depauperate systems. The observed number of species is a biased estimation of the true species richness in a system, and the observed species number increases non-linearly with sampling effort (Shultz *et al.*, 1999). The species richness as presented in this study should therefore be viewed with caution and treated as a tentative measure of *observed* species richness in order to compare different locations and habitats on the Farasan Islands. Nevertheless, the comparatively rich bivalve fauna of the Red Sea coast in general, and the Saudi Arabian coast in particular, justifies more detailed studies on the distribution and ecology of bivalves in this region.

Acknowledgements

My gratitude extends to H.H. Prince Bandar bin Saud bin Mohammed Al Saud, Secretary General, Saudi Wildlife Commission, Saudi Arabia, for his continued support towards conservation efforts in Saudi Arabia and for permission to carry out biodiversity research on the Farasan Islands. My appreciation goes also to Dr Tom Butynski (Director, KKWRC) for commenting on an earlier draft of this article, as well as to Ali Sedan (Ranger, Farasan Marine-Protected Area) for his dedication to collecting shells.
Much of the material collected as part of this work has been presented to the Zoological Museum in Hamburg, Germany.

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table 1: List of the marine bivalve species collected by the author on the Farasan Islands, Saudi Arabia. The full version of this table, including authority, localities etc., is available online at:- http://www.conchsoc.org/system/files/MolluscWorld/MW26-table.pdf

ARCIDAE
Barbatia (Barbatia) amygdalumtostum Barbatia (Barbatia) decussata
Barbatia (Barbatia) foliata
Barbatia (Barbatia) setigera
Barbatia (Barbatia) parva
Anadara (Anadara) uropigimelana
Anadara (Anadara) pygmaea
Arca (Arca) avellana
Arca (Arca) navicularis Arca (Arca) ventricosa
Acar plicata

GLYCYMERIDAE
Glycymeris (Glycymeris) arabicus
Glycymeris (Glycymeris) lividus
Tucetona pectunculus audouini

MYTILIDAE
Brachidontes (Brachidontes) variabilis
Modiolus (Modiolus) auriculatus
Septifer (Septifer) bilocularis var.
Forskali Gregariella ehrenbergi
Lithophaga (Leiosolenus) hanleyanus
Musculus (Ryenella) cumingiana

PINNIDAE
Atrina (Servatrina) pectinata
Atrina (Atrina) vexillum
Pinna muricata

PTERIIDAE
Pteria macorptera Pteria producta
Pinctada radiata

MALLEIDAE
Malleus (Malvifundus) regula
Vulsella vulsella
Vulsella fornicata

ISOGNOMONIDAE
Isognomon (Isognomon) legumen
Crenatula picta

PECTINIDAE
Decatopecten plica
Gloripallium maculosum
Mimachlamys sanguinea
Chlamys (Scaeochlamys) livida
Chlamys (Scaeochlamys) superficialis
Laevichlamys rubromaculata
Mirapecten cf. yaroni

PLICATULIDAE
Plicatula (Plicatula) australis
Plicatula (Plicatula) plicata

LIMIDAE
Lima lima

SPONDYLIDAE
Spondylus groschi
Spondylus (Spondylus) spinosus

OSTREIDAE
Saccostrea cucullata
Lopha cristagalli Dendostrea frons
Dendostrea crenulifera
Neopycnodonte cochlear
Alectryonella plicatula

ANOMIIDAE
Anomia achaeus

GALEOMMATIDAE
Scintilla spec. A
Lionelita denticulata
Scintillula variabilis
Kellia cycladiformis

LUCINIDAE
Divaricella macandreae
Divalinga arabica
Ctena (Ctena) divergens
Cavilucina fieldingi
Codakia (Codakia) tigerina
Pillucina fischeriana
Cardiolucina semperiana

UNGULINIDAE
Diplodonta spec. 1
Diplodonta (Diplodonta) subrotundata
Diplodonta (Diplodonta) raveyensis

SPORTELLIDAE
Basterotia angulata

CARDITIDAE
Cardites rufa
Beguina gubernaculum
Cardita variegata

CARDIIDAE
Vasticardium marerubrum
Vasticardium assimile
Trachycardium flavum Fulvia (Fulvia) australis
Acrosterigma maculosum
Afrocardium richardi
Parvicardium sueziensis
Fragum nivale
Fragum fragum
Lunulicardia auricula

CHAMIDAE
Chama pacifica
Chama asperella
Chama brassica
Chama plinthota
Pseudochama corbieri

TRIDACNIDAE
Tridacna (Chametrachea) squamosa
Tridacna (Chametrachea) maxima

MACTRIDAE
Mactra (Mactra) lilacea

MESODESMATIDAE
Paphies (Atactodea) striata

TELLINIDAE
Quidnipagus palatam
Serratina capsoides
Scutarcopagia scobinata
Acropaginula inflata
Tellinella staurella
Pinguitellina pinguis
Loxoglypta secunda

SEMELIDAE
Ervilia purpurea
Ervilia bisculpta
Larca kallima
Larca seychellarum

PSAMMOBIIDAE
Gari (Gari) insignis
Gari (Gari) maculosa
Asaphis violascens
Azorinus coarctatus

DONACIDAE
Donax biradiatus

VENERIDAE
Periglypta aff. Reticulata
Timoclea (Glycodonta) marica
Gafrarium pectinatum
Callista (Callista) florida
Lioconcha (Lioconcha) ornata
Pitar hebraea
cf. Pitar spoori Circe (Circe) scripta Circentia callipyga
Tapes (Tapes) literatus
Irus macrophylla

GASTROCHAENIDAE
Gastrochaena gigantea

CORBULIDAE
Corbula (Anisocorbula) taitensis

MYIDAE
Tugonella decurtata
Cryptomya (Venatomya) elliptica

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 Angela Marmont Centre for Biodiversity, Darwin Building, for which you turn left 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 meetings in October and January with an early start time of 11:00 h. 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 – *Friday 29th July-Monday 1st August*
YNU/YCS Malham Tarn meeting. Conchological Society members welcome.
Leader: Terry Whitaker (t.whitaker1@btinternet.com)

WKSHP – *Saturday 6th August*
New Zealand shell identification workshop.

This meeting is being held by kind invitation of Judith Nelson at Hilbre House, Pembroke Road, Woking, Surrey GU22 7ED (01483 761210)
from 10.00 am prompt until approximately 5.00 pm
Please note Hilbre is a non-smoking property
Those attending should please bring books to help identification, and a packed lunch. Coffee, tea and biscuits are provided.
As numbers for the workshop are limited, please confirm any booking made by 1 July so that it can be checked whether there are any places vacant. A fee of £5 will be charged to cover expenses. PLEASE BOOK EARLY.

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.

Conchological Society - diary of meetings (continued)

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 1.00 pm. Lecture to start at 2.00 pm.

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 22nd October*
11.00 am in the Angela Marmont Centre Centre for Biodiversity, Darwin Building.
Full day meeting of Council only.
(NOTE: NOT 2nd October as stated in error in MW Issue 25)

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*
This meeting is being held by kind invitation of Judith Nelson at Hilbre House, Pembroke Road, Woking, Surrey GU22 7ED (01483 761210) from 10.00 am prompt until approximately 5.00pm.
Please note Hilbre is a non-smoking property
Those attending should please bring a microscope and lamps (a few microscopes are available if booked in advance), Petri dishes or other dishes for sorting purposes, a fine water colour paint brush (00), tweezers/forceps, dissecting tools, if possible an extension lead and/or double electric plug, books to help identification, and a packed lunch. Coffee, tea and biscuits are provided.
As numbers for the workshop are limited, please confirm any booking made by 1st November so that it can be checked whether there are any places vacant. Those NOT confirming by 1st November will be taken as not wishing to attend and their place will go to someone else. No reminders will be given.
A fee of £5 will be charged to cover expenses.
PLEASE BOOK EARLY.

Molluscan items may be brought for identification. For details of subjects being covered at the Workshop please contact Judith or visit the Web Site at www.conchsoc.org.

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

NHM – *Saturday 28th January 2012*
11.00 am in the Angela Marmont Centre for Biodiversity, Darwin Building.
Please note the revised start time. No Council meeting.

Please bring plenty of exhibits and demonstration material. There will be a lunch break at about 1.00 pm. Lecture to start at 2.00 pm.

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

Guest speaker at 2.00 pm
Suzanne Williams
(Dept. of Zoology (Mollusca), Natural History Museum)
Trochidae

Cornu aspersum featured on an exhibition poster outside London's Natural History Museum earlier this year. (photo: June Chatfield)

Conchological Society Annual General Meeting 24th March 2012

Members are reminded that they can nominate candidates for election to the Council.

Rule no 12: *Candidates for nomination to Council shall be paid-up Members of the Society when nominated and when the votes are counted at the Annual General Meeting and shall be nominated by two Members. Nominations, other than those made by Council, shall be sent in writing to the General Secretary at least three months before the Annual General Meeting and shall be accompanied by a signed declaration of the candidate's willingness to serve.*

Note: Nominations must be received by the Hon General Secretary for this particular Annual General Meeting **not later than 30th November 2011**.

Participants of the Conchological Society and Porcupine joint field meeting outside the Scillonian Club, St Mary's, Isles of Scilly (see page 21)
(Photo: John Llewellyn-Jones)

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 programmes (e.g. Works) are used, please indicate the programme 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.