particularly for Pisidium spp. Should the weather become unpleasantly hot it may be possible to continue to examine material indoors.

Meet at 10:30h at the bridge over the River Loddon on the A329 at the public footpath sign next to the petrol filling station (SU 768716), nearly opposite the multiscreen cinema. This will provide a brief opportunity to re-sample the site next to the bridge to see if there have been species changes since the 2007 floods. Or, for those coming by car, at 10:00h at Loddon Bridge Park and Ride (parking spaces have been reserved next to the small office) (SU 768717) signposted from the end of the A329M (first exit northbound after the M4 exits). This car park is behind, but separate from, the multiscreen cinema car park. For those coming by train the easiest station is Earley. Walk to the end of Station Road then turn left down Wokingham Road (A329) until the river is reached (about 20 mins). Please inform the leader if you intend to come.

There may be a short Council meeting during this meeting, if required.

YCS - Saturday 5 September
Walden Dale, VC65.
Contact: David Lindley
(0113 2697047) (home),
david.lindley3@btinternet.com
Meet at 10:30h in West Burton village centre by the village green, grid ref. SE 017866.

FIELD - Friday - Monday 18-21 September
Isle of Skye
Marine meeting
Leader: Shelagh Smith
(016977 42014) (home)
Accommodation should be sought in the Broadford area. Cottages on Skye tend to be small and are in very short supply, so if you are planning to attend this meeting, early booking of your accommodation is vital.

NHM – Saturday 3 October
11.00h in the Dorothea Bate Room [Palaentology Demonstration Room]
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 13.00h. Lecture to start at 14.00h.

The morning’s activities will include exhibits and demonstrations on deep-water [shelf edge] marine molluscs and freshwater molluscs, and other options still at the planning stage. Members are encouraged to bring specimens of any Mollusca for identification, a X20 binocular microscope will be available if needed.

Guest speaker at 14.00h
Luciana Genio (University of Leeds)
Recent researches on Bathymodiolus in NE Atlantic cold seeps

NHS – Saturday 17 October
Upper Nidderdale, VC64.
Contact: David Lindley
(0113 2697047) (home),
david.lindley3@btinternet.com
Meet at 10:30h in the car park in Pateley Bridge on the south side of the river, grid ref. SE 157654.

FIELD - Saturday 24 October
Nottinghamshire, Sherwood Forest area. Slug search
Leader: Chris du Feu
(01427 848400) (home)

WKSHP – Saturday 28 November
The annual workshop held in Woking offers Members the opportunity to receive tuition on identifying difficult groups. Subjects: small marine bivalves and helicid land snails
Bookings to Judith Nelson. Tel: 01483 761210 (home)

NHM – Saturday 12 December
14:00h in the Dorothea Bate Room [Palaentology Demonstration Room], preceded by Council meeting.

Guest speaker at 14.00h
to be announced

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Editorial

This is my last issue as Editor of Mollusc World. I originally agreed to produce 9 issues, but have finally managed to produce 18 issues! I would like to thank everyone who has provided contributions over the last 6 years or so, but I am especially grateful to the few members who have written articles on a regular basis, often at my request and with only a few days notice. I also thank Emma Pitrakou who has designed every issue of Mollusc World and is responsible for the attractive product we have today. Finally, my thanks to Peter Topley, who has proof-read most of the later issues. Peter will be taking over as the new Editor (see details below).

It has been a struggle to get enough copy for this issue, hence its lower number of pages than usual and its late publication date. Having said that, I hope you enjoy the variety of material in this issue, especially the 2 long articles from overseas members Alex Menz and Mike Murphy, and of course the whacky shell house in Ireland. With the production now used for the magazine we are able to include plenty of high quality photographs at very little additional costs – so don’t feel that you have to skimp on these. Remember that they do need to be of reasonably good resolution (0.6-1.2 MB is ideal), and other images must be at 300dpi. One of the most difficult parts of the role as Editor is getting material that is topical, current and relevant to the interests of the readership. The Society’s field meeting activities are well reported in Mollusc World but there is plenty of scope for additional items on the recording schemes and conservation. Everyone needs feedback to provide the stimulus for further effort.

Finally, please give Peter Topley your full support and provide him with plenty of interesting articles to enable us to continue and build on this high quality Society publication.

Ian Killeen

Mollusc World

This magazine is intended as a medium for communication between members on all aspects of Molluscs from archaeology to life in the sea, field collecting at home and abroad and even eating molluscs. If you look back on the content over the last three years we include articles, field meeting reports, research news, results from the mapping schemes and identification keys. We welcome all contributions in whatever form they arrive.

How to submit articles:

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” and send a separate mail without any attachments advising that the e-mail was sent. 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 no larger than 8 x 6” and 300 dpi 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”.

Please send articles to:

Peter Topley, c/o The Hon. General Secretary, Miss R.E. Hill 447b Wokingham Road, Earley, Reading RG6 7EL

email: molluscworld@ntlworld.com

About the 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 over 300 members worldwide. Members receive two publications Journal of Conchology which specialised in Molluscan Biogeography, Taxonomy and Conservation and Mollusc World, our newsletter 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 membership secretary at address below. £1 discount given to payments before March 31st each year.

For UK residents we suggest payment by standing order but please indicate at standard rate we encourage you to sign a Gift Aid form.

Overseas members can pay by IBAN transfer to the following account:

- Conchological Society, National Westminster Bank, Bolton, BL1 1BN
- IBAN GB12 NWBK IB30 9960 5238 46 BC NWBK GB12

- Contact: Mike Weideli, 35 Bartlemy Road, Newbury, Berks, RG14 6LD

- Design by Emma Pitrakou

- Printed by Henry Ling Ltd

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FIELD MEETING

Phenacolimax major sites in SE Devon
14 & 15 March 2009 Keith Alexander

Phenacolimax major is an elusive species; its habits and ecology are poorly documented. A lot of time over the weekend was therefore spent discussing what we do know – or rather what we think we know - and whether this applied to the sites we were visiting. The known sites tend to be relatively undisturbed ancient woodlands, where humidity is maintained at a permanently high level by the presence of springs, wet seepages, and/or streams beneath a relatively dense canopy of broad-leaved trees, but where the ground is not subject to flooding. The sites also tend to be well-sheltered, out of the drying wind. The snails are found amongst moss, leaf litter and other debris on the soil surface, and often demand considerable search effort to locate. South-east Devon is one of the very few strongholds for the species known in Britain and was an obvious target area for Conch Soc’s distributional project on the species. Eighteen sites are known in the county and this field meeting targeted three of these and also explored further afield.

Saturday was spent in the Teign Valley above Steps Bridge. Bradford Wood is the only known site in Dartmoor National Park – discovered here by Dave Bolton in 1992 - and so most of our time was spent here. A stream cuts down through the western end of the wood and has created a broad area of nutrient-enriched wet-flushed ground in otherwise dry acid oak woodland. After two hours of searching through the lower valley we only had a few possible Phenacolimax, all found by Rosemary Hill (and confirmed later). The presence of Cochlidina lusitanica is an interesting feature of the site – it is very localised in Devon and unexpected in the granite woodlands of Dartmoor - and a few juvenile Zonitella subjucicans also added some species diversity. A very dry area with Vitrina pellucida caused some initial excitement before its true identity was agreed. The profusion of wild daffodils provided an attractive backdrop to the search.

After lunch we explored further up the main river valley into Thomas Cleave Wood, but this proved a poor area, with a cold drying wind scouring down the side valley. An old stone ruin at the entrance to the valley was the main feature of interest found, as the walls had been colonised by Meridigera obscura – another surprise for a Dartmoor site; how does a lime-loving species manage to find a very isolated mortared wall? This area was sufficiently unrewarding however for us to return to the morning’s locality and explore further up the stream valley – usefully extending into the neighbouring 10km square. Here we found springs with extensive areas of golden saxifrage Chrysosplenium and we managed to build up the site list by adding Cetrarium tridentatum, Columella edulis and Dryopteris affinis. The spring-line area appears to have good potential for further specialist molluscs but we were running out of time and could not spend too long here.

Sunday’s target was to check the two old East Devon AONB sites. These are very different in character to the Dartmoor valley, being goyle - steeply incised funnel-shaped stream gullies cut down through the local sandy strata and flint beds. We started in Lincombe Goyle on the west side of the Sid valley, where P. major was reported by Joan Paton in 1969. The goyle initially did not look too promising as the upper flanks have been converted to conifer plantation, there was much cherry laurel and rhododendron on the goyle sides, whilst fallen trees had recently been cleared away for a shoot. Molluscs proved hard to find and so we decided to abandon the goyle and try the neighbouring Beacon Goyle. After struggling up the
land-slipped goyle sides however, Tom Walker managed to find a live P. major beneath a broken branch section lying in a shallow mossy boundary ditch immediately above the brow to the goyle. The old ditch presumably acts as a drainage runnel down into the goyle and keeps this elevated situation moister than might otherwise be imagined. Rosemary Hill also ponders about Phenacolimax major’s mobility – maybe it moves up and down the goyle sides depending on soil moisture and/or the threat of flooding? For its size it is a very mobile mollusc and it soon seeks out shelter if exposed in the open – for photography for example!

Moving on to Beacon Goyle, we found more plantations and rhododendron but without the recent disturbances from clearance of fallen trees. But, again, molluscs proved elusive. A mature Zenobia subrufescens was found and a juvenile Cepaea nemoralis with Ariaenta colouring and a distinct but small umbilicus provoked some discussion of the key identification characters.

After lunch we visited the near-pristine Roncombe Goyle on the east side of the Sid valley. The old record here was from A. E. Boycott and may date back as far as the 1920s. We were very much aware of treading in historic footsteps! This goyle is very much aware of treading in historic footsteps! This goyle is similar in structure to the morning’s sites, the deeply-incised gully cutting through sandy substrata and flint beds down this time onto what appeared be a mudstone layer. The woodland vegetation here is very much semi-natural, and the structure relatively open through cattle grazing. The cattle do not however penetrate the stream channel cut into the bottom of the goyle as fallen tree trunks provide protection, and the old land-slipped sides are covered by mosses and liverworts as a result. The environment is very much one of shelter and humidity. Tom again triumphed with the discovery of a live P. major, soon followed by another found by Rosemary. While it is good to have rediscovered the species after a gap of around 90 years, the site has almost certainly not changed much over the intervening period. However we did spot young growth of Impatiens glandulifera in places – probably introduced through road stabilisation works above the head of the goyle - and so the site is clearly about to change dramatically for the worse. Examination of a bag of leaf litter taken away for closer inspection provided a useful addition to the site list, with worn shells of Acicula fusca. One final comment from Rosemary, that both vitrinid species were smaller than she has collected on other occasions, perhaps because the cold winter had reduced feeding opportunities.

We are grateful to Mick Jones, NT Warden, for permission to investigate Bridford Wood, to Sir John Cave for the two eastern goyles, and to Mr Smith for Roncombe Goyle.
The All-Ireland Non-Marine Molluscan Database – a digital repository and online resource for molluscan recording

Andrew Byrne, Evelyn Moorkens, Roy Anderson, Julia Nunn, Liam Lysaght and Eugenie Regan.

There is a wealth of records for the non-marine mollusca of Ireland due to the great efforts of amateur and professional conchologists and malacologists for the last two centuries. Much of these records have been held and maintained by the Conchological Society of Britain and Ireland in paper formats. However, there are many records held in other mediums by different groups and individuals within the Island of Ireland, including the National Parks and Wildlife Service (NPWS), the Heritage Council, the Centre for Environmental Data and Recording (CEDaR) and other organisations.

There are 149 species of mollusc mapped, from 2,446 sites, with a total of 46,615 records that range in date from 1842 to 2007. The database can be interrogated through the National Biodiversity Data Centre’s online mapping system (maps.biodiversityireland.ie). The database is currently on a beta test; permitting the database to be accessed online in a testing phase allowing validation and feedback from experts and end-users (users comments are welcome).

Demonstration of viewing molluscan data using the mapping system

Images of the mapping system are shown here to demonstrate the functionality of this system for displaying and interpreting molluscan data. Firstly the database was queried for two species of conservation interest, Myxas glutinosa and Pisidium moitessierianum, both of which appear on conservation assessments for Ireland (Bratton, 1991 in Kerney, 1999; Kerney and Moorkens, 2003). Pisidium moitessierianum was considered extinct in Ireland (Kerney, 1999) until its rediscovery in 2003 in the Royal Canal (Killeen and Moorkens, 2003). It has been considered endangered in Ireland and is in decline across much of its native range (Moorkens, 2008). The distributions for each of the species were mapped together, using the online mapping system on the island of Ireland scale (Figure 1). The midlands-east region of Ireland is focused on for the purposes of this demonstration. The mapping system allows one to view records against different GIS (Geographic Information System) layers (for example, localities, designated areas etc.), in this case the records are viewed against the counties of Ireland layer (Figure 1). The ‘zoom in’ tool was then used to view the records in the 1km square that the two species co-occurred. Some records had high resolution (100m or higher) and so the mapping system displayed the records at this resolution. At these higher resolutions the Discovery Series Ordnance Survey cut-in, showing that the records are actually from around Kilmore Bridge, Co. Kildare (Figure 2). Zooming further in reveals the aerial photograph layer of the site. Due to the fact these species are considered rare and endangered in Ireland, it was queried to see if the area was protected in anyway (Figure 2). The records were, at least, partially in proposed Natural Heritage Areas (pNHAs), though it is possible that the species may have been recorded just outside of the protected boundary.

We hope this resource will be used by (and useful for) recorders and encourage, and enthuse, people to study and be interested in this important part of Ireland’s fauna. We also hope that the database, as a repository, will be utilised as a safeguard of valuable biological information for generations to come.

Acknowledgements

We would like to thank the funders of this project, National Parks and Wildlife Service and the Heritage Council. We also would like to thank key collaborators: the Conchological Society of Britain and Ireland, Centre for Environmental Data and Recording (CEDaR) and all the recorders of the non-marine mollusca of Ireland, without their work this resource would not exist.

References


Killeen, I.J. and Moorkens, E.A. (2003). Pisidium moitessierianum from Kilmore Bridge at 100m resolution. Both species co-occur at the same site and they are selected in the first view. The NHA GIS layer is selected in the second view. Turning off the species layers allows the end-user to view the site’s aerial photograph alone (third view). Blue/yellow = co-occurrence of species.
The publication of Biotir 2 The Landsnails of Madeira: An illustrated compendium of the landsnails and slugs of the Madeiran archipelago provides an end to the project on Land snails of Madeira. It provides the first full colour illustrated guide to identification of landsnails on the Madeiran Islands. This fauna is well known in a European context, as it has a high percentage of range restricted endemic species. The provision of range maps using well-known in a European context, as it has a high percentage of range restricted endemic species. The provision of range maps using

The issue of Biotir 2 is oil based and as such is the first to be available only in a hard copy format. There is no plan to make it available on-line at this stage, however, a number of people have expressed interest in a digital version, and this is something that is being considered. The book is available for purchase from the bookshop at the University of Madeira, and from a number of online retailers.

The book is divided into two parts. The first part provides an introduction to the landsnails and slugs of Madeira, including a history of the study of this family of land snails, and an account of the various taxonomic groups. The second part provides a detailed account of each species, including information on its distribution, ecology, and conservation status. The book concludes with a comprehensive index, which includes entries for all the species described in the book, as well as other relevant information such as literature cited.

The book is a valuable resource for anyone interested in the landsnails and slugs of Madeira, and it is hoped that it will help to increase our understanding of this fascinating group of land snails.
An eighteenth century description of the mating of Limax maximus

Aydin Örstan

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The well-known and often photographed mating of the slug *Limax maximus* takes place whilst a couple is suspending itself with mucus from an elevated point, commonly a tree branch or a wall (Örstan, 2008). Adams (1898) published the first detailed description of this process, although there were a few earlier and shorter accounts of it, the very first one apparently being that of Martin Lister published in 1678 (Isabel Hyman, in litt.).

Recently, during a search of Google Books (http://books.google.com) for the occurrences of the phrase “limax maximus”, I discovered a description of the mating of that species in James Barbut’s *The genera Vermium exemplified by various specimens of the animals contained in the orders of the Intestina et Mollusca Linnaei*, published in London in 1738. As far as I can tell, Barbut’s account of the mating of *L. maximus* has not been noted before.

Barbut’s 101-page book is bilingual with each page carrying text both in English and French; in addition, brief descriptions of the orders and genera are given in Latin. Scattered throughout are 11 plates of illustrations drawn by Barbut as noted on the cover of the book. Barbut’s description of the genus *Limax*, closely following the original of Linnaeus (1758), is as follows:

“...The body is long, creeping; has over it a kind of buckler made of flesh; underneath a longitudinal flat disk. There is a hole on the right side, for the genitals and evacuations. The feelers are four in number, placed above the mouth.”

The “buckler” is, undoubtedly, the mantle, but it is not clear if the “longitudinal flat disk” refers to the internal vestigial shell of the slugs in the genus *Limax* or to the sole of the foot. Linnaeus’s corresponding statement was also equivocal. The hole on the right side that Barbut (and Linnaeus before him) observed was most likely the conspicuous pneumostome, the breathing hole that is visible in Barbut’s drawing of *L. maximus* (Figure 1). The openings of the rectum and the ureter are next to it, but the genital opening is separate and closer to the front of the head and is normally kept closed except during mating (Figure 2). The misidentification of the pneumostome as the genital opening was an oversight of Linnaeus that Barbut perpetuated.

This is how Barbut outlined the mating of slugs:

“...Their coming together is towards the end of spring. The organs of reproduction are placed, as in the snail, on the right side of the neck. The male implement unfolds with the same mechanism, as the finger of a glove when turned inside out. They are sometimes met with hanging in the air with their heads downwards, their tails united by a kind of viscous and thick tie, are grappling to the branch of a tree. In this situation they remain for three hours, and that is the instant of impregnation.”

Barbut also gave brief accounts of the four species of slugs that were known from Great Britain at that time and which Linnaeus had described in 1758. These were *Limax ater* (now *Arion ater*), *Limax rufus* (now *Arion rufus*), *Limax maximus* and *Limax flavus*. Although Barbut did not specify which of those four slug species mated in the manner he described, we can deduce that his description was for *L. maximus*, because unlike *L. maximus*, the two Arion species and *L. flavus* all mate on the ground (Quick, 1960).

Barbut’s brief description of the eversion of a slug’s penis is remarkably accurate. Moreover, whilst discussing *L. ater*, he states correctly that “it is an [sic] hermaphrodite, both sexes being in each individual, and both in the collus impregnate, and are impregnated, at the same time.” However, Barbut did not state if these were his original observations or were taken from the literature.


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This work presents the results of a 10 year study to map the mollusc fauna of the Susa Valley. The valley lies mostly in north-west Italy (with the city of Turin to the east) but with some parts in France in the Departments of Savoie and Hautes-Alpes. The actual area of the catchment does not appear to be given in colour on colour relief maps. Therefore the conclusions sections include an analysis of the fauna, analysis from ecological and biogeographical perspectives and conservation.

It would be easy to suggest that the results from this type of study is easily disseminated through local and national record centres and web sites, but most of us involved in any biogeographical study would be thrilled to have a work such as this as the end product. The book is well presented, beautifully produced and at €50 is a good value. Anyone working on the biogeography of European non-marine molluscs should buy a copy and enjoy! For further details contact: eugenia.grassini@riepomonte.it
Collecting and …… eating snails in Morocco
Alex Menez

In November 2008 I formed a part of a team that carried out biological work in Morocco. This was the last fieldwork trip carried out as part of the CIMBANTUR campaign, an Interreg IIIA Gibraltar-Morocco project run by the Gibraltar Ornithological & Natural History Society and the Institut Scientifique de the University Mohammed V Rabat-Agdal, co-funded by the European Union and the Government of Gibraltar. During the two week trip I collected at 63 locations and amassed a very large amount of material, both live and dead. Morocco is a very interesting place for the malacologist. It lies in the West Mediterranean and West Saharo-Arabian biogeographical regions and has high species diversity and high rates of endemism. Morocco has a complex geology with four main physiographic regions:

1. An area of highlands paralleling the Mediterranean coast (Er Rif);
2. The Atlas Mountains (Moyen Atlas, Haut Atlas and Anti-Atlas) extending in a south-western to north-eastern direction between the Atlantic Ocean and Er Rif from which the mountains are separated by the Taza Depression;
3. The Atlantic Coastal Plain along the Atlantic Ocean located in an arc formed by the Er Rif and Atlas Mountains;
4. The Plains and Valleys south of the Atlas Mountains. These merge with the Sahara in the southeast. The climate is generally Mediterranean-subtropical with cooling Atlantic and Mediterranean breezes. There is considerable fluctuation in the interior with cold winters and hot summers. Temperatures may drop below zero in the Atlas Mountains with snow on mountain peaks during most of the year. The south and southeast desert regions become very hot during the summer. Morocco is of great interest biogeographically and ecologically because of its key location between the rest of the African continent and Europe. There are many floral and faunal similarities between southern Iberia and the African continent and Europe. There are many floral and faunal similarities between southern Iberia and the Algerian-Maghrebian faunas. There is evidence that these geological changes may have led to vicariance and subsequent genetic differentiation. There is a lot of opportunity for new work for the malacologist. A revision of many of the molluscan taxa is required to accurately assess diversity and systematic status. Many problematic taxa exist and there is much synonymy in the early literature. Most of the published literature on the land mollusca of Morocco dates back from the 1870s to 1930s. During the 1980s Mary Seddon and colleagues, from the National Museum of Wales, undertook mapping work in Morocco (as well as Algeria and Tunisia) and several papers were published, mostly on taxonomic and distributional aspects of their research. Very few papers have been published on the Moroccan land molluscs in the last 10-15 years, and no biogeographical treatment exists.

The Strait of Gibraltar separates the Iberian fauna from the Mahgreb and has been a geographic barrier for gene flow during the last 5 million years. The Miocene desiccation of the Mediterranean Basin (the Messinian Salinity Crisis) resulted from the closing of the Strait 5.96 million years ago creating land bridges which may have allowed exchange between the Iberian and Maghrebian faunas. There is evidence that these geological changes may have led to vicariance and subsequent genetic differentiation.

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Our fieldwork trip took in the three Atlas ranges, south and south-western Morocco as well as parts of the west coast. I collected enough material to keep any malacologist sorting, identifying, synthesising and studying for years!
compared to other parts of the city. Another part of my malacological activities included collecting in the Mohammed V Rabat–Agdal University and I plan to return there to do more detailed work. The collections have not been studied for many years and there’s a possibility that some of the original Pallaury material may be there.

Another part of my malacological activities included eating some of my research subjects! Whilst in Marrakech I sampled the excellent cooked snails offered by the vendors but they were guarded as to revealing localities. Even though one of the vendors told me these were

Molluscs are visual 1: Molluscs are visual 1  09/10/2009  22:52  Page 8

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collected locally, the large numbers sold, however, could not, I think, be sustained. M’Cissi in Morocco is one of the world’s largest exporters of snails, and a significant number are exported to southern Spain to keep the snail-hungry Spaniards in supply. I suspect, therefore, that heliculture is keeping the vendors in Marrakech in business, but this is yet another Moroccan malacological question that requires further research to answer!

Selected Bibliography


Not everything you find with a shell in Morocco is a snail! You need to take a little extra care in Morocco when looking for snails under stones. A large black scorpion in Sidi Quasik. (photo: L. Linares/GONHS).

There are a number of examples of the use of shells as interior decoration, but the Shell Cottage at the Carton Estate must be one of the finest examples of its kind.

The history of Carton Demense spans more than 800 years, it was given to the FitzGerald family in 1170 following the capture of Dublin by the Normans. The magnificent Carton House was built in the early 18th Century and the house and estate now hosts a prestigious hotel and two of Ireland’s best parkland golf courses.

In 1747 James FitzGerald, the 20th Earl of Kildare married Lady Emily Lennox, daughter of the Duke of Richmond and great-granddaughter of the English King Charles II. The pretty shell cottage was built for Lady Emily. It originally had a thatched roof, but nothing from the outside could hint at the amazing décor inside. The centerpiece is a beautiful dome lined with thousands of tropical shells of every size. The walls, windows and furniture are all patterned with shells. While Carton House has had many famous residents and guests over the centuries, the shell cottage has made an interesting home also; one resident over the years was the singer Marianne Faithful.
A field survey of the molluscs of the Pilliga Scrub in semi-arid inland New South Wales, Australia

Michael J. Murphy
Coonabarabran, New South Wales, Australia

The Pilliga Scrub (30° 45' S, 149° 15' E) is a vast 450,000 hectare (1.1 million acre) area of semi-arid eucalypt and cypress pine woodland in Gamilaraay Aboriginal Country in inland northern New South Wales, Australia. The landform ranges from low sandstone ridges and hills separated by wide sandy valleys in the east to an extensive flat outwash sand plain in the west and north. The Pilliga is a harsh environment for molluscs. The sandy soils are poor in nutrients. Rainfall is infrequent and irregular and streams are dry for most of the year. Summers are hot (often up to 45° C), with frequent intense thunderstorms. Bushfires initiated by dry lightning, storms, or lightning strikes are common. The slow-moving streams of the outwash sand plain of the Pilliga appear to support a far greater diversity of aquatic molluscs than the faster-flowing streams in the east. Only two (out of 14) aquatic species have been recorded in both areas. There was considerably less overlap (or less difference) amongst the native land snail assemblages of the two areas, with 10 (out of 16) species recorded in both. It remains to be seen whether these patterns are supported by continued sampling.

The mollusc fauna of the Pilliga Scrub was found to be richer than expected for such a harsh, dry area. Four bivalve species (two families), 10 species of freshwater snail (six families) and 23 species of land snail and slug (11 families) have been recorded so far (see Table 1). The greatest contributors to this diversity are the Hyriidae (3 species), Planorbidae (4 species), Pupillidae (7 species) and Camaenidae (4 species). Records of particular interest include the following:

- The hyriid mussel Velesunio wilsonii (found at 3 sites) is a northern Australian species and has been recorded only once before in New South Wales (Jones 2007).
- The identity of the viviparid Notopala sp. (found at 4 sites) was uncertain and may represent an undescribed species (Ponder pers. comm.). Notopala species in general have suffered a serious decline in southern Australia due to sensitivity to human-induced changes to riverine environments (Ponder and Walker 2003), and are close to extinction in New South Wales.
- The planorbid Bayardella cosmata (recorded once) is a cryptic and seldom-recorded species with few recent records in New South Wales (Ponder et al. 2000).
- Records of the pupillid Popoidea myopotinae from the western Pilliga (7 sites) represent an easily range extension of about 1000 km (620 miles) for this arid zone species (Shea pers. comm.).
- Characid species A was unknown prior to this study and awaits formal description and naming (Shea pers. comm.).
- Records of the introduced Bradybaena similis and Vallonia excentrica are the most westerly records of these species in New South Wales (Shea pers. comm.). Introduced land snails and slugs were restricted to anthropogenic moist microhabitats available in domestic gardens and urban and agricultural waste ground, and did not extend into the drier natural areas. Two native species, the pupillid Gastrocopta strangulata and the punctid Paralaoma caputspinulæ, also form part of the Pilliga’s ‘domestic garden’ land snail assemblages.

The survey so far has revealed differences between the mollusc assemblages of the rugged sandstone country of the east Pilliga and the outwash sand plain of the west/north Pilliga (see Table 1). The slow-moving streams of the outwash plain appear to support a far greater diversity of aquatic molluscs than the faster-flowing streams in the east. Only two (out of 14) aquatic species have been recorded in both areas. There was considerably more overlap (or less difference) amongst the native land snail assemblages of the two areas, with 10 (out of 16) species recorded in both. It remains to be seen whether these patterns are supported by continued sampling.

The mollusc fauna of the Pilliga Scrub (and Australia in general) comprises three different elements (Smith and Kershaw 1979). Families such as the Hyriidae, Charopidae and Rhytididae are part of an ancient Gondwanan group which predates the break-up of Australia, Africa and South America and is probably over 100 million years old. A second group, which includes the...
found in an area previously only poorly sampled.

Acknowledgements
My children Jess, Nicola and Sam helped with field work. Michael Shea (Australian Museum) and John Stanisic (Queensland Museum) helped with species identification and Michael Shea also provided comments on a draft of this paper.

References


Image captions:
Figure 1: Velesunio ambiguus, the most common mussel species found in the Pilliga, can survive buried in the moist sand below dry stream beds for up to 2 years.

Figure 2: Notopala sp. is the largest native gastropod in the Pilliga and was found in slow-moving streams which are dry for most of the year.

Figure 3: Austrorhytida sp. A is an undescribed species of carnivorous snail from the nearby Warrumbungle Ranges which was found in the Pilliga in both native woodland and in urban waste ground.

Figure 4: A aftermath of extreme intensity bushfire in the eastern Pilliga in 2006. All ground litter, ground vegetation and shrubs were incinerated, tree trunks were charred to 15 metres (49 feet) or higher and all canopy foliage scorched.

Figure 5: Streams in the Pilliga are dry for most of the year, although water can usually be found under the sand.

Figure 6: Corbicula australis was only found in fast flowing sandy streams in the eastern Pilliga. The Australian 5 cent coin is about the size of a UK 5p coin or a 2 Euro cent coin.

Figure 7: Two different shell shapes of the planorbid Glythropysa gibbosa (left and centre) with the limnaeid Austropeplea lessoni (right) collected from a dry stream in the west Pilliga.

Figure 8: The introduced snail Neveritis arctoides is a widespread species in the Pilliga Scrub.

Table 1. Mollusc species recorded in the Pilliga Scrub

<table>
<thead>
<tr>
<th>Mollusc family</th>
<th>East Pilliga</th>
<th>West/North Pilliga (outwash)</th>
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<tr>
<td><strong>BIVALVES</strong></td>
<td></td>
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<td>Corbiculidae</td>
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<td></td>
<td>Velesunio ambiguus (Philippi, 1847)</td>
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<tr>
<td></td>
<td>Velesunio wilseni (Lea, 1859)</td>
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<tr>
<td><strong>FR ESHWATER SNAILS</strong></td>
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<td>Viviparidae</td>
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<td>Bithyniidae</td>
<td>Gabbia ventignosa Frauenfeld, 1862</td>
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<td>Planorbidae</td>
<td>Bayanderella cosseta (Iredale, 1943)</td>
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<td>Glytophysa gibbosa (Gould, 1847)</td>
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<td>Helicorbis australiensis (Smith, 1882)</td>
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<td>Gastrocopta hedleyi Plabry, 1917</td>
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<td>Gastrocopta pediculus (Shuttleworth, 1852)</td>
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<td>Gastrocopta strangii (Iredale, 1937)</td>
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<td>Omegapilia australis (Angas, 1864)</td>
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<td>Succineidae</td>
<td>Austrosuccinea macgillivrayi Cox, 1864</td>
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<td>Galadistes intervenens Iredale, 1938</td>
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<td>Pratocella barbara (Limaeus, 1758) #</td>
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# introduced species

study area in gardens and urban waste ground.

Figure 10: The introduced slug Limax maximus is rare in the study area in urban gardens and waste ground.

Figure 11: Many land snails found in the Pilliga are very small. The pupid and pupillid shells shown here are dwarfed by an Australian 5 cent coin.
Snails and Shells help archaeologists learn about Land and People - the Conchological Society supports new publication

Mike Allen

The Conchological Society has agreed to be a publishing partner for one volume of the newly established Prehistoric Society Research Papers Series. The publication Land and People is dedicated to the late John Evans, an archaeologist and conchologist who wrote in 1972 the definitive publication on Land Snails in Archaeology derived from his doctoral and post-doctoral research. The 20 papers cover many aspects of research he engaged in during his career; a number of papers on landscape archaeology and environmental archaeology – and not surprisingly a number of papers relate to land snails and shells, some written by members of the Conchological Society.

Papers by Paul Davies and Mark Robinson examine land snail archaeology – and not surprisingly a number of papers relate to many aspects of research he engaged in during his career; a number of papers on landscape archaeology and environmental archaeology – and not surprisingly a number of papers relate to land snails and shells, some written by members of the Conchological Society.

The volume therefore brings together papers that address archaeological landscapes and sites. This new series has a distinctive format: the books are published in hard cover (no flopping about on your shelves), and are not that uniform uninteresting A4 format, but a squarer format and imaginatively designed allowing images to bleed into the white space making wide and varied content more pleasing to read. But also these volumes are affordable – due to subvention from the Prehistoric Society, and their skilled editors and editorial board, as well as cooperation from their co-publishers Oxbow Books and the support of the Conchological Society - the book is published at only £35. Pre-publication offer and to honour his work and contribution to his generation and those who wish to honour John, paying tribute to the innovative and inspirational work of one of the leading protagonists of environmental archaeology and the cohesive picture of how archaeological landscapes are viewed within current research frameworks and approaches, while also proposing a variety of imaginative and inspirational work of one of the leading protagonists of environmental archaeology and the holistic approach to landscape interpretation and showing how snails and shells have been, and continue to be, key to understanding some of our most important prehistoric landscapes and sites.

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