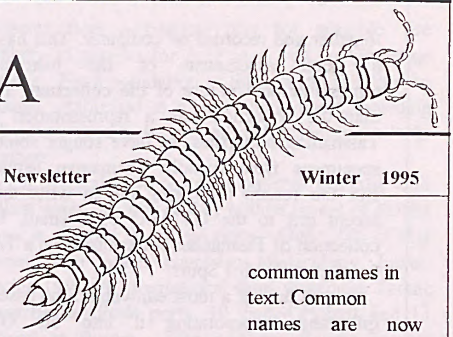
INVERTEBRATA



Issue 4 Tasmania's Invertebrate Newsletter Winter 1995

Welcome to Issue 4 of Invertebrata. I apologise to those who were waiting on the edge of their seats for this issue in early May. Since Winter begins in June that is what I should have written. Bringing the deadline for material forward still needs some work although a range of contributions were submitted. **The deadline for the next newsletter will be Friday 7 July 1995.** Please submit material more than 150 words on disk as a text. file or in ASCII format. If this is not possible then typed material will be accepted.

I have to add that I was just a little bit pleased when the Natural History Museum of London requested all back issues of '*Invertebrata*' and would like to be sent subsequent issues. Your contributions are what makes this newsletter so please keep them coming.

Send your contributions to:
Louise McGowan
Queen Victoria Museum & Art Gallery
Wellington St
Launceston Tasmania 7250
Ph. (003) 316 777
Fax. (003) 345 230

Around the traps . . .

Queen Victoria Museum & Art Gallery

Two particular topics have raised their heads in the zoology department recently and I would like to share them with readers in the hope that you will contribute your opinion and/or knowledge on the topics. Firstly, the issue of accidental introduction of terrestrial invertebrates. At the museum, public enquiries regularly come from people who have received something from interstate containing various freeloaders. Spiders seem to be the greatest offenders but maybe this is because they are more readily noticed than some other creatures (just ask any arachnophobe) and therefore reported. What are peoples thoughts on this subject (it seems to be in the too hard basket for many)?

Secondly, the protocol concerning the writing of common names in text. Common names are now required to be written in lower case. This format is found to be confusing and can make it difficult to discern names e.g. when referring to the little pygmy possum, I mean the Little Pygmy Possum, not a small pygmy possum. It is particularly relevant to museums because of the educational nature of much of our information (and the public love common names), but if it concerns others, we would like to know.

Louise McGowan recently spent two days working with Lynne Robertson to identify spiders from the Pump House Point (Cradle Mountain) Survey. Although the number identified was not enormous the amount of information gained from Lynne was. Louise felt very inspired after this meeting and would like to see a spider identification centre and library for Tasmania in the future. There is still so much to learn about the Tasmanian spider fauna and there is the demand for spider identifications. Many references are hard to get or expensive so it would sensible to pool the resources in one area. It is something to think about anyway. Bob Mesibov has unwittingly made the first significant contribution by finding a copy of Brignoli's "A Catalogue of the Araneae" in a second hand bookstore in Melbourne for $30.00! Thanks Bob.

The land snail exhibition organised by Brian Smith is on display and looks fantastic in our Zoology Gallery. This exhibition will continue for twelve months and is on loan from the Tasmanian Museum & Art Gallery.

Lepidoptera Collection - QVMAG

I have the pleasant task of looking after the QVMAG Lepidoptera collection as one of the many volunteers that the institution has to help it operate with the efficiency that it does. The collection though not large and not as representational of Tasmanian species as it might have been is nevertheless a useful collection of butterflies and moths from Tasmania's past (some specimens even go back to last century).

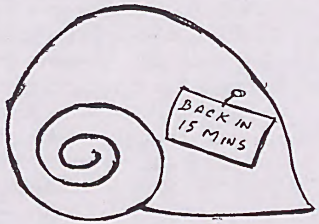
The collection has been fairly recently amalgamated into one cabinet and species placed

together and recorded on computer. This has enabled a good assessment of the historical and representational nature of the collection. To ensure that the collection has a representation of most Tasmanian butterflies we have sought some desired specimens from friendly Tasmanian lepidopterists. But the reason prompting me to write this is the recent gift to the QVMAG of a small, but good collection of Tasmanian butterflies from a Tasmanian lepidopterist, Mr I Spurr.

I am having a most enjoyable time assessing the gift and incorporating it into the QVMAG's collection. While not an exhaustive range it still has a good number of Tasmanian browns and skippers, while I have also noted a nice melanic form of the male common brown.

The building up of the QVMAG collection to enable it to be a small but useful addition to the state's Lepidoptera library is, I believe, a worthwhile goal and one of which I am proud to be a part.

Michael Fletcher



Cartoon by Mike Tobias

Articles

Ticked Off!

Recent hot humid weather provided ideal breeding conditions for a multitude of creatures including the ixodid ticks. This resulted in a widespread plague of tick larvae known as pinhead or seed ticks, which come to our attention by the infestation of dogs. Our two border collies were no exception.

Symptoms include scratching, biting at the body and paw licking. They were more severe for our small bitch which became agitated, and hyperactive, at times frantically leaping up and rolling and scratching.

The male was known to be flea allergic, and both dogs previously suffered minor effects of single tick bites i.e. lethargy and sleepiness until the ticks were removed. Leech bites appear to have no effect as the dogs had been in dense bush that day, all of these creatures including mites were suspected.

Examination of the two dogs found none of the above but small scabrous areas like dried blood were seen between the front toes, on the upper leg, neck, chest and stomach areas. The smaller female had many more than the male including around the teats. On the male the highest concentration was in the genital area from leg cocking activities. Examination with a lens showed the true identity of these patches and specimens were removed for microscopic examination.

Under the microscope the specimens were readily identifiable as larval ixodid ticks and two types were present. The first and most prominent were 'feeders' with mouth parts buried in the skin. They were tiny, globular, greatly distended, and the body was deep purple red in colour. They averaged 1.6 mm in length and formed clusters of 2 or 3 to over a dozen with isolated individuals. The clusters had a characteristic gritty feel, were readily visible on white areas but best located by feel where black.

The second type were unfed free moving 'walkers' and when clusters were disturbed these scattered everywhere. They were much smaller than the feeders averaging 0.71 mm in length. The body was flat, teardrop shaped and strikingly marked with a dark brown irregular pattern formed by body contents showing through the translucent white cuticle. Mouth parts were developed and similar to adults. The six (larval) legs were comparatively large and pale orange as for the feeders. Tarsi were flat ovoid, and translucent white with two curved claws on the upper surface.

The dogs were thoroughly washed with proprietary soaps and shampoos which proved ineffectual as specimens collected alive were still active the next day and struggling in a dish of water. Others, also apparently unharmed were removed from clusters. One other tick was collected from the male dog. This one was a male ixodid with a hard, pointed oval body and length of 2.7 mm and overall light reddish brown in colour. The dogs were finally sprayed with a suitable pyrethrin aerosol and some clusters dabbed with dettol (TM) and /or vaseline (TM). Overall this was effective and shrivelled dead specimens were later found still in clusters and easily removed.

As such, these ticks are reputed to be harmless and if left will feed and drop off. This of course at least partly ensures their survival to select another host the following year to complete the second stage in their three year cycle. Squashing them has also

been recommended but some will be missed particularly the walkers. Large clusters squashed into the skin may also cause problems of their own. The main concern is possible infection set up by scratching. Complete eradication appears the best option and is necessary when severe symptoms occur.

Attention is also necessary regarding the efficiency of some proprietary washes.

Mike Tobias
Amateur Naturalist
Nunamara, Tasmania.

Ballast water: a major marine pollutant.

Ballast water is one of the most destructive pollutants of the marine coastal environment. However, it has only recently been acknowledged as such. At least 15 known species of fishes, worms, molluscs, seastars, crustaceans and algae have been introduced into Australian waters via ballast water. These introduced organisms can degrade our marine environment by outcompeting native species for food and/or habitat, prey on native species or change the environment so that it is no longer suitable for the native species. In addition, ballast water can potentially ruin industries such as aquaculture, by introducing diseases and parasites. Once an organism has been introduced into our marine environment, it has so far proven to be impossible for it to be eradicated.

Ships that carry bulk cargo such as woodchips, need to be stabilised when they are empty. Seawater is used as ballast and is stored in special tanks and/or empty cargo holds. When this sea water is pumped on board, it is usually done while the ship is in port. Because the water depth is relatively shallow there, sediments, rich in marine life, are incidentally pumped in as well. This potentially hazardous medley is then discharged into the destination port once the ship is loaded with cargo. A typical bulk carrier loads 50 thousand tonnes of ballast water.

Only a few types of organisms can survive the rigours of an ocean voyage in ballast water and then successfully populate a foreign habitat. For example, those organisms that do so must be hardy enough to survive being pumped into the ship with the ballast water, as are the resting cysts of dinoflagellates. The longer the voyage, the less likely an organism present in the ballast water will survive. An organism that is alive at the end of the journey, is only likely to continue to survive if it is deposited into an environment similar to its natural habitat. Organisms collected from a tropical port for example, are unlikely to survive for long in a port in temperate regions. For a population of these organisms then to become established in a new environment, breeding individuals need to be present and generally, in large numbers.

In Australia, 40 ports are polluted annually with ballast water. A total of 121 million tonnes of ballast water is dumped into these ports. Over 70% of this comes from Asian countries, particularly Japan. During 1991, 99 international ships visited the Tamar River/Beauty Point ports, 49 visited Hobart and 13 arrived at Burnie. The northern Pacific seastar (*Asterias amurensis*), Japanese kelp (*Undaria pinnatifida*) and a toxic dinoflagellate (*Gymnodinium catenatum*) are some known species introduced into Tasmanian waters via ballast water.

In view of this problem, the Australian Quarantine and Inspection Service (AQIS) introduced guidelines in 1990 that, because of a lack of legislation, were only voluntary. These guidelines aimed to help ships minimise the presence of live organisms in ballast water by suggesting such strategies as reducing sediment intake by taking ballast water from deeper water near the ports, exchanging the ballast water mid ocean or treating the ballast water with chemicals or heat. At present, AQIS estimates that 80% of the ships arriving in Australia with ballast water comply with at least one of these guidelines. However, none of these methods is completely effective in eliminating all live organisms from the ballast water or else is very expensive or is not completely safe. For example, exchanging water mid-ocean can cause stability problems for the ship, especially during rough weather.

With ships getting faster and blooms of dinoflagellates increasing worldwide, the risk of foreign organisms being transferred to Australian waters and surviving is also increasing. More research is needed to find "...an environmentally sound, technically acceptable, cost effective, safe treatment process." (Paterson, 1994). Governments, however, appear reluctant to commit the same amount of funds towards combating the problems of ballast water as they do towards other quarantine issues. Aeroplanes, arriving from overseas, are routinely sprayed to kill any errant invertebrates and livestock are quarantined and checked for diseases before being allowed into the country. Ballast water, however, teeming with live organisms and diseases, is dumped in Australian ports even before the results from testing the water are known.

We can all do something to help combat this

problem. Usually an introduced organism is not noticed until it occurs in large numbers and has already established a successful breeding population. Attempts to eliminate it at this stage are probably hopeless. However, if found early enough there may be a chance to remove it from our environment.

To help find any introduced organisms before they become established, get to know what the native inhabitants look like. There are numerous field guides available that provide easy identification. If you do come across an unusual crab or seastar, take it to a museum for further identification. This will also help museums establish the distribution of the rarer species of our coast. Remember, however, that some marine animals are protected and should not be removed from their habitat (e.g. elephant snails, sea horses) and try to identify the animals without harming them.

Jane K. Griffith
Research Officer, Zoology, QVMAG.

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Paterson, D. 1994. Ballast water: an Australian perspective. In Kriwoken, L. and McAdam, S. (eds.) Coast to coast '94 A national coastal management conference. Hobart, Australia. 29 June - 2 July.

Those Beastly Jellyfish!

This summer heralded, for the second consecutive year, an influx of *Cyanea capillata* jellyfish along Tasmania's coastline - the eastern seaboard in particular. First specimens appeared just after Christmas and quickly escalated to plague proportions in January. They persisted to a greater or lesser extent throughout February. Odd specimens were still being washed ashore during the penultimate week of March. Last summer the pattern was similar although few were seen later than February.

Cyanea capillata is a large medusoid jellyfish capable of inflicting painful stings to bathers. Its disc complex can be over half a metre in diameter and when alive, ranges in colour from bright pink to purple. Dead or dying specimens observed at or near the tideline are usually a light khaki brown.

This sizeable invertebrate is, in many respects, a mysterious animal. Because its habitat is usually oceanic not a lot is known about its normal behaviour or life cycle. It seems likely that the El Nino influence on Pacific Ocean water temperatures is a significant factor in its local appearances.

This primitive animal is virtually a large mouth, surrounded by many folds of prehensile tentacles suspended from the lower side of its broad disc. Additionally, eight bunches of long translucent spaghetti-like stinging tentacles hang, at regular intervals, from the disc's periphery. There is a rudimentary nervous system which permits response to touch and taste, and also enables the animal to balance and swim.

The stinging cells of *C. capillata* are called cnidoblasts and are unique in the animal kingdom. While it is possible to be stung by direct unwitting contact, the usual scenario is for swimmers to emerge from apparently clear water and experience a moderate to severe 'nettle-rash' shortly afterwards. The reason is that stinging cells, detached from dead and dying jellyfish macerated by the surf, or attached to microscopic larval stages similarly distributed, remain potent for several days.

Any exposed part of the body is susceptible particularly the neck, chest and armpits. Cotton skivvies or rubber wet suits afford some protection. Stings on the face, especially the eyes, can be most unpleasant and often necessitate medical treatment. It is important not to rub the site of irritation which, in most adults, regresses after about an hour. If pain persists, a warm shower followed by swabbing the sting sites with household vinegar is usually quite effective. A degree of acclimatisation to *C. capillata* stings also occurs.

If, as has been predicted, the El Nino global weather pattern reverses this autumn it will be interesting to observe if a plague of *Cyanea capillata* jellyfish recurs during the 1995-96 summer. I for one, will not be sorry if they remain 'out there', where they belong.

Tim McManus
Veterinary Extension Office
Dept of Primary Ind. & Fisheries, Tasmania

The Identity of Shelob

One of the more puzzling zoological curiosities of J.R.R.Tolkien's Middle Earth is Shelob, the guardian of Cirith Ungol in the Ephel Duath (mountains of Shadow). Shelob is often described by non-zoologists as a giant spider, since the creature is predatory, venomous and web-spinning:

Across the width and height of the tunnel a vast web was spun, orderly as the web of some huge spider, but denser-woven and far greater, and each thread was as thick as rope. (Tolkien, J.R.R., 'The Two Towers', chapter 9)

Even a casual review of the available anatomical evidence, however, does not support an assignment of Shelob to the Araneae. The head is said to carry 'great horns' and 'two great clusters of many-windowed eyes', and

behind her short stalk-like neck was her huge swollen body...swaying and sagging between her legs... Her legs were bent, with great knobbed joints high above her back, and hair that stuck out like steel spines, and at each leg's end there was a claw. (Tolkien, 1965; ibid.)

In all spiders the head and leg-bearing segments are fused into a cephalothorax, i.e. there is no neck. The eyes are occasionally arranged as paired clusters, but with never more than four eyes on a side. The legs typically terminate in three claws, sometimes two, never one.

If Shelob is not a spider, what is she? The body form, the 'great horns' of antennae, the ommatidial 'many-windowed' eyes and the single tarsal claw are all suggestive of the Hexapoda rather than the Arachnida. In the absence of a specimen, it is possible to speculate that Shelob can be referred to the Myrmeleontoidea within the Neuroptera. Larvae of modern-day myrmeleontids dig pitfall traps for their prey, which are injected with poison when captured. Myrmeleontid larvae have a short, stalk-like neck and a large body (thorax and abdomen joined together), with ommatidial eyes.

Web-spinning is unknown among the Neuroptera, but the pupal cocoon is woven from silk produced by the Malpighian tubules. Shelob could well belong to a neotenic neuropteran species in which cocoon-spinning ability has been directed towards prey capture.

Shelob is described as an ancient creature from the Dark Years, and fossil and phylogenetic evidence places the origin of the Neuroptera well back in the Paleozoic. We are further told that she is

such as once of old had lived in the Land of the Elves in the West that is now under the Sea . . . and so came to Luthien upon the green sward amid the hemlocks in the moonlight long ago. (Tolkien, 1965; ibid.)

In other words, the distribution of Shelob-like ancestral forms was formerly much wider, and following extinction in the West and transoceanic dispersal to Middle Earth, the Shelob lineage became restricted to the glens of the Ephel Duath in southern Mordor. Shelob is thus both a living fossil and a member of a relict species of considerable evolutionary significance in entomology. The ruler of Mordor, Sauron, is to be praised for preserving the Cirith Ungol habitat and allowing Shelob to capture his slaves:

If now and again Shelob caught them to stay her appetite, she was welcome; he could spare them. (Tolkien, 1965; ibid.)

From a conservation viewpoint, the attempt by Samwise Gamgee to kill Shelob by stabbing was unfortunate, and one can only hope it failed. On this point Tolkien himself is uncertain:

Shelob was gone; and whether she lay long in her lair . . . and in slow years of darkness healed herself from within, rebuilding her clustered eyes . . . this tale does not tell. (Tolkien, 1965; chapter 10)

The identification of Shelob as an archaic neuropteran is tentative, of course, and I would be interested to hear the opinions of other '*Invertebrata*' readers on this matter.

Bob Mesibov
Research Associate, Zoology, QVMAG.

Recent Publications

Local distributions of terrestrial amphipods within highland wet forests in central Tasmania. Robert J. Taylor, Andrew M. Walsh and Raymond N. Brereton. Pedobiologia 39, 78-85 (1995).

Letters

Dear Louise,

My wife and I recently visited Tasmania for two weeks and we liked the museum. I'm impressed with the publication '*Invertebrata*'. There's a very enthusiastic group around you and it's stimulating to read about a dynamic group.

Perhaps there's a Tasmanian or two, who might be able to help me and one of my students.

I'm interested in cockroaches in general. There's a closely related group to the soil burrowers, the wood-feeding cockroaches, *Panesthia*. They eat rotting wood. There are 10 Australian species mostly found in the moister areas (but not in W.A.) in any wooded areas. There's only two records in Tas. - two species, both found on the mainland as well - one says Tasmania, no exact locality, the other says Mt Field c. 50 miles WNW of Hobart, c. 4 500 ft. Wherever I went in Tas. I kept a lookout for *Panesthia* but to no avail (they feed inside the logs but invariably a number are found underneath logs so turning logs is an easy way to find if they're present). I didn't get to the top of Mt Field - if the label is correct, the cockroach must have been caught on the summit - but they're certainly not lower down. I can't understand why they're not in Tas, the habitat looks fantastic for them and I doubt it would be too cold.

Now, for my student, Margaret Humphrey. Her interest is in the platform spider, *Coresoides* . Perhaps you know of them? We know from Tracey Churchill's work that they are in Tas. Again, I was totally unsuccessful in seeing any of the little beasts. Margaret requires some for comparative purposes - isozymes and karyotyping.

So, if there are possible contacts, Margaret and I would give thorough information with regard to collecting and sending to us etc.

kind regards,

(Dr) Harley Rose.
Department of Crop Sciences
Faculty of Agriculture
The University of Sydney
New South Wales 2006

Awards

Isobel Bennett was awarded an Honorary Doctorate of Science by the University of NSW on 7 April 1995. Isobel is one of Australia's most distinguished and well known marine biologists even though she has no formal training.

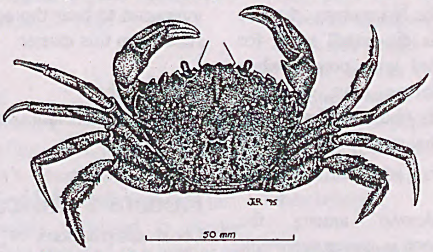
Now in her eighties, Isobel has contributed to the advancement of knowledge in marine biology for over 50 years. She is well known for her writings on the Great Barrier Reef and her book *Australian Seashores*. Much of her time was also spent documenting the marine biota of rocky shores of the temperate south-eastern Australian coast, Macquarie Island and the warmer Lord Howe Island and Norfolk Island.

The University of Sydney honoured her in 1962 with the award of an honorary Master of Science degree, the first such award it had made. She has received numerous other awards and recognition including a genus and five species of marine animals and a coral reef named for her.

Congratulations Dr Bennett on your award!

The European Shore Crab *Carcinus maenas* (Linnaeus, 1758) - Happily Breeding in Tasmania!

During a recent field trip to Binalong Bay, E.Tasmania, on the 15 May 1995, QVMAG zoology staff observed numerous juvenile European shore crabs. The juveniles were found in a sheltered inlet containing seagrass. The carapace of all of the juveniles, was approximately 1 cm in width. Adults generally grow to a carapace width of 5.0 - 5.5 cm. This introduced species is now firmly established in Tasmanian coastal waters.



European Shore Crab (*Carcinus maenas*) male
Illustration by Judy Rainbird, Technical Officer, QVMAG.