December 2006 – January 2007

SYDNEY SHELLER

Newsletter of the Shell Club of Sydney
NSW Branch, The Malacological Society of Australasia Limited ACN 067 894 848

Next Meetings:

27th February 2007
Turbininae
(1.30pm for 2pm – 4pm)

(normally 4th Saturday)

Ryde Eastwood Leagues Club
117 Ryedale Rd, West Ryde, Sydney

View these shell newsletters on line
www.sydneyshellclub.net

Submit articles or ads:

Steve Dean
PO Box 316, Mona Vale, NSW 1660
Text by disk or email only. Photos, and disks by mail, or preferably by email to
steve@dean.as

Club Executive:

Office bearers:

President: John Franklin
Vice Pres: Maureen Anderson
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Secretary: Kim Bishop
Raffles: Kim Bishop
Sheller Editor: Steve Dean
Librarian: Steve Dean
Annual Shell Show Mgr: Steve Dean
Special Projects Mgr: John Dunkerley

Shell Club of Sydney Mission Statement:

To appreciate, understand and preserve shells and their environment and to share this with others.

Some of the topics inside:

Club Talk: Collecting Shells – Rules and regulations in NSW

By Jack Hannan

There are a variety of rules and regulations that restrict where you may collect, what methods may be used and how much or what specie(s) you can take. Followed strictly, these rules significantly impinge on the scope for collecting in this state. However, there are some permit provisions, loopholes and policies that make collecting easier in some circumstances.

Here is an outline each of the mechanisms that restrict collection, along with some suggestions on how to best deal with them.

AQUATIC RESERVES

Description

- 13 aquatic reserves in NSW, each generally quite small (100s of metres to a few km in extent)
- examples include Fly Point – Halifax Park, Long Reef, Cabbage Tree Bay, Towra Point and Bushrangers Bay, plus several others in the Sydney area
- generally sited to protect heavily used areas of obvious habitat value and/or uniqueness; many of the Sydney ones were previously Intertidal Protected Areas (see later)
- Administered by NSW DPI (formerly NSW Fisheries)

Purpose

- to protect biodiversity and representative samples of marine life and habitats, and in some cases habitats of protected species; may also be set aside for research or education

Impact on shell collecting

- neither live nor empty shells may be collected

How to deal with it

- Section 37 Scientific Collecting Permit
- Aquarium Permit
- collection of small amounts of empty material, particularly from beaches, is unlikely to attract sanction

MARINE PARKS

Description

- several now in NSW, each generally quite large (10s of km to more than 100 km in extent)
- examples include Byron Bay, Solitary Islands, Port Stephens – Great Lakes, Jervis Bay and Batemans
- different rules in different zones; for practical purposes there are two main zones – Habitat Protection and Sanctuary
- zoning plans (and associated rules) will not be in force for some months at Port Stephens – Great Lakes or at Batemans
- sited to protect representative examples of broad-scale habitats within each major bioregion on the NSW coast
- administered by Marine Parks Authority which includes NSW DPI and NSW DEC (incorporating NPWS)

Purpose

- similar to that of Aquatic Reserves

- to conserve marine biodiversity, habitats and ecological processes, whilst allowing sustainable use, public appreciation and enjoyment
- unlike similar areas covering the Great Barrier Reef, do not cater for shell collecting

Impact on shell collecting

- Sanctuary Zone - neither live nor empty shells may be collected
- Habitat Protection Zone – only a restricted list of live molluscs may be collected, generally those species commonly used for food or bait; collection of dead material technically illegal in most cases.
-

How to deal with it

- Section 37 Scientific Collecting Permit
- Aquarium Permit
- collection of small amounts of empty material, particularly from Habitat Protection Zones is unlikely to attract sanction
- get in quick (Port Stephens – Great Lakes and Batemans)

INTERTIDAL PROTECTED AREAS

Description

- established in 9 areas around Sydney; with the exception of Sydney Harbour, each is quite small (100s of metres in extent)
- examples include Bungan Head, Sydney Harbour, Long Bay and Inscription Point
- generally sited to protect heavily used areas of shoreline
- Administered by NSW DPI (formerly NSW Fisheries)

Purpose

- to protect populations of seashore animals from over-collecting and to provide bases for juvenile dispersal to other areas
- created in response to complaints that people were removing large quantities of common species such as turbans, tritons and mussels for bait or food

Impact on shell collecting

- live shells may not be collected
- however, empty shell can be taken

How to deal with it

- Section 37 Scientific Collecting Permit
- Aquarium Permit
- take only empty material
- legislation refers to “10 metres seaward from mean low water mark” which provides loophole at some sites on very low tides – possible to collect living material and still be within law; great discretion advised however

FISHING CLOSURES

Description

- numerous closures within NSW
- most have no bearing on shell collecting, but some do
- a relevant example is Gunnamatta Bay in Port Hacking, where no molluscs may be collected
- created for a variety of reasons, including habitat protection and the minimisation of conflict
- Administered by NSW DPI (formerly NSW Fisheries)

Purpose

- to manage local issues relating to habitat damage or user conflict

- may have long-standing historical basis; implemented before Aquatic Reserves or Marine Parks were used

Impact on shell collecting

- variable; may impact on collecting methods (e.g. implements), or totally restrict collection of all molluscs
- live shells may not be collected in some closures
- however, empty shell can be taken

How to deal with it

- Section 37 Scientific Collecting Permit
- Aquarium Permit
- take only empty material if removal of live shells not allowed
- check with local DPI office if planning collection in an unfamiliar area – complete and specific information on closures can be hard to access from other sources such as website

"Sanctuary zones and other protected areas often have spectacular underwater scenery - making the task of finding and observing molluscs all the more enjoyable."

(Photo by Jack Hannan.
Descended approximately 8 metres down a drop-off while snorkelling, and then took the picture while looking back up towards the surface)

MARINE EXTENSIONS OF NATIONAL PARKS

Description

- not many in NSW; medium in size – some kilometres in extent)
- local example includes Bouddi National Park Marine Extension – near Broken Bay
- generally sited to compliment adjacent National Parks
- Administered by NSW DEC through NPWS

Purpose

- protection of marine life and habitats and, where consistent, public appreciation and enjoyment

Impact on shell collecting

- neither live nor empty shells may be collected

How to deal with it

- collection of small amounts of empty material, particularly from beaches, is unlikely to attract sanction
- possibly some sort of permit from NPWS

PROTECTED SPECIES LEGISLATION

Description

- various species listed for total protection, includes so-called 'threatened species'
- only one species, an inland snail, is currently listed
- list is likely to expand in future, eventually taking in more molluscs
- Administered by NSW DPI (formerly NSW Fisheries)

Purpose

- to protect species considered to have suffered major population decline and/or which are at risk of becoming extinct

Impact on shell collecting

- limited at present, but may eventually become significant
- protection only applies to listed species
- giant clams, tritons and helmet shells are among the species protected in Qld under similar legislation

How to deal with it

- possibly by Section 37 Scientific Collecting Permit
- take only empty material if removal of live shells not allowed

GENERAL BAG AND SIZE LIMITS

Description

- specify how many of a particular species can be taken, and at what size
- most molluscs have a bag limit of 20, though some abundant spp. have limit of 50
- a few, such as abalone and turban shells have a size limit
- Administered by NSW DPI (formerly NSW Fisheries)

Purpose

- to allow sustainable harvesting of each species

Impact on shell collecting

- little impact, as limits are much higher than the numbers that would normally be collected
- no impact on collection of empty shells

How to deal with it

- if the collection of large numbers of a particular species is required, apply for Section 37 Scientific Collecting Permit

RESTRICTIONS ON COLLECTING METHODS

Description

- there are restrictions on the use of tools and equipment to take molluscs
- only scallops (and sea urchins) can be taken by SCUBA
- generally, implements such as pumps, spades etc. can only be used in mud or sand areas – and not around seagrass, mangroves or rocky reefs
- particular implements are restricted to particular situations – e.g. single bladed knife can be used for pipis and cockles or on rock platforms

- Administered by NSW DPI (formerly NSW Fisheries)

Purpose

- to protect sensitive habitats from physical damage
- to protect populations from over-harvesting

Impact on shell collecting

- live shells (except scallops) cannot be taken on SCUBA
- in many situations, common implements cannot be used to take live shells

How to deal with it

- section 37 Scientific Collecting Permit if needing to use SCUBA or if in doubt
- avoid interfering with sensitive habitats
- take shells by hand gathering whenever possible

THE 'LAW OF THE SEA'

Description

- on board any vessel, the captain or master is 'god'
- the captain or master can insist that you not bring dead or live shells onto a boat, regardless of any actual legal requirements
- very likely if on a dive or snorkelling charter; unlikely if on a fishing or spear fishing charter

Purpose

- depends on captain's personal views
- may relate to a real or perceived need to protect a popular diving or snorkelling destination

Impact on shell collecting

- it is unlikely that you can successfully take larger live shells on any dive or snorkel charter
- however, some operators will allow dead shells to be taken if this is legal at the location
- remember, dive and snorkel operators will tend to take clients to protected areas (e.g. Aquatic Reserves and Sanctuary Zones) as these are often where the best sites are

How to deal with it

- if possible, go on a dedicated shell-collecting charter, or at least a spear fishing charter
- use your own boat or hire one if you have the necessary local knowledge
- be discrete and within the law – and don't mention what you are doing unless captain has specifically told you that it is o.k. to collect
- even if captain has said o.k. still be discrete – other passengers may not share his or her view
- never put dangerous species (cone shells) under your wetsuit!

"Still, as the spiral grew,
He left the past year's dwelling for the new,
Stole with soft step its shining archway through,
Built up its idle door,
Stretched in his last found home,
and knew the old no more.
…Build thee more stately mansions, O my soul,
As the swift seasons roll"
The chambered Nautilus by **Oliver Wendell Holmes.**

Australia's Cretaceous Ammonites

By Associate Professor Chris Illert,
Istituto per la Ricerca di Base (Australian Division)

The Cretaceous period, from 144 to 66 million years ago, saw an accelerated pace in the break-up of ancient super continents. It was a time of change, with new land masses progressively altering ocean circulation patterns and influencing world climates.

Early in this period large-scale flooding occurred worldwide, producing the vast Eromanga Sea in central Australia and explaining why marine fossils have been found from Cooper Pedy (WA/SA) to Lightening Ridge (NSW).

Marine reptiles abounded, along with dinosaurs and pterosaurs, for most of the Cretaceous and our oldest mammal fossil dates from this time (a 110 million year old platypus jaw, part of the Galman Collection from Lightening Ridge), marking the start of the rise of mammals.

Apart from the cold-spell at the beginning of the period, and another at its close, the climate of Australia's Cretaceous was mostly very warm and humid. Toward the end of the period, Australia's inland sea vanished along with marine reptiles and ammonites. On the land the dinosaurs died –out, and ancient gymnosperm dominated landscapes began to be replaced by flowering plants and associated faunas.

The Cretaceous also saw the rise and fall of many important families of marine creatures called cephalopods (meaning "head-footed") because of their well developed brains and their octopus-like tentacles. The popular human perception of these creatures is anthropocentric and condescending, fisherman often using them as bait, but anyone who has actually kept an octopus in an aquarium will tell you they can be endearing, friendly, extremely intelligent (in some instances comparable to dogs and cats) and capable of amazing pattern recognition and advanced problem solving.

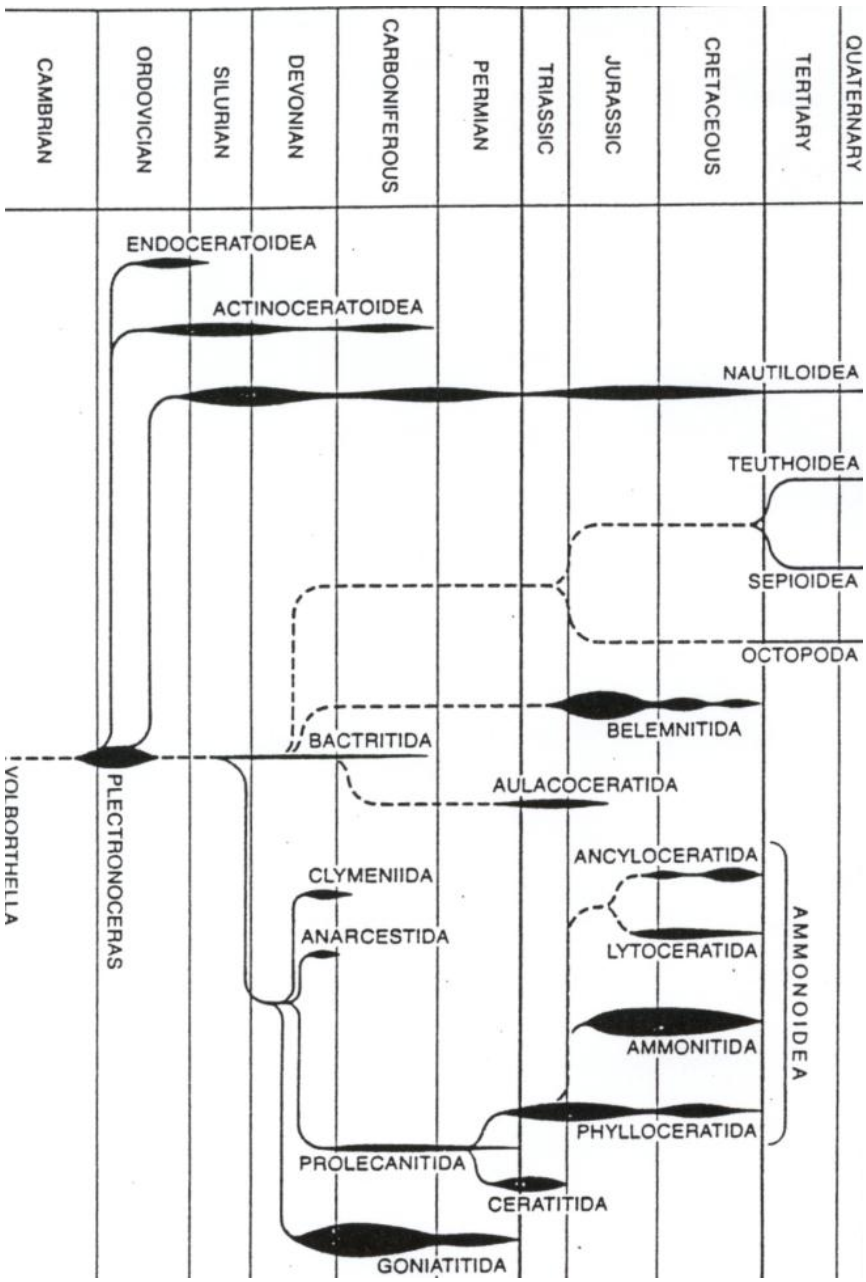
Externally shelled cephalopods were once abundant in world oceans but, today, only half a dozen species of chambered Nautilus survive to tell us of these once diverse and successful dynasties. At least three quarters of the 10,500 known fossil cephalopod shell species are tightly coiled, flat, discoidal ammonites. Though far outnumbering fossil nautiloids, in both abundance and in total number of varieties, ammonites are now all extinct.

Ammonoids evolved from ancient bottom dwelling nautiloids when gas filled chambers within their shells became increasingly buoyant, permitting a free-swimming, hovering, mode of life with unprecedented mastery of mid ocean environments. As shelled cephalopods increasingly left the ocean bottom for this free-swimming or floating ("pelagic") lifestyle, it was only a matter of time before some of their octopus-like tentacles fused together to form a protective hood (sometimes called the "shield" or "aptychus"). This hood (in the case of ammonites, made from two pieces like a double barn door) sealed the shell aperture when the soft bodied creature withdrew inside in response to attacks in midwater. Many modern snails also have a similarly protective "operculum" which evolved independently.

The ancient ancestors of nautiloids in many respects resembled modern day chitons, the "coat of mail" shells, with multiple body segments each possessing their own gill pairs(s). In the course of time, body segmentation vanished and the total number of gill pairs decreased as the soft body-plan became more integrated and efficient. The increasingly free-swimming ("pelagic") lifestyle of ammonites, through increasingly clean oxygenated water, further reduced the need for multiple pairs of gills.

The famous anatomist William Owen in 1832 argued that multiple gill-pairs were a sign of "primitiveness" in cephalopods, and that ancient Ellesmerocerids were probably the first "modern" nautiloids managing with four gills, in many respects similar to the living species Nautilus pompilus which has two gill pairs, 94 sheathed tentacles without suckers, no ink-sack, a crude water filled "pinhole camera" eye without lens, a beak, and a tongue ("radula") containing 13 rows of teeth.

But this kind of classification, based on soft-body features, is largely impractical for the vast majority of all cephalopod species because they are extinct with only their shells preserved in the fossil record. This has caused a heated split within taxonomical community, for more than a century, between malacologists (who emphasise the importance of soft body features) and conchologists (who study shells). Through necessity paleontologists are invariably conchologists, and all ammonite species are classified according to their shell features. It is not as if one can go outside and find live ammonites.



However, unexpected and fortuitous inroads occurred into the question of soft body anatomy when W Sturmer (1970) and U. Lehmann (1971) shone 25 to 40 kv x-rays through Devonian shales containing fossilised cephalopods. They found that soft-body features had been pyritized, creating microvariations in rock density that could be “seen” with x-rays even though, if one broke the rocks open, this information was invisible and only the fossilized shells were apparent. For the first time researchers saw shadow images of tentacles, gills complex eyes with lenses, ink-sacks, and other features. This was a great improvement upon the classic tentacle impressions (“footprints”) of orthocerid nautiloids that had been observed as early as 1955 by R. H. Fowler. These new x-ray shadow images weren’t very sharp, and they weren’t always present in the fossil record, so the bulk of what we want to know is still a mystery but, at least, this technique offered some real hope for malacologists.

The extinction of ammonites was a major evolutionary loss. Recent studies of heteromorphic shells are only just beginning to reveal how architecturally sophisticated and utilitarian they were.

Part of the problem was that most heteromorphic ammonites shells are extremely rare, with some species being known only from a handful of fragments (often not even one complete specimen is known) The scientific literature describing these shells date back at least to classic papers in “Palaeontographica” (1980), Palaeontological Abhandlungen” (1984), and the “Journal of the College of Science” at the Imperial University of Tokyo (1904), but it was often difficult from the broken fossil fragments to extrapolate the shape of whole unknown heteromorphic shells.

However in the last decade, two of the most powerful branches of modern mathematics, Differential Geometry and Calculus of Variations, have been applied to this problem. These fields of mathematics are so difficult that they generally aren’t even taught to undergraduates in science courses at many modern universities. Only half a dozen or so mathematicians in the world today actually understand how to apply this advanced mathematics to seashell analysis. But, in summary, differential geometry is centered upon two truly fundamental functions, respectively called “torsion” and “curvature”, which can’t be explained here.

These functions can often be determined for the entire shell, from analysis of only a sizeable piece of fragment. Once we have these functions we can often write a computer program to reconstruct the whole shell as it was in life. Sometimes though, the curvature and torsion functions aren't unique, and several shell shapes may seem possible. This is where Calculus of Variations plays a role, it can be used to determine which of the proposed shell shapes is "optimal" in the sense that the least energy needed to be expent by the creature in producing it: nature is, after all, efficient in what it does.

In this way mathematicians and computer scientists can often confidently reconstruct, from fossil fragments, whole shell shapes that might otherwise have remained unknown. And from these whole-shell reconstructions we can study the way that growth-lines turned corners and from that infer interesting things about the life orientations of these floating creatures throughout the course of their lives, and hence infer things about the soft bodies within these shells.

Heteromorphic ammonites were amongst the most enduring and successful of all marine creatures. Their shells grew in highly functional, sensible shapes, that persisted during vast periods of geological time when so many of their tightly coiled conventionally shaped cousins perished. All available evidence points to heteromorphic ammonite shell design being biologically adequate, if not competitive and superior, even though we may not yet understand its purpose and function fully in all cases. Their extinction was probably an accident, due to the planktonic lifestyle of juveniles, and not through any fault of shell design. New species are being discovered all the time, and we have only really begun computer reconstructions using advanced mathematics previously unimaginable. This is not a field in which we have all the answers, but it is a field where new answers are possible to previously intractable problems through the use of advanced new mathematical techniques and computer technologies.

CEPHALOPOD EVOLUTION was characterized by a split, sometime in the Ordovician Period (between 440-500 million years ago), between the four gilled creatures that evolved into modern nautilus, and the two-gilled creatures that produced squids, cuttlefish, octopuses, belemnites and ammonites. In the latter case, small conical shells belonging to bactrid nautiloids gradually rolled into loose coils then progressively tighter ones that characterized many of the latter ammonites. Belemnites had an internal chambered shell surrounded by soft body, as does modern-day Spirula and also the cuttlefish (in the latter case the chambers are so thin and numerous that the cuttle-bone appears laminated instead of chambered). In the case of the octopus a vestigial skeleton consists of small horny supports or a simple rod, whilst the squid has a 'pen'. These are all homologues of external chambered shells.

Inaugural COA award

Write up by Sydney Shell Show manager – Steve Dean

Winners of the COA award get a spectacular plaque plus a badge to wear. These are sent from the COA in America at their expense and are to be awarded at major shell shows to people who have prepared an educational exhibit that significantly furthers the interest and knowledge in shells.

Our annual shell show has been accepted as meeting all the requirements to be able to judge and then issue COA awards, and October 2006 saw exhibitors competing to become our first COA recipient.

The rules for COA competition include:

- The COA only accept recognised regional shows that run an annual competitive event
- To compete for a COA award an exhibit must form part of the advertised competition categories and be judged with them. (a stand alone educational exhibit, no matter how good is not eligible)
- Shows cannot create a separate category called COA or educational exhibits.
- Judges need to be competent and knowledgeable (Malacological researchers, major international shell dealers etc)
- If no exhibit comes up to standard of educational and scientific excellence, then the award should not be issued that year

Competition categories at our shell shows specify number of specimens and too few or too many looses marks. In the past I have added other shells to educate and labelled them as not part of the competitive section, and still been marked down, so I stopped doing an educational element.

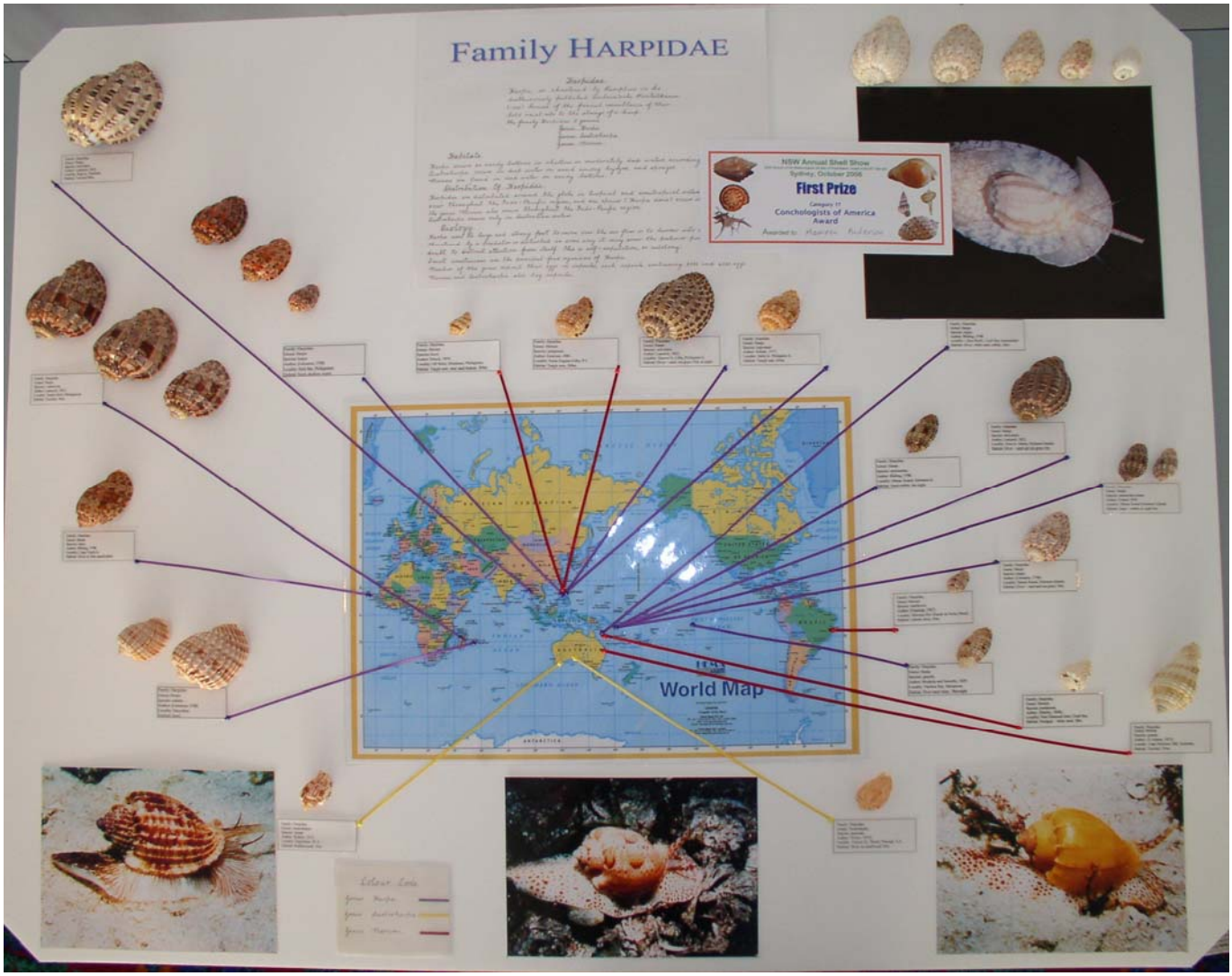
Now all judges are instructed, that in the case of a COA entry that has many more shells than the category specifies (as an educational exhibit should) then the exhibit can have two sections. One that shows the competitive specimens - meeting all the restrictive requirements for Sydney Shell Show competition (labelling, number of shells etc) plus an additional section that is not judged for the normal category placings. For the purpose of COA award judging the judges then look at the whole display including BOTH the competitive and non-competitive sections, and the two sections should integrate and compliment each other for overall educational and scientific effect.

The introduction of the COA award has thus enabled our annual show to again include educational elements in all categories, thus achieving its overall goal of furthering the education and knowledge of shells, at least in Sydney.

Enough background, now for the winner:

Congratulations go to Maureen Anderson for a spectacular and comprehensive exhibit of Harpidae showing the regions where each species is found, plus other interesting information about Harpidae.

The non-competitive portion of her exhibit shown below included a large number of very rare Harpidae, all in gem condition placed on a board. There was no clear plastic cover so that their beauty could be fully appreciated. This required that someone stand guard next to the exhibit all day. The educational board was complimented by the competitive display which included a number of even rarer specimens to round out the overall educational display (Also shown below).



Note:

Congratulations also to the COA award runner-up **Trevor Appleton**, who transported his exhibit all the way from Queensland to compete.

Pictures of his educational volute entry will appear in the next Sheller issue.

Annual Shell Show 2006 – Shell of the Show.

Steve Dean

In our next issue of the Sheller we will include the results and pictures from our October 2006 annual shell show.

To wet your appetite, here are the details about the 'Shell of the Show' category. All shells in this category were indeed spectacular, and although there is no requirement for self collected or local NSW shells, the two entries that scored the highest were both self collected and both happened to come from NSW.

Normally I only allocate two judges to this category, but this year the overall quality of entrants was so high I ended up allocating seven judges to ensure the very best shell was selected.

The winner was a common tropical species that was in absolutely Gem, Gem, Gem condition. It is a ***Strombus luhuanus*** Linnaeus, 1758. I have seen tens of thousands of this species while diving around the tropical indo-pacific but nothing compares. The pictures do not do justice to it. It is in perfect physical condition (as strombs sometimes are). However it is quite large for the species and has far better colour and pattern than I have seen on any reef or in any collection.

As I said it was not judged for its location at all, but coming from NSW makes it even more special since NSW specimens of ***Strombus luhuanus*** are usually small, light weight, thin lipped and pale coloured with limited patterning, with most specimens being sub-adult.

In mid northern NSW there is a stretch of coast line where the rock platform was quarried to get large blocks for breakwalls. Some of the quarry pits have become large shallow intertidal rock pools that have sandy floors. The pools are on the outer rock platform along way from the beach or rivers and get good fresh water with nutrients and limited rain run off. However they do not cop the full onslaught of waves being protected by the part of the rock platform not cut away. The specimen was taken live by snorkel in one of these pools, 0.5m in silty sand. It goes to show what looking in the right location can do for quality of specimen.

Congratulations to the person who found it and exhibited it - Debra Phillis

Pictures below and front cover.