

2016

GASTROPODA PACIFICA



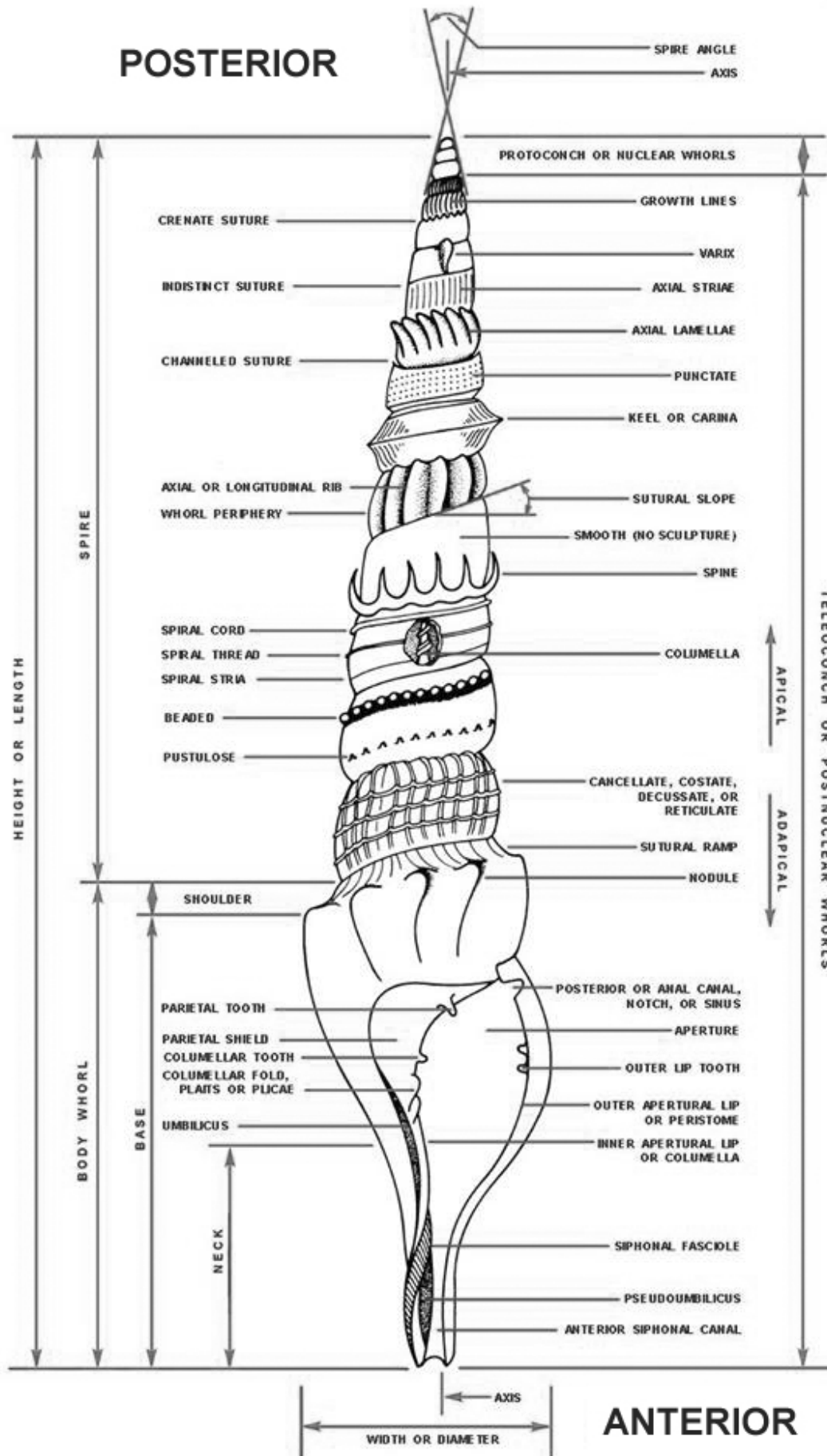
Auto-compiled by Christophe Avon

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Nucella freycinetii (Deshayes, 1839)

MURICIDAE

-250m, Trawled by comm.ercial fisherman, From hardpan bottom among rubble, Monbetsu, Hokkaido, Japan, 2015, 63.4mm.

An extremely variable muricid, *Nucella freycinetii* is a large dogwhelk ranging from northern Honshu, Japan to Kamchatka Peninsula, Russia. The sculpture varies from virtually smooth with only subtle fine striations to tall and elaborate wavy frills (as shown). This is undoubtedly correlated with the environment, with specimens in calmer and deeper waters generally having stronger sculpture. The spire height is also rather variable, but this difference seems to be randomly distributed among populations. A carnivorous and predatory gastropod inhabiting hard rocky bottoms, it appears to have a wide bathymetric range from intertidal down to about -200m deep. Although a comm.on species across its range, the extremely frilled form shown here is mostly restricted to waters deeper than -100m and is rarely seen. Typical shell length around 45mm., extremely large specimens may exceed 70mm. Due to its variability some synonymous names have been proposed in the past, such as *N. alabaster* (Pilsbry, 1907) and *N. saxicola* (Valenciennes, 1846). The name *N. alabaster* refers to heavily sculptured specimens with taller spires and some authors treat it as a subspecies, *N. freycinetii alabaster*.



Scelidotoma vadososinuata (Yokoyama, 1922)

FISSURELLIDAE

-110~120m, By gillnet, Yagi Port, Hirono-cho (Ex Taneichi-machi), Iwate Prefecture, Japan, 2015/x, 52.2mm.

Scelidotoma vadososinuata is a moderately large fissurellid endemic to the Japonic Province with the nominal subspecies native to northern Japan and another subspecies *S. v. hoonsooi* Choe, Yoon & Habe, 1992 known from Korean waters, which supposedly have a much more depressed shell with more distinct imbricated radial sculpture. It is a rare species, partly due to it living well-attached on hard rocks beyond usual diving depths, making it difficult to collect. A grazing gastropod living attached to hard substrates and feeds on algae, it inhabits rather deep water at around -50~200m. Typical shell length around 40mm., extremely large specimens may exceed 60mm. Large specimens in good condition are much sought-after and prized; younger shells less than 20mm. in length usually inhabit shallower water and are collected more often. It was first described in the genus *Emarginula* then soon moved to *Tugalina* and remained there for a long time before being moved again to *Scelidotoma*, its the current genus. The Japanese name ('Wamei') « Koshidaka-Saruawabi » is named in honour of the ship Koshidaka-maru which collected the material for description. It is rather similar to the congener *S. gigas* (Martens, 1881) which lives at a shallower depth and is often confused with it. They can be distinguished by *S. gigas* having a much more elongate and lower shell, as well as generally coarser sculpture. The foot of *S. gigas* is of a darker colouration than *S. vadososinuata* (usually red vs. orange), and the mantle edge is black unlike that of *S. vadososinuata* which is the same colour as the foot.



Very similar to *S. bella* of the western US.



In the fossil record too. Middle Miocene of southern California.



Septa occidentalis (Mörch, 1877)

RANELLIDAE

Dived in shallow water, Boca Raton, Florida, U.S.A., 27.2mm.

The « Pale Triton » is a small but lovely ranellid with an extremely wide distribution in subtropical and tropical waters around the globe. Compared to other species in genus *Septa*, it has a more stout shell with rougher surface. When alive, the shell is covered entirely by a thick periostracum with finely reticulate surface. An uncommon carnivorous and predatory gastropod, it inhabits rubble bottoms of shallow water from low intertidal down to about -50m. A small-sized *Septa* species, its shell length averages at around 25mm, while the largest individuals may exceed 40mm. The Hawaiian population was recognised for some time as a separate subspecies *S. occidentalis beui* (Garcia-Talavera, 1985), but is now considered a synonym by most. In the western Pacific there appears to be a long confusion between this species and the name *Septa limbata* (Röding, 1798), with many specimens of *S. occidentalis* labelled as *S. limbata*. The issue with the name *S. limbata* was in fact discussed and solved by Alan Beu in 1986, who noted that the figure cited in the description is in fact *S. flaveola* (Röding, 1798). As *S. limbata* and *S. flaveola* was described in the same work by Röding and *S. flaveola* was in prevailing use, Beu selected the name *S. flaveola* to be the senior synonym as first reviser and designated a single specimen to be the neotype for both names. In addition, Beu clarified that the only modern use of the name *S. limbata* (as *Tritonium limbatum*) was actually applied to a mis-identified specimen of *Monoplex gemmatus* (Reeve, 1844). Specimens of *Septa* from western Pacific in collections identified as *S. limbata* (often mis-spelt as *S. limberti*; Japanese name Hime-Jyuseira) usually have nothing to do with the name *S. limbata* but are in fact mostly *S. occidentalis* and sometimes either *M. gemmatus* or *M. mundus* (Gould, 1849). Although merely a speculation, treating the western Pacific populations of *S. occidentalis* under a different name probably roots in disbelief that the same species is shared across Pacific and Atlantic Oceans.



Neptunea costaria Fraussen & Terryn, 2007

BUCCINIDAE

-500~550m, Pacific coast of Iturup Island, Kuril Islands, 2014/iv, 72.3mm.

An attractive neptune with numerous deeply carved spiral ridges, *Neptunea costaria* is a cold-water buccinid apparently endemic to the southern Kuril Islands. Although originally described as *Costaria borealis* Golikov, 1977, Koen Fraussen and Yves Terryn after rightly moved it to genus *Neptunea* in their « A Conchological Iconography: Family Buccinidae, Genus Neptunea » (2007). A problem caused by this genus movement was that its scientific name became a junior homonym of *Neptunea borealis* (Philippi, 1850) and thus had to be replaced. The two authors therefore proposed the current replacement name, taken from the original genus assigned by Golikov. A carnivorous and predatory gastropod, it inhabits soft bottoms of rather deep water around -400~600m. It is a very rarely seen species, mostly due to its difficult-to-access distribution range. Typical shell length around 60mm., very large specimens may reach 80mm. It is perhaps most similar to *Neptunea oncodes* (Dall, 1907) ranging from the northern Kuril Islands to Bering Sea, but can be distinguished by its stronger spiral cords and shallower suture.



Coluzea icarus Harasewych, 1986

TURBINELLIDAE

Trawled from deep water, Broome, Western Australia, Australia, 72.4mm.

Characterised by a pure white shell with a single prominent peripheral keel, the « Icarus Pagoda Shell » is a delicate Columbariinae species apparently endemic to the northern part of Western Australia, Australia. The spines on the keel is variable in which direction they point to, from upwards to slightly downwards, as well as in their strength. Although a very attractive species, it is very uncomm.on on the market due to limited supply like other pagoda shells from Western Australia. A carnivorous and predatory gastropod feeding on polychaete worms like other Columbariinae species, it inhabits soft bottoms of upper continental shelf at around -400~600m deep. Typical shell length around 60mm., extremely large specimens may exceed 75mm. It is actually named after Icarus, son of Daedalus, from Greek mythology who famously attempted to escape from Crete by the means of wings made from wax. Icarus failed to follow Daedalus' instructions of not to fly too close to the sun, and fell to the sea due to the wings melting. The reason for naming this species after Icarus was not made clear in the original descrption, however.



Coluzea altocanalıs Dell, 1956

TURBINELLIDAE

-600m, Trawled, Chatham Rise, New Zealand, 80.0mm.

With prominent spiral keels carving out a spire of utmost elegance, *Coluzea altocanalıs* is surely one of the most attractive pagoda shells of all. An endemic species of New Zealand, it inhabits muddy bottoms of deep water around -400~1000m in the upper continental slope of North Island, South Island, as well as along the Chatham Rise. A carnivorous and predatory gastropod, it primarily feeds on polychaete worms like other members of Columbariinae. Perhaps one of the rarest and most sought-after *Coluzea* species, it is very difficult to obtain in fine condition. Generally a little-varied species, in juvenile specimens the peripheral keel appears even more prominent due to the other keels being less developed than in adult specimens. Although the typical shell length is around 80mm., the largest specimens are known to exceed 125mm., making it likely the largest of all pagoda shells.



·Adelomelon riosi Clench & Turner, 1964

VOLUTIDAE

-200m, Trawled, Ilha de São Sebastião, São Paulo State, Brazil, 255.9mm.

A large volutid of solemn dignity, the « Rios' Volute » is a South American volutid ranging from São Paulo State, Brazil to Mar del Plata, Argentina. Once a great rarity, today it has become much easier to acquire and is only uncomm.on. It is very susceptible to encrustation damage from polychaetes and other sessile invertebrates, however, and clean specimens of good size are therefore not easy to obtain. Quite variable in breadth compared to height, some specimens are rather elongate and others are quite stout; though the whorls are always strongly convex. The subgenus *Weaveria* was once erected for just this species based on the thick and deciduous periostracum, surface without zigzag-line pattern, and the strongly convex whorls. In spite of this, it is now clear that it often does carry zigzag pattern especially when young and some other *Adelomelon* species also have the same type of periostracum. *Weaveria* was therefore recently synonymised with *Adelomelon*. A carnivorous gastropod inhabiting soft bottoms of rather deep water around -100~500m, it apparently feeds primarily on echinoderms. Typical shell length around 230mm., extremely large specimens may reach 350mm.



Is comm.un in ocean floors 240-280 m in Brazil between Itajai Santa Catarina-Santos Sao Paulo, hundreds are in collections from the ancient fisheries of toad fish in that area.

Buccinum kurilensis Golikov & Sirenko, 1988

BUCCINIDAE

-450~470m, Trawled, Pacific coast of Urup Island, Kuril Islands, 2016/vi, 74.0mm.

A refined whelk with numerous spiral cords and straw-coloured periostracum, *Buccinum kurilensis* is a cold-water buccinid endemic to the southern Kuril Islands. Two of the many spiral cords are thicker than the rest and are slightly raised to make the spire appear angulated, the extent of which is somewhat variable among individuals. The siphonal canal is often slightly recurved in large specimens. A carnivorous and possibly scavenging gastropod, it inhabits soft bottoms of deep water around -400~700m. An extremely rare species partly due to its difficult to access and narrow distribution range, it virtually never appears on the shell trade market. It is a medium-sized *Buccinum* with a typical shell length around 60mm., although extremely large specimens may reach 80mm.



Very similar to *B. costatum* Golikov, 1980, from the Bering Sea at 600-800 m.

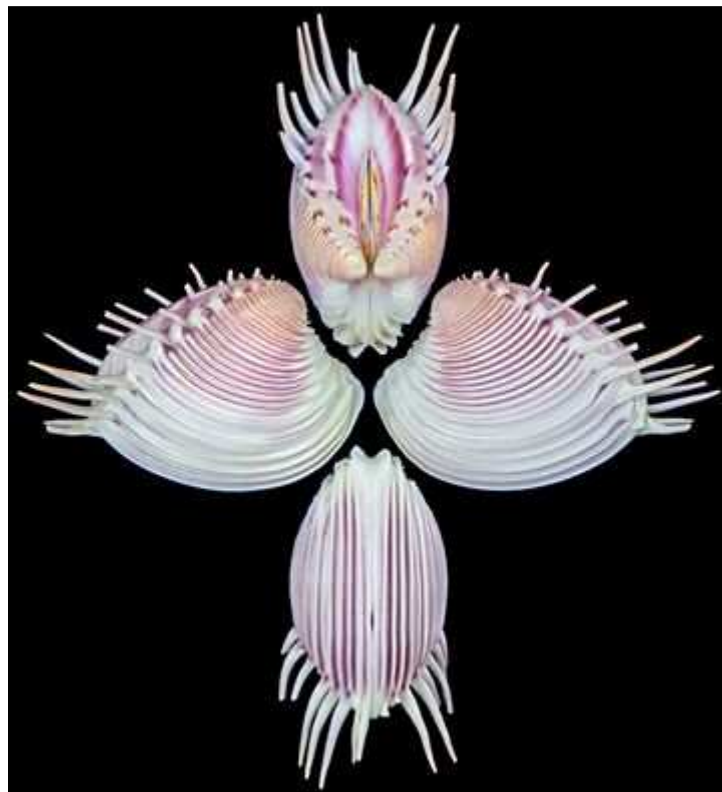


Hysteroconcha dione (Linnaeus, 1758)

VENERIDAE

-3-4m, Dived, Adícora, Paraguaná Peninsula, Falcón Municipality, Venezuela, 52.7mm.

An extraordinary venerid, the delicately lavender « Royal Comb Venus » is one of few non-pectinoid bivalves to possess significant long spines on the shell. The spines project posteriorly in two rows along a ridge running from the posterior margin to the umbo, and are thought to have a protective function guarding the soft siphon from predatory fishes. Although locally a common species the spines are fragile and easily broken, vast majority of specimens have no intact spines left. Specimens with well-preserved spines (as shown) are therefore quite rare and much sought-after by collectors. It is a western Atlantic species ranging from eastern Mexico to Venezuela, most specimens apparently originate from Venezuela. A filter-feeding and bivalve, it lives buried in sandy bottoms of shallow water from low intertidal zone down to about -10m deep. Typical shell length around 30mm. excluding the spines, extremely large specimens may reach 50mm. When describing this species, Linnaeus famously alluded the view from umbo to human female genitalia, which he saw great similarity between, and wrote the description using obscene sexual terms. The obscenity actually increased in the description included in his later work « *Fundamenta Testaceologiae* » (1771) and was criticised by other naturalists such as Emanuel Mendes da Costa. The specific epithet 'dione' apparently refers to the goddess Dione, mother of Venus, in Greek mythology. Initially it was placed in the genus *Venus*, later in *Pitar* for many years, before its current placement in *Hysteroconcha* was accepted. Quite similar in appearance and often confused with its eastern Pacific congeners *H. lupanaria* (Lesson, 1831) and *H. multispinosa* (Sowerby II, 1851). The larger *H. lupanaria* has much longer spines on average but fewer in number, plus the concentric ribs are flat and not raised in the posterior half of the shell; the brown-coloured *H. multispinosa* is smaller and has even denser spines than *H. dione*.



Alcithoe fissurata (Dell, 1963)

VOLUTIDAE

-450~500m, Trawled, Motiti Island, Bay of Plenty, North Island, New Zealand, 2015/xii, 176.8mm.

Alcithoe fissurata is an elegant volutid endemic to the northern half of North Island, New Zealand. Three subspecies are currently recognised, differing in shell morphology as well as geographic and bathymetric ranges. The moderately rare nominal and eastern subspecies *A. f. fissurata* (shown) ranges from Cape Brett to Bay of Plenty and is characterised by a thin and lightweight shell with clearly stepped spire, found in rather deep water around -350~700m. It is also the largest subspecies with the average shell length around 180mm. and the largest specimens exceeding 215mm. The northernmost subspecies *A. f. crassa* Bail & Limpus, 2005 is only known from the northern tip of North Island to Three Kings Islands and is characterised by a wider, thicker, heavier shell attaining a similar size as the nominal subspecies. It occurs at a very shallow depth around -50~80m, and is very rare (described from less than a dozen specimens). The western subspecies *A. f. elegans* Bail & Limpus, 2005 ranges from Ahipara to Cape Maria van Diemen and is characterised by a smooth, less stepped spire, together with a much smaller shell (averaging at around 100mm. shell length, although very large specimens reaching 170mm. are supposedly known). It occurs at moderately deep water around -250~350m and is extremely scarce, only two specimens were known at the time of description and few more have been collected since. Future investigations may prove that these three subspecies are each worthy of species rank in their own right. All are carnivorous and predatory gastropods inhabiting sandy to muddy bottoms. It was originally placed in the subgenus *Palomelon* within the genus *Pachymelon*, until the recent synonymisation of *Palomelon* with *Alcithoe*. *Pachymelon* remains valid but is a fossil genus with only one currently accepted species, *Pachymelon amoriaformis* (Marwick, 1926) from Early Miocene which is a distinctive medium-sized (around 70mm. in shell length) species with an unusually large number of very fine columellar plaits (6~8). All other extant and extinct species previously referred to *Pachymelon* have been moved to *Alcithoe* and the need of retaining the genus *Pachymelon* for *P. amoriaformis* alone is quite debatable.



Gaza superba (Dall, 1881)

MARGARITIDAE

-700m, Trawled, Mississippi River Delta, Gulf of Mexico, Louisiana, USA, 36.4mm.

Characterised by a gorgeously iridescent golden sheen, the « Superb Gaza » is a much celebrated rarity ranging from Gulf of Mexico through to the Caribbean Sea. The apex is deciduous (i.e., naturally falls with growth) and is thus always missing in adult specimens. The outer layer of the shell is slightly variable in colouration from golden to olive and beige, the inner layer is highly nacreous and pearly. The diet and feeding mechanism of genus *Gaza* is not well-known in general, but sand and mud have been found in the digestive tract suggesting they are detritivores that swallow detritus and digest the organic matter within. A deep-water species, it inhabits sandy to muddy bottoms around -400~900m in depth, mostly specimens are collected from about -600m deep. Typical shell diameter around 35mm. with the very largest specimens reaching 45mm. It is conchologically similar to the congener *Gaza olivacea* Quinn, 1991, another large *Gaza* that reaches a similar size, and is often confused with it. However, it can be easily distinguished by its lower spire and the umbilicus being only half-covered by callus (always nearly completely covered in *G. olivacea*).



Spondylus darwini Jousseume, 1882 syn. *pickeringae* Lamprell, 1998

SPONDYLIDAE

-20~30m, Dived in coral reef, Ras Abu Galum, Dahab, Sinai Peninsula, Egypt, 2004, 136.3mm.

Perhaps much better known by the now synonymised name *Spondylus pickeringae*, *S. darwini* is a large spondylid with a limited distribution range restricted to Red Sea and Gulf of Aqaba. Although the name *S. darwini* has been long attributed to an Indo-West Pacific species with dense spines following Lamprell and other authors, recent research suggest that this is a mistake and the densely spined species is actually *S. asperrimus* Sowerby II, 1847. The true *S. darwini*, which Jousseume described with unknown locality, is deemed to be one and the same as *S. pickeringae*. As *S. darwini* was described much earlier, it is the senior synonym and takes precedence as the scientific name. Due to their extremely variable morphology the taxonomy of Spondylidae is constantly in a status of flux and often even chaos. Perhaps only genetic evidence in the future will reveal the true relationships among the various names of *Spondylus*, but of course finding specimens that can be concretely identified to those names to sequence is another issue. A filter-feeding species, it is found around -5~40m deep in coral reefs and lives a sessile life cemented on dead corals. Although locally not uncomm.on, it is quite rare on the shell trade market due to its inaccessible distribution. Characterised by strikingly contrasting white spines and reddish interstices, like many spondylids it is very variable in spine length and thus not easy to find a specimen with well-developed spines in good condition. Typical shell length around 110mm., extremely large specimens may exceed 150mm. The specific epithet is dedicated to Charles Darwin and the better known junior synonym was named for Joan Pickering of the Natural History Museum, London.



Morum macandrewi (Sowerby III, 1889)

HARPIDAE

Sakai, Minabe-cho, Wakayama Prefecture, Japan, 1993/i/31, Coll. Tadashi Ookoba, 41.8mm.

Characterised by relatively few but strongly nodulous and raised varices, the « MacAndrew's Morum » is a symbolic harpid of the Japonic province ranging from Chiba Prefecture, Japan to East China Sea. A classic rarity and much sought-after by Japanese and global collectors alike, even dead shells are rare and live-collected specimens are extremely scarce. It is a carnivorous and predatory gastropod and inhabits coarse sand bottoms of moderate depths around - 30~200m. Very rarely it is found beached after storms, and recently a few live individuals have been sighted by lucky divers. Despite the recent staggering increase in the availability of many species inhabiting East China Sea due to Chinese trawlers the availability of this species has remained virtually unchanged, suggesting that its distribution centre is in Japan and is truly rare in East China Sea. Typical shell length around 40mm., extremely large specimens may exceed 55mm.



Laevichlamys boninensis (Dijkstra & Matsukuma, 1993)

PECTINIDAE

-15m, Dived on coral under rocks, Chichijima Island, Ogasawara Islands, Tokyo, Japan, 2012/vi/21, 43.5mm.

A peculiar pecten of erratic beauty, *Laevichlamys boninensis* lives attached by byssus when young with an ordinary *Chlamys*-like shell but upon reaching a certain size (around 15-20mm.) abruptly changes to a entirely sessile lifestyle and irregular growth by sementing the right valve to hard substrate, mostly corals. An endemic species of Ogasawara Islands (also known as Bonin Islands), Japan, it was first discovered as a single right valve by Dr. Katsura Oyama in 1943. Initially, it was interpreted to be a remote population and a great range extension of *Hinnites corallinus* Sowerby I, 1827. This was due not only to the great similarity in shell morphology, but also largely because the type locality of *H. corallinus* was originally recorded as Eastern Africa, still in the Indo-West Pacific. Later, however, this was found to be an error and the correct type locality of *H. corallinus* was deemed to be southwestern Africa; making it very improbable for the Ogasawara shell to represent the same species. Upon careful re-examination of the morphological characters, it was found to have several key differences from *H. corallinus*, most importantly a 'shagreen' microsculpture on both ears (visible as small white triangles on the images) which *H. corallinus* completely lacks, as well as the much smaller size (up to 55mm. vs up to 150mm.). It was therefore described as a new species in 1993, using a complete specimen from the famous Ryosuke Kawamura collection as holotype. In fact, it is known today that although several species of Pectinidae around the world abruptly changes to semented lifestyle and therefore appear superficially very similar (once known as the 'Hinnites' group), they have evolved independently from various pectinid groups and the similarity is a result of convergent evolution. The 'shagreen' sculpture on the ears is also seen in many other Western Pacific pectinids that have an ordinary *Chlamys*-like shell, and is an important supporting evidence in placing it in *Laevichlamys*, its current genus. A very famous and rarely available species, it is much sought-after by collectors especially in Japan; its apparent rarity is mostly due to the fact that the Ogasawara Islands are very difficult to access and specimens are therefore rarely taken. Individuals vary greatly in growth patterns, many become semi-buried in coral while others remain on the surface and are easy to remove (as shown). A filter-feeding bivalve, it inhabits moderately shallow water around -10~40m. Typical shell length around 35mm., extremely large specimens may exceed 50mm.



Livonia mamm.illa (Sowerby I, 1844)

VOLUTIDAE

In shark nets, Banks Strait, Tasmania, Australia, 268.9mm.

With an unmistakable gigantic protoconch the « False Baler » is a large and iconic volutid endemic to Australia, ranging from Queensland to Southern Australia, including Tasmania. The specific epithet unsurprisingly refers to the exceptionally mamillate protoconch, which is not deciduous and remain attached to the teleoconch throughout the entire life. The holotype specimen is actually a juvenile and the protoconch therefore appeared even more dramatic than in an adult shell. The common name, on the other hand, is a reference to its superficial similarity with species of the genus *Melo*, the true baler shells. The shell is thin and lightweight, usually adorned with two wide bands of 'zigzag' patterns and has an orange aperture. It is however a rather variable species, especially with regards to the pattern, and completely unpatterned individuals are not uncommon. Specimens from Sandy Cape, Queensland, its northern limit, often show finer 'zigzag' patterns and have a much shorter spire resulting in a stouter overall form. Specimens with a white aperture and interior has been given the name *leucostoma* Mayblom, 1951, but the name carries no taxonomic validity as such specimens occur side-by-side with orange-mouthed ones and is merely a colour variation. A carnivorous and predatory gastropod, it inhabits sandy bottoms of moderately deep subtidal waters around -80-400m in depth. Although locally a moderately common species the shell is quite prone to encrusting damage and inclusions, making it very difficult to find a high quality specimen with a clean pattern. Typical shell length around 240mm., extremely large specimens are known to exceed even 310mm. Surprisingly perhaps, hybrids appear to exist between it and the much smaller sized congener *Livonia roadnightae* (McCoy, 1881). Such supposedly hybrid specimens carry characteristics of both species and was originally described as a new species *Livonia quisqualis* Iredale, 1957. These are extremely rare and only a few have been discovered so far.



Stirpulina ramosa (Dunker, 1882)

CLAVAGELLIDAE

-100m, Kominato, Kamogawa, Chiba Prefecture, Japan, 61.2mm.

A truly eccentric and extraordinary bivalve, *Stirpulina ramosa* is a 'watering-pot' clavagellid that during development stops growing its bivalved shell and abruptly switches to growing a calcareous tube. Although an array of other superficially similar genera such as *Brechites* and *Nipponoclava* are known in the superfamily Clavagelloidea, recent researches have revealed that the bizarre life style of building an adventitious tube and living buried in the sand in fact evolved twice within the superfamily Clavagelloidea, once in Clavagellidae and once in Penicillidae. All other such genera belong to the Penicillidae radiation, and *Stirpulina ramosa* is the only extant member of the genus. This makes it the only surviving endobenthic tube-dwelling clavagellid in the world, a remnant species from Late Cretaceous and a « living fossil ». All other living clavagellid species live a sessile life cemented to hard substrates and do not live buried in sand. A clear difference from the penicillids is that it only has the left valve cemented to the calcareous tube, whereas all tube-building penicillids have both valves cemented. The right valve remain free and mobile within the tube. Another difference is that the 'watering-pot' end of the tube consists of bifurcating tubules, a feature not seen in the 'watering-pot' of penicillids. An endemic species of Japan inhabiting sand and gravel bottoms -50~200m deep south of Chiba Prefecture, it is a filter-feeder and the tip of its tube is always protruded slightly from sand to access sea water. A very uncommon species, usually only shattered empty tubes are collected; live-collected specimens are extremely scarce. The only recorded specimen with soft parts preserved was housed in the collection of Emperor Shōwa Hirohito, and this was dissected by the eminent malacologist Prof. Brian Morton in order to reveal the anatomical differences with penicillids. Typical length of the adventitious tube around 70mm., extremely long tubes may exceed 100mm.



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Cylindrus bengalensis (Okutani, 1968)

CONIDAE

-80~120m, Trawled, Racha Island, Phuket, Thailand, 2016/i, 113.4mm.

With a glorious textile-like tent pattern the « Bengal Cone » is an exceedingly famous conid ranging from Andaman Sea to Bay of Bengal, reaching southeastern India. Once exceedingly rare and most sought-after, today it has become much easier to obtain and is considered only uncomm.on. Large, perfect specimens are however still rarely seen and much treasured. A carnivorous and predatory gastropod feeding on polychaete worms, it inhabits sandy to muddy bottoms of moderate depths around -50~150m deep. Typical shell length around 100mm., extremely large specimens may exceed 140mm. Although it resembles the closely related congener « Glory-of-the-Sea » *Cylindrus gloriamaris* (Chemnitz, 1777) and was thought to be a local form of it when initially discovered, it can be distinguished relatively easily by its taller spire, narrower shoulder, and larger tent-like patterns. From this similarity, it is also known as the « Glory-of-Bengal ». One of the most beautiful species described by the eminent Japanese malacologist Prof. Takashi Okutani, it remains one of his favourite species of all time.



Alcithoe benthicola (Dell, 1963)

VOLUTIDAE

-500~600m, Dredged, north side of North Island, New Zealand, 2015/xii, 245.8mm.

Characterised by an exceptionally graceful tall spire *Alcithoe benthicola* is the largest of all extant species of *Alcithoe*, a volutid genus largely restricted to New Zealand. No exception to the majority, it is an endemic species of New Zealand and has a narrow distribution limited to the northern side of North Island, northward from Bay of Plenty. A carnivorous and predatory gastropod, it inhabits muddy substrates of deep water around -400~800m in depth. Dell gave it the name 'benthicola' in recognition of its very deep distribution. Typical shell length around 200mm., although the most extreme specimens are known to exceed 270mm. A well sought-after rarity among the New Zealand volutes partly due to its large size, it is very difficult to obtain a decent and large specimen over 240mm. as shown. Although the ventral (i.e., aperture) side is usually clean, the dorsum side of adult individuals is always covered in dark deposits and circular marks. In fact these are not due to damage or contamination in shell formation, but instead is the attachment scar of its egg capsules. This intriguing behaviour is apparently unique to this species among all extant *Alcithoe* species. It seems that a dwarf population rarely exceeding 150mm. apparently exists Poor Knights Islands, further research may justify this population as a valid subspecies or even a distinct species.

Shell has 21 circular marks. The dorsum side of adult individuals is always covered in dark deposits and circular marks.



Tudivasum zanzibarica from Tanzania, 48.9mm.



Cantrainea panamensis (Dall, 1908)

COLLONIIDAE

-800m+, Trawled on muddy bottoms, Constitucion, Maule, Talca Province, Chile, 21.8mm.

Cantrainea panamensis is a large and handsomely sculptured colloniid characterised by a strongly angulate shoulder and numerous spiral cords of various strength. Rather widely distributed in the eastern Pacific ranging from Baja California to Chile, it is an omnivorous detritus layer grazer inhabiting soft bottoms of deep water around -400~1100m in depth. It is a cold-seep associated gastropod reported from the Concepción Methane Seep Area in Chile, although it also occurs in regular non-chemosynthetic seafloor. It is quite a rarity especially large specimens complete with the calcareous operculum, although in the methane seep site it is apparently locally quite comm.on. It is quite variable in the number of weak spiral cords, but the general profile is little-varied. Typical shell length around 15mm., very large specimens may exceed 25mm.



Turriconus excelsus (Sowerby III, 1908)

CONIDAE

-120~150m, By tangle net, Panglao Island, Bohol, Philippines, 2004/iii, 84.0mm.

The « Illustrious Cone » is one of the most coveted rare cones of all, and surely one of the most attractive. It is characterised by a tall, stepped spire and is unmistakable among all known conids. A famous species included in S. Peter Dance's fifty « Rare Shells » (1969), only three specimens were known then and none of them fresh. It has a wide distribution range in the Indo-Pacific ranging from Burma to Philippines to Japan to northern Australia to Solomon Islands. The type locality is New Caledonia, which was for a long time considered to be a mistake but recently some dead shells have been collected there, confirming its occurrence. Most specimens seen on the market today comes from Balut and Aliguay islands of Philippines. A predatory gastropod feeding on polychaete worms, it inhabits rather deep water of about -100~400m in depth. Average shell length around 75mm., gigantic specimens may exceed 110mm. Its colour and pattern are both quite variable and the now synonymised name *T. nakayasui* (Shikama & Habe, 1968) was given to a form with less patterns than usual.



Buccinum bombycinum Dall, 1907

BUCCINIDAE

-600~650m, From muddy bottoms by traps, Yaizu, Shizuoka Prefecture, Suruga Bay, Japan, 2016/iii/15, 47.0mm.

Buccinum bombycinum is a small cold-water whelk With an exceptionally glossy and smooth periostracum for the genus. Although the supposed documented distribution range is from Sakhalin, Russia to Suruga Bay, Japan, virtually all specimens have surfaced from Suruga Bay, especially Yaizu. A rare species, it is much sought-after by collectors especially in Japan and it is very difficult to obtain a specimen from outside Japan. A carnivorous and scavenging gastropod, it inhabits muddy bottoms of deep water around -350~800m in depth. Most specimens are taken by bait-traps aimed at either whelks or crabs, although some have surfaced as by-catches of fisheries targeting hagfish and other deep-water fishes. Typical shell length around 40mm., extremely large specimens may exceed 50mm. Apparently it is one of the most delicious *Buccinum* species, despite its rarity and small size. Numerous spiral threads are present on the shell surface in two sections, the strength of these vary to some extent among individuals.



Perisserosa guttata (Gmelin, 1791)

CYPRAEIDAE

-100~200m, By tangle nets, Tinina, Balut Island, Mindanao, Philippines, 2015/xii, 64.5mm.

The « Great Spotted Cowrie » is a lovely classic rarity among cypraeids characterised by circular bright spots on the dorsum and long tooth on the base extending to the dorsum as marginal lines. One of S. Peter Dance's fifty « Rare Shells » (1969), only sixteen were known by 1963 according to a list of known specimens published then by Woodward and it was exceedingly rare until the late 1900s. Today it is known to be a widely distributed species ranging from Maldives to Japan to Philippines to Queensland, Australia; it is very variable and several forms / subspecies names are currently being used. The nominal subspecies occurs from Philippines to Queensland and is uncomm.on, best known from moderate depths around -25~100m in the Philippines where specimens with clear large spots are taken by diving or tangle netting. The form *azumai* (Schilder, 1960) is a northern form of *guttata* with smaller indistinct spotting and often lacking the labral blotch known from Japan and East China Sea; in recent years the Chinese trawlers are producing a huge quantity of this form from the East China Sea making it very comm.on and inexpensive, but most specimens are quite poor. The form *bicallosa* (Raybaudi, 1985) refers to an angular form with well-developed white callous on both sides best known from Philippines. It is extremely rare in Queensland, its southern limit, and the specimens from here (usually deeper water around -150~300m) may represent a real subspecies; although not formally named these are often referred to as « *queenslandica* » on the market. The only widely accepted subspecies except the nominal *guttata guttata* is the uncomm.on Indian Ocean subspecies *guttata surinensis* (Raybaudi, 1978) from deeper waters (-100~300m) of Maldives to Thailand; characterised by an depressed oval shape, fine spots, darker and larger basal blotches, and much longer marginal lines. It is an omnivorous gastropod often inhabiting crevices of rocky walls, emerging at night to feed on a mixture of sessile invertebrates (such as bryozoans and sponges) and algae. Extremely variable in size, the typical shell length is around 55mm. but specimens smaller than 35mm. and larger than 85mm. are known to exist; specimens less than 45mm. or over 70mm. are rather rare. It is still one of the most sought-after cowries today, giant dark specimens with large well-defined spots are perhaps the most coveted although an ideal specimen is still very difficult to obtain.



Tenagodus ponderosus Mörch, 1861

SILIQURIIDAE

-15m, Dived inside sponge, Albany, Western Australia, Australia, 2003/xii, 94.5mm.

The « Ponderous Worm Snail » is a bizarrely coiled siliquariid with regularly coiled early whorls abruptly changing to an uncoiled tube. An obligatory sponge commensal, it spends the entire life within the body of the host sponge which provides shelter and protection. It is a filter-feeder and feeds by drawing water in through the aperture, filtering food particles using the ctenidium (gill), and finally discharging the filtered water through the slit. The reason for the uncoiled growth is to catch-up with the host's growth, as to effectively filter-feed its aperture needs to be situated at the surface of the sponge. The coiling characteristics therefore varies among individuals, largely influenced by the host's growth patterns. Usually a number of specimens are found together inside a single host sponge. There is a corneous operculum heavily sculptured with opercular bristles, an important taxonomic character in Siliquariidae where the shell characteristics are in many cases too variable to be useful below genus level. It inhabits shallow subtidal waters down to about -50m and ranges from the Arafura Sea to western and northeast Australia, though the actual distribution may be slightly wider. It is very similar in general appearance to the Atlantic species *T. senegalensis* (Sowerby II, 1876) as well as the Mediterranean species *T. obtusus* (Schumacher, 1817), but is usually readily distinguishable by the slit morphology -- the slit of *T. ponderosus* is a series of elliptical holes on the coiled whorls then gradually becoming denticulated and then finally smooth-sided at the uncoiled part, whereas that of *T. senegalensis* and *T. obtusus* is smooth-sided without denticulation throughout the entire teleoconch. Its shell is also slightly thinner and generally contain less significant cracks compared to *T. senegalensis* and *T. obtusus*. Many authors actually consider *T. senegalensis* and *T. obtusus* to be synonymous, although this is still a topic of debate. Typical shell length around 100mm., extremely large specimens may exceed 200mm. Although a common species, it is rather difficult to find a well-sized specimen in good condition on the shell trade market. For many years it was placed in the genus *Siliquaria*, until Bieler rendered it as an objective synonym of *Tenagodus* in 1992.



Homalopoma eoa Azuma, 1972

COLLONIIDAE

-400m, Trawled, Punta Engano, Lapu-Lapu City, Mactan Island, Philippines, 2016/iii/31, 12.3mm.

Vivid and brilliant like a jewel the « Dawn Turban » is one of the most prestigious rarity among turban shells and their allies. First discovered from South China Sea and once thought to be endemic to Taiwan, it was subsequently also found Izu Islands, Japan and later in the Philippines. A large *Homalopoma* with a beautiful wholly bright red shell characterised by numerous axial ribbing, it was made famous by T.C. Lan who included it in his monumental work « Rare Shells of Taiwan » (1979). Most specimens of the early days have surfaced as by-catches of Taiwanese coral fisheries, though this supply has effectively stopped. Today it remains extremely scarce across its range, especially live-taken specimens. Most likely an omnivorous detritus layer grazer, it occurs in deep water around -200~500m. It is little-varied in conchological characters except that the axial ribbing may vary in strength and frequency. Typical shell length around 12mm., very large specimens may exceed 15mm. The specific epithet 'eoa' is apparently derived from Eos, the rosy-armed goddess of the dawn in Greek mythology; as its radiant hue is reminiscent of the colour of daybreak. *Homalopoma striatum* Suzuki, 1972 is a synonym, the name being inspired by the axial ribs.



Ginebis japonica (Dall, 1925)

CALLIOTROPIDAE

-180~200m, Uraga Channel, « Uchibo », Chiba Prefecture, Japan, 2016/iv/04, 27.6mm.

With a brilliant silvery hue *Ginebis japonica* is a rather rare calliotropid endemic to Japan, with a distribution range from Sagami Bay to Tosa Bay. A detritivorous gastropod that feeds by swallowing sediment and digesting the organic matter within, it inhabits sandy to muddy bottoms of rather deep water around -150~800m. Very similar to and often confused with its much more comm.on sister species *Ginebis crumpii* (Pilsbry, 1893), but differs from it by having three rows of strong tubercles instead of two. Furthermore, in *G. japonica* the tubercles are more numerous, and in mature specimens the outer lip is more flared. Typical shell length around 30mm., extremely large specimens may exceed 40mm. The genus name *Ginebis* is taken directly from Japanese and literally means « silvery top shell ».



From Sagami Bay, 300-350m in depth.



Niso splendidula (Sowerby I, 1834)

EULIMIDAE

-35~70m, Dredged, Gulf of Chiriquí, Panama, 23.1mm.

The superbly patterned « Splendid Niso » is a truly amazing member of Eulimidae, which are comm. only much smaller in size and lack significant pattern. Due to its beauty it is one of few eulimid species highly coveted by shell collectors. An uncomm. on species, it ranges from Gulf of California to Ecuador and inhabits sandy bottoms of moderate depths around -20~80m deep. Members of Eulimidae exclusively parasitise various echinoderms and live on the host's body fluid. The genus *Niso* is known to parasitise starfish (Asteroidea) and although the host species of *Niso splendidula* is not known, it is not considered to be an exception from this mode of feeding. Like other species of *Niso*, it is most likely hemiparasitic and spends most of its time free-living and only attach to the host when feeding. A ptenoglossate radula is present, unlike many other eulimids. Typical shell length around 25mm., extremely large specimens sometimes exceed even 40mm.



A collection of Columbarium species.



Scutellastra mexicana (Broderip & Sowerby I, 1829)

PATELLIDAE

Low tide, On large boulder, Barra de Navidad, Jalisco, Mexico, 205.5mm.

With large individuals often exceeding 200mm. in shell length the massive « Giant Mexican Limpet » is the largest of all living limpets. Ranging from western Mexico to Peru, it is the only *Scutellastra* species found in the eastern Pacific. An algae-grazing herbivorous gastropod living attached on hard substrates, it occurs from low tide to shallow subtidal waters down to about -10m. Although it used to be a comm.on species widely used as a local delicacy in dishes such as ceviche, overharvesting led to a great population decline and was apparentl close to extinction across parts of its range in Mexico. Today it is uncomm.on to rare at the typical shell length around 150mm. or less, large specimens exceeding 200mm. are very rarely found. It is said that the largest examples may attain a colossal 350mm. The shell is characteristically rostrated and oval-shaped, it is also exceptionally thick and can easily withstand an adult human being standing on it. Although large specimens appear featureless due to erosion and encrustation, it carries numerous major and minor dorsal radial ribs which is much more clearly seen in young individuals.



Look how big it is!



Neptunea contraria (Linnaeus, 1771)

BUCCINIDAE

-150~250m, Trawled, northwest coast of Portugal, 2004/x, 89.3mm.

The « Left-Handed Neptune » is a peculiar buccinid that is normally sinistral or coiled left-handed, hence the name. An eastern Atlantic to Mediterranean species, it ranges from Spain to Portugal to Morocco. It inhabits a rather wide bathymetric range of around -100~800m deep and is known to live deeper in the southern part of its range. It is a comm.on carnivorous gastropod throughout its range. Although generally little-varied and cannot be mistaken with any other species, it is greatly variable in size. Typical shell length is around 100mm., but very large individuals may attain 190mm. The colouration is also variable and ranges from white to dark brown. Two well-known synonyms include *perversus* Kiener, 1840 and *sinistrorsus* Deshayes, 1832, both also refer to the reverse-coiling characteristic in this species.



Adelomelon beckii (Broderip, 1836)

VOLUTIDAE

-50~80m, Trawled, Mar de Plata, Buenos Aires Province, Argentina, 400.2mm.

A colossal volutid, the « Beck's Volute » ranges from Espiritu Santo, Brazil to Tierra del Fuego, Argentina and is the largest volute of South America. Due to its large size, it is recently growing in importance as seafood locally and the shell is a popular decorative item. A carnivorous and predatory gastropod feeding chiefly on other gastropods and bivalves, it inhabits soft bottoms of moderate depths around -20~80m and is locally comm.on. Typical shell size around 300mm., extremely large specimens may exceed even 490mm. Specimens are very prone to damage from encrusting polychaete tubes and barnacles, large specimens with clean surface are very difficult to obtain. The large protoconch is characterised by a sharp protrusion posteriorly. It often carries irregular 'lightning' patterns of ziczac lines, but the occurrence of these is highly variable and many specimens lack any significant patterning. The outer lip flares slightly in geronic specimens.



Margarites rossicus (Dall, 1919)

MARGARITIDAE

-100~150m, Trawled, Sea of Okhotsk, Russia, 1990/vii, 28.4mm.

The « Pearly Margarite » is a brilliantly iridescent margaritid occurring from Hokkaido, Japan to Sakhalin, Russia in the Sea of Okhotsk. The surface layer of its shell is dull grey, but this layer is usually heavily corroded to reveal the pearly nacreous layer beneath (as shown). A generalist gastropod feeding by grazing and swallowing detritus, it inhabits a rather wide bathymetric range around -100~550m deep. An uncommon to rare species it is only very occasionally offered in the shell trade market, although it is evidently not uncommon in its natural habitat. Typical shell length around 25mm., extremely large examples may reach 35mm. It was once treated by many as a calliostomatid in the genus *Otukaia* due to the superficial similarity in the shell, but currently the initial assignment by Dall in *Margarites* is deemed correct.



Pteropurpura falcata (Sowerby II, 1834) f. *adunca* (Sowerby II, 1834)
MURICIDAE

-50m, Hota, « Uchibo », Chiba Prefecture, Japan, 2016/iii/18, 55.0mm.

The spectacularly winged « *Adunca Murex* » ranges from Hokkaido, Japan to Korea to Taiwan. It is a very variable species with regards to the number of varices per whorl, development of varices, and the significance of spiral cords. The number of varices, especially, may vary from three to six per whorl. This led to a few synonyms being generated for the various forms. The name *P. falcata* was once reserved for those specimens with few varices per whorl, with well-developed wings, and lacking strong spiral ribs. The most famous synonym is undoubtedly *P. adunca* (Sowerby II, 1834), originally applied to specimens with more numerous varices and conspicuous spiral cords. For a very long time *P. adunca* was treated as a separate species in its own right until Houart & Sirenko synonymised it with *P. falcata* in 2003. Currently it is often used as a form name (like here), some still retain the opinion that the two are separate species. A carnivorous gastropod feeding mostly on bivalves, it inhabits hard substrates of moderate depths around -20~80m. Typical shell length around 45mm., very large specimens exceeds 70mm. Although not uncomm.on, it is rare to find large specimens with wide varices in good condition.



Pteropurpura falcata (Sowerby II, 1834) f. *adunca* (Sowerby II, 1834)

MURICIDAE

-50m, Hota, « Uchibo », Chiba Prefecture, Japan, 2016/iii/18, 56.0mm. / 55.0mm.

The spectacularly winged « *Adunca Murex* » ranges from Hokkaido, Japan to Korea to Taiwan. It is a very variable species with regards to the number of varices per whorl, development of varices, and the significance of spiral cords. The number of varices, especially, may vary from three to six per whorl. This led to a few synonyms being generated for the various forms. The name *P. falcata* was once reserved for those specimens with few varices per whorl, with well-developed wings, and lacking strong spiral ribs. The most famous synonym is undoubtedly *P. adunca* (Sowerby II, 1834), originally applied to specimens with more numerous varices and conspicuous spiral cords. For a very long time *P. adunca* was treated as a separate species in its own right until Houart & Sirenko synonymised it with *P. falcata* in 2003. Currently it is often used as a form name (like here), some still retain the opinion that the two are separate species. A carnivorous gastropod feeding mostly on bivalves, it inhabits hard substrates of moderate depths around -20~80m. Typical shell length around 45mm., very large specimens exceeds 70mm. Although not uncomm.on, it is rare to find large specimens with wide varices in good condition.



Livonia nodiplicata (Cox, 1910)

VOLUTIDAE

-50~100m, Trawled on sand and gravel bottom, Augusta, Western Australia, Great Australian Bight, Australia, 345.5mm.

The magnificent « Cotton's Volute » is an extremely large volutid endemic to southern and western Australia. It is characterised by and well-known for its deciduous bulbous protoconch, which naturally breaks after the animal reaches a certain size. This differs from all other recent *Livonia* species, leading Iredale to propose a new genus *Cottonia* for it in 1934; although this is now generally understood to be unnecessary and is treated as a synonym of *Livonia*. To be exact, Iredale established *Cottonia* for a famous junior synonym of it -- *Scaphella dannevigii* Verco, 1912. Sometimes a part of the protoconch remains (as shown) to adulthood, and extremely rarely adult specimens with complete protoconch are found. A carnivorous gastropod, it inhabits sand and gravel bottoms across a rather wide bathymetric range from subtidal waters as shallow as -5m to a depth of -200m. Many large specimens are dived or fished in relatively shallow water below -50m deep. Although not uncomm.on locally, large and perfect specimens are costly to obtain on the shell trade market. Typical shell length around 320mm., extremely large specimens may exceed 390mm.



Calyptogena (Akebiconcha) kawamurai (Kuroda, 1943)

VESICOMYIDAE

-300~350m, Trawled on mud by fisherman, Choshi, Kashima-Nada, Chiba Prefecture, Japan, 2009/iii/20, 150.1mm.

Calyptogena kawamurai is a large vesicomylid clam endemic to Japan. Originally described from a single specimen taken by longline from -180m in Sagami Bay, it was later found as far north as Kashima-Nada. In 1992, another *Calyptogena* species was described from the shallowest hydrothermal vent known in the Okinawa Trough, Minami-Ensei Knoll, as *C. solidissima* Okutani, Hashimoto & Fujikura, 1992. Although this was very similar to *C. kawamurai*, the authors found very fine and regular radial threads on both valves and used that as the main diagnostic character. As deep-sea research progressed in Japan, *Calyptogena* specimens identified as *C. solidissima* was found in a number of methane seeps in Suruga Bay and Okinawa, but these specimens did not have any radial threads and were therefore not significantly different from *C. kawamurai*. These observations led to a study in 2006 by Prof. Shigeaki Kojima and colleagues who used molecular phylogeny and population genetics to study populations of *C. kawamurai* and *C. solidissima*, discovering that the two were genetically indistinguishable and shell characteristics overlap. In fact, some specimens from Minami-Ensei Knoll also lacked fine radial threads. Following these results, the authors concluded that *C. solidissima* should be treated as a junior synonym of *C. kawamurai*. *Calyptogena kawamurai*, therefore, has a distribution range from Kashima-Nada to Okinawa within Japan, and is notable for being able to inhabit both methane seeps and hydrothermal vents (probably also reducing sediments for the shallower populations). The shallowest *Calyptogena* species in Japan it may be found as shallow as -100m, although vast majority are found at a depth from between -300~900m. A chemosymbiotic bivalve, it has a much enlarged gill housing chemosynthetic endosymbionts and relies on these for nutrition. Unlike other *Calyptogena* species, its comparatively shallow habitat means it is sometimes caught as a by-catch in trawl fisheries, especially spider-crab fisheries, and such specimens are often offered to collectors. As it requires patchily distributed reducing environments such fortunate catches remain very scarce, and it remains a highly desirable shell of great rarity especially for Japanese collectors. Typical shell length around 110mm., extremely large specimen such as the one shown may exceed 150mm. The monotypic genus *Akebiconcha* was erected for it in the original description; although often treated as a subgenus some authors consider it to be still worthy of a full genus. The name *Akebiconcha* draws attention to the similarity between its shell and the fruit of the plant genus *Akebia*, a traditional fruit in Japan which is simply called « Akebi » in Japanese. Accordingly, in Japan it is known as the « Akebi Shell ».



From Suruga Bay, 118.3mm.



Gaza olivacea Quinn, 1991

MARGARITIDAE

±500m, Trawled, Guajira Peninsula, Colombia, 2010, 43.5mm.

Gaza olivacea is a superbly iridescent Atlantic margaritid ranging from the Caribbean Sea to Rio de Janeiro, Brazil. A very large and attractive *Gaza*, it is a classic rarity and highly coveted by collectors but its availability is very scarce in good condition. A deep-water species, it inhabits sandy to muddy bottoms around -300~700m in depth. The diet or mode of feeding is not well-known for the genus *Gaza* in general, although sand and mud have been found in the digestive tract which suggest they swallow detritus and digest the organic matter within. Typical shell length around 35mm., extremely large specimens may exceed 45mm. The apex is deciduous and is always missing in adult specimens. It is sometimes confused with the conchologically similar *Gaza superba* (Dall, 1881) which reaches a similar size, but can be easily distinguished by its taller spire and the umbilicus being nearly completely covered by callus (only half covered in *G. superba*).



Ecphora quadricostata (Say, 1824)

MURICIDAE

Pliocene Epoch, Neogene; Lower Yorktown Formation, Beaufort County, North Carolina, U.S.A. (4.5 to 4.3 million years ago), 2000/vi, 50.0mm.

With truly astonishing sculpture the « Four-ridged *Ecphora* » is an extinct muricid and is certainly one of the most phenomenal fossil Cenozoic gastropods. As the name suggests it is characterised by four very strong spiral ribs on the body whorl, which are closer spaced in smaller specimens. Due to its beauty it is a much sought-after species by both fossil and shell collectors alike, and is a popular target for fossil hunting in the formations where it is found. Fragments are comm.on, intact specimens are quite uncomm.on. Presumably it was a carnivorous and predatory gastropod inhabiting shallow waters and mainly feeding on bivalves. Typical shell length around 60mm., extremely large specimens may exceed 110mm. Rather unfortunately, this remarkable species had a convoluted taxonomic history due to much confusions in localities of its type material. When Thomas Say described this species (as « *Fusus 4-costatus* », interestingly) he listed the type locality as Miocene, Maryland; but it was later discovered that most of his materials actually originated from Pliocene Yorktown Formation, Virginia. More confusingly however, a specimen matching the original drawing could not be found from Say's existing Virginia materials and evidences suggested the specimen actually came from Pliocene, South Carolina. Unable to find the holotype, a lectotype from Pliocene, Yorktown, Virginia has been selected. Eitherway, *E. quadricostata* is now restricted to the Pliocene strata ranging from Virginia to Florida, U.S.A. This caused a problem because this meant *Ecphora* specimens truly from Miocene, Maryland was still without a name, but it is Maryland's Official State Fossil (as *E. quadricostata*, of course). Finally, the Miocene species from Maryland was named *E. gardnerae* in 1987 by Druid Wilson and following that the name of Maryland's State Fossil was also corrected in 1994. *Ecphora gardnerae* was once thought to be the earliest illustrated American fossil in the published literature (by Martin Lister in 1770), but this honour actually goes to *Chesapecten jeffersonius* (Say, 1824) which was illustrated in 1687, strange enough also by Lister. The entire genus *Ecphora* has gone extinct by the Late Pliocene.



Acreuciroa rostrata (Jaeckel & Thiele, 1931)

EUCIROIDAE

-300~500m, Trawled, Taishou-jima (i.e., Sekibi-sho), Senkaku Islands, 2016, 56.1mm.

The « Rostrate Euciroa » is a large Western Pacific euciroid ranging from the southern half of Japan to around Indonesia. Its shell has a very thick nacreous inner layer concealed only by a rather thin external layer, often worn near the apex (as shown) revealing the stunningly beautiful prismatic iridescence below. Used to be quite a rarity but in the recent years specimens have become much more readily available from Chinese trawlers working in the East China Sea, rendering it to no more than uncomm.on. A carnivorous and predatory bivalve inhabiting sandy to muddy bottoms of quite deep water around -200~600m, it predominantly feeds on small arthropods and polychaete worms. Typical shell length around 45mm., extremely large specimens may exceed 60mm. It is the type species and currently the sole species in the genus *Acreuciroa*.



Pionoconus gauguini (Richard & Salvat, 1973)

CONIDAE

Marquesas, French Polynesia, 2012/x, 70.4mm.

With a very limited distribution range from Marquesas Islands to Tahiti and Society Islands, the « Gauguin's Cone » is one of many stunning conids endemic to the French Polynesia. An uncommon to rare species, it is much coveted by shell collectors and commands high prices in the shell trade. A carnivorous and predatory gastropod that actively hunts polychaete worms, it inhabits sand to rubble bottoms of coral reefs around -15~40m deep. It is nocturnal and spends daytime buried in sand under slabs of rocks or coral. The colouration varies from light pink to dark purple, brown to black blotches of various sizes are sometimes present. Typical shell length around 65mm., extremely large specimens may exceed 90mm. It is conchologically very similar to *Pionoconus barthelemyi* from western to central Indian Ocean, despite the great distances separating the two. Compared to *P. barthelemyi*, *P. gauguini* has a smoother shell surface and a more sharply carinate shoulder. Furthermore, the surface colouration of *P. barthelemyi* is generally orange to red whereas it is pink to violet in *P. gauguini*.



Stylobates aeneus Dall, 1903

ACTINIIDAE

-600m (-2000ft.), From shrimp traps, northern Oahu Island, Hawaii, USA, 2003/iii, 56.7mm.

Superficially, the « shell » of *Stylobates aeneus* looks exactly like a gastropod shell, complete with an umbilicus. Quite understandably, it was initially described by Dall as a trochid. It is however not produced by a mollusc at all -- instead it is the work of a rather rare shell-forming actiniid sea anemone (Cnidaria: Anthozoa) capable of secreting a proteinaceous « shell » made of chitin, termed « carcinoecium » (i.e., « house of crustacean »). After examining further specimens, Dall realised his mistake and published a short note in 1919 to correct his erroneous phylum placement. A deep-water anthozoan, it inhabits sandy bottoms around -400~800m deep and lives obligately in association with hermit crab hosts, the host species being *Sympagurus dofleini* (Bass, 1912). This is considered to be a case of mutually beneficial symbiosis: by living on the back of hermit crabs, *Stylobates* gains a means of transportation as well as food scraps from the hermit crab; while the hermit crab gains protection from predators by the sea anemone's nematocysts (stinging cells). Members of the genus *Stylobates* (four described so far) are the only sea anemone known to have the capability of producing entire « shells » for their hermit crab hosts, although some others are known to extend the existing shell slightly. Still, *Stylobates* must first settle on an existing gastropod shell, from where it starts the shell making process. Therefore at the apex of the carcinoecium a true gastropod shell can always be found. Being able to make a shell for the host means the hermit crab no longer needs to find replacement shells as it grows, thus forming life-long relationships with the sea anemone. *Stylobates aeneus* was originally described from Hawaii but its distribution is now known to reach Guam. Specimens collected in Japan are generally also referred to *S. aeneus* and share the same host species, *Sympagurus dofleini*, but these differ in some aspects of the morphology and may represent a different species. Typical width of the carcinoecium is around 50mm., very large specimens may reach 80mm. Fresh carcinoecia are gold to bronze in colouration but over time those preserved dry often darkens and conversely specimens fixed in alcohol may lighten. The carcinoecium is very thin and fragile as it does not possess a calcium carbonate layer, to the extent that it often collapses when the host hermit crab is removed. Intact specimens of the carcinoecia are therefore rarely seen.

Mirapecten cranmerorum (Waller, 1986)

PECTINIDAE

-150~200m, Trawled, Somalia, 2008/x, 71.2mm.

Mirapecten cranmerorum is a gorgeous pectinid endemic to waters eastern Somalia. A greatly coveted rarity and collector's item, much of its apparent scarcity now is due to its limited distribution in the Somali waters where piracy is a real threat. Once ago it was only uncommon and much less costly to obtain, when occasional supplies brought considerable numbers to Europe. Sparse scales are present only on the left valve, which is usually darker coloured and slightly more convex compared to the right valve. The colouration varies slightly from orange to red and the patterning differs among individual specimens. A filter-feeding bivalve, it inhabits hard bottoms on moderately deep waters around -80~200m. Typical shell length around 60mm., very large specimens may exceed 80mm. A new genus, *Somalipecten*, was proposed for it as part of the original description but this is now considered to be a junior synonym of *Mirapecten*.



Neocancilla takiisaoi (Kuroda, 1959)

MITRIDAE

-20~30m, Dived, Zampa-misaki (Bolo Point), Okinawa Island, Japan, 2002/x, 50.0mm.

With a wonderful combination of triangular 'tent' pattern and cancellate sculpture, the unmistakable « Isao Taki Mitre » is one of the most exquisite mitrids in the world. Widely distributed in the Western Pacific ranging from Japan to New Zealand to as far east as Pitcairn Islands, its type locality is Hachijō-jima, Japan and most specimens appear to originate from either southern Japan or New Caledonia. Its beauty and the fact that it is a very scarce species makes it one of the most desired mitres of all, made famous by featuring in « World Seashells of Rarity and Beauty » (1991) depicting a shell from the R. Kawamura collection, as well as T.C. Lan's « The Classic Shells of the World » (1993). It is sometimes beached, albeit very rarely and usually in poor condition. A carnivorous and predatory gastropod presumably feeding on sipunculid worms, it inhabits sand or rubble bottoms of moderate depths around -20~100m. Typical shell length around 45mm., extremely large specimens may reach 65mm. It is named in honour of Dr. Isao Taki (1898-1961) who was an influential malacologist and zoologist in Japan, along with his younger brother Dr. Iwao Taki (1901-1984).



Zoila jeaniana (Cate, 1968)

CYPRAEIDAE

-20~40m, On sponge, Dived, Shark Bay, Western Australia, Australia, 2005/i, 64.3mm.

The « Jean's Cowrie » is a delightfully patterned cypraeid endemic to Western Australia, Australia; ranging between the Montebello Islands in the north and around Kalbarri in the south. It can be differentiated with other similar *Zoila* species by the presence of columellar dentition and a base with uniform orange to brown colouration, bounded by a pale margin. Like almost all *Zoila* species, it has been divided into many forms/subspecies. The nominal form is moderately rare and usually trawled from around -80~150m deep, occasionally found as shallow as -40m. The form *sherylae* Raybaudi, 1990 (shown here) from Shark Bay area is only uncommon due to its shallower depth around -20~60m, and is generally smaller than the nominal form. The rare form *thalamega* (Lorenz, 2002) consists the southmost population around Kalbarri; it inhabits shallower depths around -20~80m and is characterised by more elongate shell with rostrate tips. The name *aurata* Raybaudi, 1979 refers to rare deep-water shells trawled from -150~250m around northern Western Australia, characterised by much paler and typically golden colouration. It used to be treated as a valid subspecies but genetic examination in the recent years could not differentiate it from the nominate subspecies; it is currently treated as taxon inquirendum but in reality is probably merely a deep-water variation and not worthy of a subspecific rank. It is a carnivorous grazer feeding solely on demosponges, as is typical for *Zoila*. Typical shell length around 75mm., very large specimens may reach 110mm. It is named after Mrs. Jean Cate, wife of the Cypraeoidea specialist Crawford N. Cate who described this species.



Janthina janthina (Linnaeus, 1758)

JANTHINIDAE

Beached, Dampier, Western Australia, Australia, 2003/i, 33.0mm.

The « Comm.on Violet Snail » is a gorgeously coloured janthinid with an extremely wide distribution across the world's warm and temperate seas due to their wholly pelagic lifestyle. The foot is specialised in making air rafts from mucus which enables it to float the on sea surface, usually apex-down. The splendid colouration is thought to be a camouflage to match the colouration of surrounding seawater. Furthermore, its shell is lighter coloured above the suture, considered as an example of counter-shading to make it blend in to seawater and difficult to find for predators when seen from below. It is a hermaphrodite exhibiting protandrous hermaphroditism, meaning each individual begin life as a male and then changes sex to female at a later stage; thus small individuals are males and large individuals are females. A predatory snail feeding on pelagic jellyfish encountered on the sea surface, two comm.on preys include the pelagic hydrozoans « By-the-wind Sailor » *Velella velella* (Linnaeus, 1758) and « Portuguese Man O' War » *Physalia physalis* (Linnaeus, 1758). It is comm.on and often occurs in large aggregations of dozens of individuals. In events of strong winds or storms whole aggregations are frequently stranded and beached; such events are greatly prized by beachcombers as it is otherwise only rarely beached. Typical shell width around 30mm., extremely large specimens may grow to 45mm.



Mitra hayashii (Kira, 1959)

MITRIDAE

Saga, Saga Prefecture, Japan, 1990/vi, 54.0mm.

The « Hayashi's Mitre » is a famous and much sought-after Western Pacific mitrid ranging from Japan to the Philippines. When initially discovered in Japan, it was thought to represent a recently extinct species as no live specimen was found. Many years later however, live specimens started to surface. In fact it is named after Mr. Shoichiro Hayashi, the first person to collect a fully mature specimen of this species alive and provided it for description. It used to be rare to very rare, and was made famous by inclusion in the classic book « Rare Shells of Taiwan » (1979) by T.C. Lan. Majority of specimens do actually come from Taiwan, although recently more specimens are surfacing from the Philippines. It has become more readily available in the recent years and is now perhaps best described as uncomm.on or moderately rare. A carnivorous and predatory gastropod feeding probably on sipunculids like most mitrids, it lives on soft bottoms of rather deep water around -100~300m. Typical shell length around 50mm., very large specimens may exceed 65mm. Though used to be placed in the genus *Scabricola* it is now generally accepted to be a member of *Mitra* and included in the subgenus *Nebularia*, considered by some to merit a full genus status.



Ficus investigatoris (Smith, 1894)

FICIDAE

-150~200m, In fisherman's net, Muttom, Kanyakumari District, Tamil Nadu, India, 2015/x,
130.0mm.

The « Bengal Fig » is a large and intricately sculptured ficid found exclusively in the Indian Ocean, ranging from Bay of Bengal to Mozambique; the type locality being « Ganjam coast, eastern India ». For many years it was considered a rare shell as the main supply was by-catch from trawlers working Somalia, but very recently fresh supplies have emerged from India and it has become much easier to obtain. In its natural habitat it is a locally comm.on gastropod mostly seen on sandy to muddy bottoms of rather deep water around -100~400m, although occasionally it is found as shallow as -30m. Ficidae is considered to feed by swallowing small organisms with detritus and organic particles, though some claim they feed on echinoderms and polychaete remains have been detected in the digestive tracts of *Ficus*. The surface sculpture is characteristic and little-varied among individuals, although the shell width to height ratio varies considerably. Typical shell length around 100mm., very large specimens (as shown) are known to exceed 130mm. In « A Conchological Iconography: The family Ficidae » (2000), Varhaeghe & Poppe cited the authority of this species as « Smith, 1906 », but this was due to a confusion between two references by the same author and it was actually described in 1894. The specific epithet refers to the H.M. Indian Marine Survey Steamer « Investigator » which collected the first specimens that became the basis of the original description.



Barnea dilatata (Souleyet, 1843)

PHOLADIDAE

-20~30m, Trawled in mud, West Phuket Island, Thailand, 1998/ii, 79.3mm.

The « Dilate Piddock » is a large burrowing pholadid with a rather wide distribution in the Indo-West Pacific, ranging from Japan to India to Australia. A common filter-feeding bivalve with a much larger body than the shell, it lives deeply buried in sand or mud in shallow water from intertidal down to about 20m deep. Its very long siphon (up to four times shell length), which it uses to feed, is considered a delicacy in some places. For example in Ariake Sea, Japan it is a famous local speciality and is widely harvested to be eaten either fresh or dried; although its numbers in that area appears to be diminishing in the recent years. The shell is very fragile and has one calcified accessory plate, the protoplax. The apophysis, spoon-like appendage serving as a point of attachment for the foot musculature, is very long and narrow. Typical shell length around 80mm., very large specimens may exceed 120mm.



J'aime

J'aime

J'adore

Haha

Wouah

Triste

Grrr

Luria tessellata (Swainson, 1822)

CYPRAEIDAE

-5~10m, Dived, Oahu Island, Hawaii, USA, 32.2mm.

The « Checkerboard Cowrie » is a highly distinctive cypraeid with its four characteristic dark blotches on the dorsum. An exceedingly famous and much sought-after species, it is very variable in blotch development and is thus not easy to find a specimen with well-balanced 'checkerboard' pattern; it is also rather variable in callous development. An omnivorous gastropod, it lives under corals and rocks from rather shallow to moderately deep water ranging around -3~50m. Almost all specimens are from Hawaii where it is uncomm.on (live specimens becoming rarer recently) and it was once thought to be an endemic there. From the 1980s, however, a few have been taken live around Taiwan and more recently in the Philippines; its true range therefore appears to be quite wide. It appear to only occur in the deep water in the western Pacific and is extremely rare there; the name *Luria lani* (Raybaudi 1986) was given to the Taiwanese population but is currently regarded as a junior synonym. Typical shell length around 30mm., extremely large individuals are known to reach 55mm.

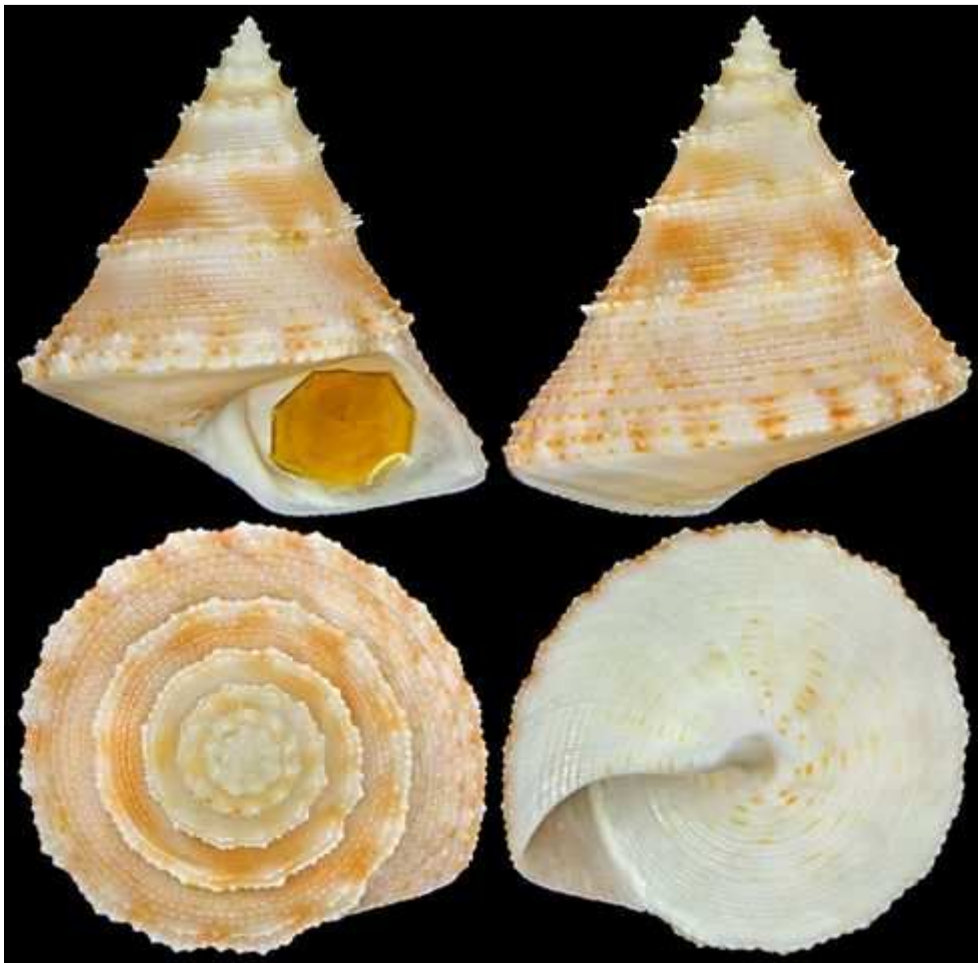


Calliostoma toshiharui Kosuge, 1997

CALLIOSTOMATIDAE

-150m, By tangle nets, Aliguay Island, Zamboanga Peninsula, Mindanao, Philippines, 2003/viii, 44.4mm.

The « Toshiharu's Top Shell » is a large and spectacularly ornamented Western Pacific calliostomatid ranging from the Philippines to Borneo. It is characterised by two to three spine-bearing spiral cords just above the suture, although the development of spines vary among individuals. The whorls are strongly shouldered due to the spine-bearing cords being especially prominent and thus appear slightly concave. A rare species even in the usual dead collected condition, live taken specimens without significant damage (as shown) are very rare. Most likely a carnivorous grazer feeding on tissue of cnidarians like most calliostomatids, it inhabits rather deep water around -150~300m. Typical shell height around 35mm., extremely large specimens may exceed 50mm.



Tonna melanostoma (Jay, 1839)

TONNIDAE

-60~80m, In fishing net, Kakeromajima, Amami Islands, Kagoshima Prefecture, Japan, 2007/vi, 235.9mm.

With a unique dark aperture the « Black-mouthed Tun » is an unmistakable and extremely handsome tonnid ranging from southern Kagoshima Prefecture, Japan to New Zealand. It is not only the most coveted and sought-after tonnid species of all, but also a species of legendary fame and rarity among all shells. A very large tonnid with an average shell length around 220mm., extremely large specimens are known to exceed 300mm. Despite having a large size and being easily recognisable it is very rare across its rather wide range, especially adults displaying well the signature black mouth. Most specimens appear to originate from either southern Japan or around New Caledonia, although recently young specimens have been surfacing frequently from the Chinese coast. Young specimens lack the signature « black mouth » as that only develops as the snail matures, but the characteristic sculpture of alternating thick and thin spiral cords make them unmistakable still. The only species it may be mistaken with is its sister species *Tonna hawaiiensis* Vos, 2007 which is endemic to Hawaii and has been wrongly treated as the same species for many decades. *Tonna hawaiiensis*, however, is a much smaller species on average and never develops a fully black aperture to the extent of *T. melanostoma* even when mature. Like other tonnids it is a carnivorous and predatory gastropod inhabiting sandy to muddy bottoms and predominantly hunts holothurians (sea cucumbers), most likely nocturnally.



Cymbiola irvinae (E. A. Smith, 1909)

VOLUTIDAE

-120m, Trawled on sandy to muddy bottom, South of Mandurah, Western Australia, Australia, 78.3mm.

The « Irvin's Volute » is a solid volutid endemic to the western shoreline of Western Australia, Australia. A little-varied species in terms of patterning and form, but the extent of shoulder spine development is very variable from being completely smooth and spineless to having long and recurved spines. It is a rather rare and sought-after species that is usually dredged dead or crabbed, live-taken specimens are very rare. Although it closely resembles the much more comm.on *Cymbiola nivosa* (Lamarck, 1804), that species has a much smaller protoconch and less dense shoulder spines (when present) which are always solid and not hollow like those of *C. irvinae*. A carnivorous and predatory gastropod feeding on other invertebrates, it inhabits sand or gravel bottoms of moderately deep water around -50~250m. Typical shell length around 100mm., extremely large examples are known to reach 130mm.



Perotrochus wareni Anseeuw, Puillandre, Utge & Bouchet, 2015

PLEUROTOMARIIDAE

-350-450m, Dredged, Grand Passage, North of New Caledonia, 45.4mm.

The « Warén's Slit Shell » is a small pleurotomariid endemic to New Caledonia, characterised by a fine pustulose sculpture. For many years, it was considered to merely represent a 'pustulose form' of *P. caledonicus* Bouchet & Métivier, 1982 which occurred allopatrically and shared with it similar size, colour, and shape. The type specimen of *P. caledonicus*, however, had smooth and unbeaded spiral cords; no clear intergrades between the two forms were known. Only very recently, a study using both morphological and molecular data finally revealed that the two in fact represent two distinct lineages and are separate species. The 'pustulose form' was therefore described anew, as *Perotrochus wareni*, shown here. Though the two species appear to occur allopatrically in New Caledonia, *P. wareni* is more comm.on in the northern New Caledonia while *P. caledonicus* is predominantly found in the southern areas around Isle of Pines. They also differ slightly in depth preference, with *P. wareni* occurring mostly around 350m deep and *P. caledonicus* slightly deeper at around 400m. Furthermore, the range of *P. wareni* extends westwards to Lansdowne Plateau in the Coral Sea but the range of *P. caledonicus* does not appear to reach the Coral Sea at all. The population from Chesterfield Plateau in the Coral Sea, previously attributed to *P. caledonicus*, was revealed to be a further distinct species in the same study and was named *P. pseudogranulosus* Anseeuw, Puillandre, Utge & Bouchet, 2015. It inhabits hard substrates and is a carnivorous grazing gastropod feeding on demosponges. Typical shell length around 40mm. but extremely large specimens may exceed 70mm. Though it is locally somewhat comm.on, high quality specimens are uncomm.on on the shell trade market.



Perotrochus caledonicus Bouchet & Métivier, 1982

PLEUROTOMARIIDAE

-350-450m, Dredged, Southwest of the Isle of Pines, New Caledonia, 50.5mm.

The « New Caledonia Slit Shell » is a small, lustrous pleurotomariid endemic to New Caledonia as its name suggests. For many years, this species was thought to occur in two forms with distinct sculpture -- a 'smooth form' with uninterrupted spiral cords and a 'pustulose form' with the cords divided into many conspicuous beads. Although no obvious intergrades were known, the two were similar in size, colouration and shape as well as co-occurring in similar areas and were thus assumed to represent a single species. A recent study using both morphological and molecular data clearly revealed, however, that the two in fact represent two distinct lineages and are separate species. The 'smooth form', as shown here, corresponds to the nominal *P. caledonicus* and is more comm.on in the southern New Caledonia, though the distribution range does extend northwards up to the Grand Passage area. The 'pustulose form' was newly described as *Perotrochus wareni* Anseeuw, Puillandre, Utge & Bouchet, 2015; it is more comm.on in the northern New Caledonia but also occurs in the south, and the range extends westwards to Lansdowne Plateau in the Coral Sea. These two species differ slightly in depth preference, with *P. caledonicus* occurring mostly around 400m deep and *P. wareni* mostly around 350m deep. The population from Chesterfield Plateau in the Coral Sea, previously also attributed to *P. caledonicus*, was revealed to be a further distinct species and was named *P. pseudogranulosus* Anseeuw, Puillandre, Utge & Bouchet, 2015. The name *P. caledonicus* therefore currently refers solely to the 'smooth form'. A carnivorous grazing gastropod, it lives on hard substrates and feeds on demosponges. Typical shell length around 40mm., extremely large specimens are known to exceed 65mm. Though it is locally not uncomm.on, high quality specimens are still uncomm.on in the international shell trade.



Bursa verrucosa (Sowerby I, 1825)

BURSIDAE

-25m, SCUBA dived, Raoul Island (Sunday Island), Kermadec Islands, New Zealand, 31.6mm.

With numerous black warts well-contrasted against a whitish-yellow background, the « Verrucose Frog Shell » is one of the most striking bursids of all. The shell form is little-varied, but the warts vary in strength among individuals, in many cases a series of warts are reduced to a simple 'dotted-line'. It has a much restricted distribution from southeast Australia to Lord Howe Island, Norfolk Islands, Kermadec Islands, and northern New Zealand. One of the rarest frog shells and specimens are much sought-after by collectors, especially those with large and well-formed warts. It inhabits sandy to muddy bottoms of shallow subtidal water around -10~40m deep, and is a carnivorous gastropod like other bursids, probably mainly feeding on polychaete worms. Typical shell length around 30mm., very large specimens may exceed 55mm. A monotypic genus *Annaperenna* Iredale, 1936 was once proposed for it, but is now regarded as a synonym of *Bursa*.



Entering the manned submersible JAMSTEC DSV « Shinkai 6500 » for dive #1457 to Edmond hydrothermal vent field, 3320m deep, Central Indian Ridge.



First dive in the manned submersible DSV « Shinkai 6500 », to Edmond Hydrothermal Vent Field, Central Indian Ridge (3320m deep). Feb 26, 2016. Photos by C. Nicolai Roterman, Julia D. Sigwart and Leigh Marsh.





JAMSTEC R/V Yokosuka cruise YK16-E02, exploring deep-sea hydrothermal vent fields of the Central Indian Ridge using the « Yokosuka Deep-tow camera » (YKDT) and manned submersible DSV « Shinkai 6500 ». February -- March, 2016.







JAMSTEC is docking in Mauritius! [Chong Chen](#) has this GREAT pic of the JOIDES resolution and the French Marion Dufresne in port together! JAMSTEC is of course. the Shinkai 6500!! Its like watching three USS Enterprises together!



Coming out of « Shinkai 6500 », one of only six manned deep-submersibles in the world, after a successful dive to Edmond Hydrothermal Vent Field, 3320m deep, Central Indian Ridge. JAMSTEC R/V Yokosuka cruise YK16-E02. Photo by [Nicolai Roterman](#).



JAMSTEC R/V Yokosuka cruise YK16-E01 to Central Indian Ridge, using AUV Urashima to locate novel hydrothermal activities. January 2016.





JAMSTEC R/V Yokosuka cruise YK16-E01 to Central Indian Ridge, using AUV Urashima to locate novel hydrothermal activities. January 2016.



J'aime
J'adore
Haha
Wouah
Triste
Grrr

Mikadotrochus salmianus (Rolle, 1899)

PLEUROTOMARIIDAE

-250~300m, Trawled, Kashiwa Island, Kōchi Prefecture, Japan, 1983/v, 93.5mm.

The « Salmiana Slit Shell » is an elegant pleurotomariid with a blazing coluration and a characteristically tall spire, ranging from Honshu, Japan to Taiwan to Philippines. A much sought-after rarity, most specimens have generally come from Taiwan although recently Chinese fishermen have also trawled many (mostly poor) specimens from the East China Sea. It reaches the largest size in Tosa Bay, Japan where the shells are the thickest and with a rather pale colouration; the shells gradually thins down towards south with specimens from the Philippines being the lightest in build but with a dark colouration. Both Tosa Bay and Philippines specimens are still very scarce today, especially in large size, though in the East China Sea it is probably best described as uncomm.on. A carnivorous grazer feeding on sponges, it inhabits hard substrates of rather deep water around -100~400m. Typical shell length around 90mm., extremely large specimens are known to exceed 135mm. For many decades since its description it was confused with its congener *Mikadotrochus beyrichii* (Hilgendorf, 1877) due to the small quantity and poor quality of available specimens. As better specimens surfaced, however, its obvious differences with *M. beyrichii* quickly became apparent and it has become widely accepted as a valid species since the 1970s. A well-known synonym is *Mikadotrochus schmalzi* Shikama, 1961.



JAMSTEC R/V Yokosuka cruise YK16-E01 to Central Indian Ridge, using AUV Urashima to locate novel hydrothermal activities. January 2016.





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Tenagodus obtusus (Schumacher, 1817)

SILIQURIIDAE

Almeria, Andalusia, Spain, 118.9mm.

Tenagodus obtusus is a curiously shaped slit-worm shell with the first few whorls coiled regularly but suddenly shifting to growing an uncoiled tube. It is mainly known from the Mediterranean Sea with specimens from Atlantic waters generally attributed to *T. senegalensis* (G. B. Sowerby II, 1876), although some authors claim that the two should be considered synonymous. *Tenagodus senegalensis* appear to have generally more tightly coiled earlier whorls, although they are quite variable indeed. It is an obligatory sponge commensal and spends the entire life inside the host sponge, in most cases *Holoxea furtiva* Topsent, 1892. More than one specimens is usually found together in a cluster within the sponge. Most of the shell is completely embedded in the sponge which provides shelter and protection, only the uncoiled tube extends out. It is found in intertidal and shallow subtidal waters down to about -50m, and is a filter feeding gastropod. There is a corneous operculum supported by a much reduced foot, which is heavily sculptured with opercular bristles, the form of which is an important taxonomic character in this family. It is very similar in general appearance to the Indo-West Pacific species *T. ponderosus* Mörch, 1861, but is usually readily distinguishable by the slit morphology -- the slit of *T. ponderosus* is a series of elliptical holes on the coiled whorls then gradually becoming denticulated and then finally smooth-sided at the uncoiled part, whereas that of *T. obtusus* is smooth-sided without denticulation throughout the entire teleoconch. Typical shell length around 100mm., extremely large specimens may exceed 160mm. Although generally a common species, it is uncommon to find one in good condition on the shell trade market.



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Aplustrum amplustre (Linnaeus, 1758)

APLUSTRIDAE

Dived, Nuku Hiva, Marquesas Islands, French Polynesia, 19.9mm.

The « Royal Paper Bubble » is a most lovely aplustrid shell-bearing opisthobranch widely distributed across the tropical Indo-West Pacific. A carnivorous and predatory gastropod mainly feeding on polychaete worms, it inhabits fine sandy bottoms of shallow waters less than 15m depth and is comm.on throughout most of its range. Generally instantly recognisable by its two characteristic broad pink bands bordered by black lines, but the pattern is actually somewhat variable, especially the thickness of black lines. Specimens from the Marquesas Islands (shown) appear to differ from all other by having much darker colouration and much thicker black lines. Typical shell length around 15mm., extremely large specimens may exceed 25mm. On a side note -- Voskuil (1995) separated from this species *Aplustrum exquisitum* (Voskuil, 1995) which has one thick black band, instead of two black lines and a white band, between the two pink bands; and tip of the columellar being bent slightly towards the right instead of left when viewed at the aperture view with apex pointed upwards. *Aplustrum exquisitum* is supposed to be endemic to Marquesas and co-exist with *A. amplustre* there. However, when one views sufficient material, it appears that *A. exquisitum* is most likely merely a form of *A. amplustre* with an uncomm.on pattern, as a whole range of intermediates can be found in Marquesas.



Buccinum viridum Dall, 1889

BUCCINIDAE

-800m, Trawled, Astoria, Oregon, U.S.A., 43.5mm.

The « Turban Whelk » is a deep-water buccinid native to the northern Pacific, best known from the West coast of North America. Although generally an inhabitant of sandy to muddy bottoms of deep water around -700~2500m, it is also an important member of chemosynthetic ecosystems California and Oregon, USA, being comm. only found in hydrothermal vents (e.g., Explorer Ridge), methane seeps, and on whale falls. It is a carnivorous gastropod but also scavenges when the opportunity arises. There are two forms, one with an obvious spiral cord on the shoulder and the other with a rounded shoulder. Though supposedly a comm.on species, it is quite an uncomm.on species in the shell trade. It is the type species of subgenus *Viridibuccinum*. Typical shell length around 40mm., very large specimens may exceed 60mm. A similar species, *Buccinum thermophilum* Harasewych & Kantor, 2002 is known from the Endeavour Vent Field, Juan de Fuca Ridge, and differs from *B. viridum* by smaller, narrower, more higher spired shell and a much more ovate aperture. Furthermore, the spiral ridges in *B. thermophilum* is generally much sparser.



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Provocator mirabilis (Finlay, 1926)

VOLUTIDAE

Dredged from deep water, New Zealand, 122.4mm.

The « Astonishing Volute » or the « Golden Volute » is an elegant deep water volute endemic to sub-Antarctic Pacific waters around New Zealand. It is a locally not uncomm.on predatory gastropod living on muddy bottoms and has a rather wide bathymetric range between approximately -200~1500m. Unlike other members of genus *Provocator* it has a rather thick shell and no columellar folds, and is thus often placed in its own genus *Iredalina*. The protoconch is usually glazed over and forms a posterior spike-like structure, which varies in length and is rarely preserved completely. Two forms seem to exist: a more comm.on form with sloped spire and more stout shell; and a rarer form with stepped spire and elongated shell (shown). Colour uniform, varying from pale to rather dark orange; a scarce white form occurs Auckland Islands. Adults have thickened lip and the average shell length is about 100mm., but giants exceeding 160mm. (with long, well preserved spike) are known to exist.





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JAMSTEC R/V Yokosuka cruise YK16-E01 to Central Indian Ridge, using AUV Urashima to locate novel hydrothermal activities. January 2016.





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Buccinum mizutanii Habe & Ito, 1970

BUCCINIDAE

-80m, Dredged, Kuril Islands, 1991, 77.5mm.

The « Mizutani's Whelk » is a uniquely sculptured cold-water buccinid ranging from Hokkaido, Japan to the Sea of Okhotsk. Whorls carry two prominent, thick spiral cords on the body whorl an additional weaker one on the base. The first cord below the shoulder is usually the strongest and is characteristically nodulose, giving it an unmistakable strongly wavy appearance. It is most similar perhaps to *B. nodocostum* Tiba, 1984, which shares the nodulose spiral cord but differs by the cords being more numerous and much narrower as well as less prominent. *Buccinum opisoplectum* Dall, 1907 and *B. glaciale* f. *inclitum* Pilsbry, 1904 are also similar but likewise these species also have more numerous, much narrower spiral cords and are easily separable. It appears to be a very rare species in the shell trade market. A carnivorous and scavenging gastropod, it inhabits muddy bottoms of rather deep water around -100~500m. Typical shell length around 90mm., very large specimens may reach 120mm. It is named in honour of Mr. Shosan Mizutani, a fisherman based in Abashiri, Hokkaido who first discovered this species.



Scelidotoma gigas (Martens, 1881)
FISSURELLIDAE

-20~25m, Coast of Yagi, Hirono-cho, Iwate Prefecture, Japan, 82.3mm., 2014/vii

The « Giant Tugali Limpet » is a very large fissurellid native to northwest Pacific, with a distribution ranging from northern Korea and Japan (north of Fukushima Prefecture) to Sakhalin. A rather uncomm.on algae-grazing herbivorous species, it inhabits hard rocky substrates of intertidal to shallow subtidal waters down to about -30m deep. Although the shell is not colourful, its soft parts are vivid and brightly coloured in orange to red and the foot is larger than the shell. A shallow notch in the anterior end of the shell proves that it is a slit limpet, but this feature is often very inconspicuous in gerontic specimens. Typical shell length around 70mm., very large specimens may exceed 95mm. It used to be placed in the genus *Tugali* (hence the comm.on name), but is now moved to *Scelidotoma*. Although the external appearance is similar to abalones, its flesh is said to taste bitter and vile when raw and tasteless when cooked. It is one of the host species of the symbiotic scale worm (Polychaeta: Polynoidae) *Arctonoe vittata* (Grube, 1855), which lives in the pallial groove of the host. The host helps the worm move about and protects it from predators, the worm does not feed on the host and in return helps the host fight predators such as sea stars by biting them.



Bullia othaeitensis (Bruguière, 1789)
NASSARIIDAE
Masirah Island, Oman, 49.1mm.

Bullia othaeitensis is a very handsome nassariid characterised by numerous equally spaced spiral ridges. Native to Eastern Arabia with most specimens originating from Oman, the actual range may extend as far as Karachi, Pakistan. Its name is very confusing as although it is an arabian species, the specific epithet means « from Othaeite » with Othaeite being an alternative spelling of « Otaheite », an old name for Tahiti, French Polynesia. This is due to a mistake in recognising the origin of the type material, which unfortunately was not too uncommon back in the days when the accurate provenance for many species remained unclear for decades. In fact, the entire genus *Bullia* is absent from the Western Pacific. It is perhaps better known by the name *Bullia tahitense* (Gmelin, 1791) which is a junior synonym, and that name also means « from Tahiti ». The two authors may have received material from the same lot with the same mistaken locality labels, especially considering the short time difference between the two descriptions, though this is merely speculation. The specific epithet is often misspelt in various ways, such as « otaheitensis » or « othaeitense ». It is a very rarely available species, mostly absent from collections. Fresh specimens carry sparse orange-brown axial flammules, though these fade over time. A carnivorous and scavenging gastropod, it inhabits sandy bottoms of shallow waters down to about -15m. Typical shell length around 30mm., very large specimens as shown may exceed 45mm.



Harpa doris Röding, 1798

HARPIDAE

-2.5m (-8 ft), Dived by local person, On clean brown sand, Dakar, Senegal, 65.6mm.

The « Rosy Harp » is a lovely harpid ranging from Senegal to Angola, and is the only recent Harpa species in the Atlantic Ocean. It is characterised by radial bands of rectangular, rosy red patches that makes it an especially beautiful harp shell. The extent of red patches vary greatly among individuals and the synonym *H. rosea* Lamarck, 1816 is often used as a form name by collectors and dealers for exceptionally reddish specimens. Two distinct forms are known, the nominal form from coastal mainland Africa (shown) has thin, lightly constructed and more slender shells; whereas the form from Ascension Island and Cape Verde Islands are much more robust and shorter. The island form was initially described as a separate species, *H. robusta* Röding, 1798, and although regarded as a synonym today many feel it is still worthy of a subspecific rank if not a full species. Like all Harpa species it is a carnivorous and predatory gastropod that mainly feeds on small crustaceans, and inhabit shallow sandy bottoms to -30m depth. Typical shell length for the nominal form around 60mm., very large specimens may exceed 80mm.; the island form is generally smaller and averages at around 40mm., though the largest specimens may exceed 70mm. It used to be a rarity before around 1980s when the Atlantic shells were less readily available, today it is regarded as a comm.on species and has become easily obtainable.

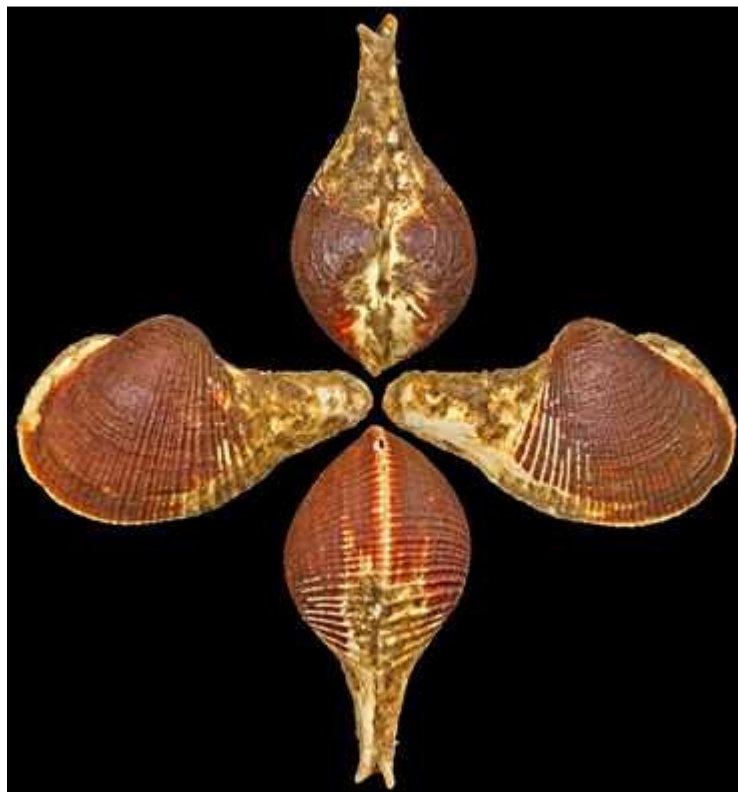


Cardiomya behringensis (Leche, 1883)

CUSPIDARIIDAE

-350m, In shrimp traps, Teuri Island, Hokkaido, Japan, 2000/xi, 38.1mm.

Cardiomya behringensis is a rather solid medium-sized cuspidariid ranging from Honshu, Japan (both Pacific and Japan Sea) to Sea of Okhotsk to as far north as Bering Sea. Being a cuspidariid it is a carnivorous and predatory bivalve which hunts small animals, mostly crustaceans such as copepods and ostracods, using the inhalent siphon's suction power. It inhabits muddy bottoms of deep water around -200~450m deep, and is always covered by a layer of mud on top of the periostracum in natural condition. A very rare species, it is a celebrated collector's item among those who collect cuspidariid clams and difficult to acquire in collectible condition. Typical shell length around 20mm., very large specimens such as the one depicted may reach and exceed even 40mm.



Cuspidaria trosaetes Dall, 1925

CUSPIDARIIDAE

-350m, In shrimp traps, Teuri Island, Hokkaido, Japan, 2000/xi, 28.5mm.

Cuspidaria trosaetes is a delicate, medium-sized cuspidariid from the Japan Sea, ranging from Hyōgo Prefecture to Hokkaido, Japan (and maybe the Kuril Islands). Like other members of *Cuspidaria*, it is a truly carnivorous and predatory bivalve that actively hunts small crustaceans (such as copepods and ostracods) using its inhalent siphon and trapping them in the mantle cavity. It inhabits a rather wide bathymetric range of around -50~650m, and is usually found on soft bottoms. It is characterised by a short, compressed posterior rostrum and a well inflated oval shell. The shell itself is white, with a greenish-brown periostracum which is thin and semi-transparent at first but increasingly thickens and as a result becomes more opaque in later stages. A rare species, it is very difficult to obtain a live-taken specimen in good condition. Typical shell length around 30mm., very large specimens may exceed 40mm.



Calliostoma tigris (Gmelin, 1791)
CALLIOSTOMATIDAE
New Zealand, 1960s, 62.0mm.

Delicately painted with alternating chestnut and pale yellow stripes, the « Tiger Maurea » is a beautiful endemic calliostomatid of New Zealand. It is the largest extant calliostomatid known to date, with the largest specimens reaching an impressive shell height of over 100mm., although vast majority are smaller and average at around 60mm. The largest specimens originate from Three Kings Islands. The surface sculpture is fairly consistent, although the spire form varies from narrow conical to broad conical. The early whorls are almost always characteristically narrow and differ in sculpture from later whorls. Fully mature specimens have the inside of the outer lip noticeably thickened. The colouration pattern can vary quite a bit, for example many from the Chatham Islands lack discrete axial bands with more scattered pattern, which was named as a subspecies *C. tigris chathamensis* (Dell, 1950) but now considered to be a synonym. It is a carnivorous grazer feeding on thecate hydroids and occur on rocky substrates from very shallow intertidal waters down to rather deep water around -200m. It is usually placed in the subgenus *Maurea*, which many consider worthy of a full genus rank.



Neancistrolepis glabra Habe & Ito, 1973

BUCCINIDAE

-550~560m, 44°09.9'N 144°33.0'E, By deep-water whelk pot, Abashiri, Hokkaido, Japan, 1996/vii, 126.8mm.

Neancistrolepis glabra is a cold-water whelk with smooth, glossy periostracum ranging from Hokkaido, Japan to the Okhotsk Sea. A carnivorous and often scavenging gastropod, it inhabits sandy to muddy bottoms of deep water around -500~800m. A highly coveted species by collectors of Buccinidae, it is an extremely rare species on the international shell trade, especially adult specimens of decent quality. Even locally in Japan it is now quite a rarity, it was once only uncomm.on but now the supplies have effectively run dry. In fully adult specimens, the outer lip recurves slightly and characteristically flares out, extending anteriorly. The periostracum is often darker coloured in adults than juveniles and peels rather easily when dried. The operculum is teardrop shaped and as usual for the genus *Neancistrolepis* it is much smaller than the aperture, though not as small as in the genus *Parancistrolepis*. Typical shell length around 110mm., very large specimens may exceed 140mm. It is one of only two currently recognised species in the genus *Neancistrolepis*, the other being *N. beringianus* (Dall, 1919).

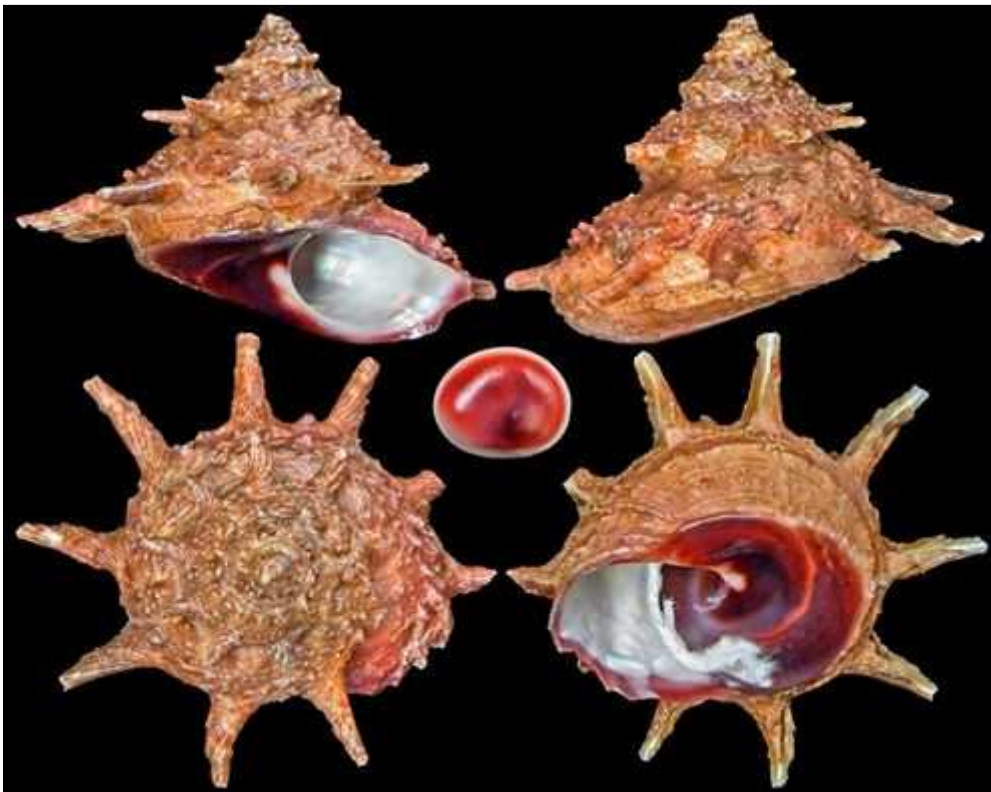


Bolma johnstoni (Odhner, 1923)

TURBINIDAE

-90~120m, Trawled, N'zeto (aka. Ambrizete), Zaire, Angola, 48.4mm.

Bolma johnstoni is a stunning turbinid characterised by a well-developed, near-black basal callous which makes it unforgettable and unmistakable. The shell surface carry scaly sculpture and a single row of rather long spines, the operculum is an attractive reddish-brown coloured one with a granulose central area. A famous endemic species of Angola, it is a rare species due to its restricted distribution and is much sought-after by collectors. It inhabits rather deep water around -70~120m, and although no reliable data exists regarding its detailed feeding behaviours it is almost certainly a grazer. Typical shell diameter including spines around 40mm., very large specimens may exceed 50mm. In the original description it was placed in the genus *Astraea*, and later moved to *Bolma*, its current genus. On dealers' lists and collection databases it is quite often misspelt as « *Bolma johnsoni* » (missing a « t » in the specific epithet).



Perotrochus pseudogranulosus Anseeuw, Puillandre, Utge & Bouchet, 2015

PLEUROTOMARIIDAE

-300m, Trawled, Nouméa, New Caledonia, 2011, 41.0mm.

Perotrochus pseudogranulosus is a recently described medium-sized slit shell, previously confused with *P. caledonicus* Bouchet & Métivier, 1982. Due to the well-known existence of a « smooth » and a « pustulose » form with apparently no intergrades, there has been a long suspicion that *Perotrochus* species from around New Caledonia, previously all attributed to *P. caledonicus*, might actually be a species complex of at least two species. Indeed, an investigation using both morphology and molecular sequencing of the COI barcoding gene revealed in 2015 that the two were distinct species. The « smooth » form with unbeaded to weakly beaded spiral ribs but lacking in significant pustulation matches the type series of *P. caledonicus*, whereas the « pustulose » form with strongly beaded ribs is a separate species described as *P. wareni* Anseeuw, Puillandre, Utge & Bouchet, 2015. Surprisingly however, a further previously undescribed species was detected from the Coral Sea material -- *P. pseudogranulosus*. *Perotrochus pseudogranulosus* is rather similar to *P. caledonicus* but can be distinguished by a more conical shell with much more flattened basal disc, the presence of a characteristic strong metallic lustre on the shell surface, and a more regular « checkerboard » pattern under the selenizone. The spiral cords tend to be finely beaded, especially above the selenizone, hence the specific epithet. Phylogenetic reconstructions using the COI gene suggest it is in fact most closely related not to *P. caledonicus* but to *P. deforgesii* Métivier, 1990, which is sister to the *P. caledonicus* -- *P. wareni* group. The original description was based only from materials collected from the Coral Sea and restricted to the Chesterfield Plateau; but seeing a number of specimens has turned up in the shell trade throughout the past years with the locality data near New Caledonia, its true distribution may extend to as far as western New Caledonia. Presumably a carnivorous grazer feeding mostly sponges like other pleurotomariids, it inhabits rather deep water around -300~500m deep. Typical shell diameter around 40mm., extremely large specimens may exceed 55mm. This species appears to be rare in the shell trade market, much rarer than either *P. caledonicus* or *P. wareni*, most likely due to its main habitat in the Coral Sea is too remote for regular visits to be made.



The manned deep submersible DSV « Shinkai 6500 » capable of diving to 6500m depth and the automated underwater vehicle (AUV) « Urashima », on-board R/V Yokosuka together for the first time ever. They will head to Indian Ocean for the next two epic voyages, YK16-E01 and YK16-E02, to study hydrothermal vents there. During E01 « Urashima » will look for new vents and during E02 « Shinkai 6500 » will take scientists to the deep below to observe the vents and take samples. I will be on-board both cruises, starting January 2016.



On-board JAMSTEC R/V Yokosuka with DSV « Shinkai 6500 » and AUV « Urashima », during preparation for cruises YK16-E01 and YK16-E02. These are the first cruises ever to have both « Shinkai 6500 » and « Urashima » on-board. Photo by [Hiroko Makita](#).



Buccinum lamelliferum Lus, 1976 sensu Higuchi, 2006

BUCCINIDAE

-1300m, Trawled, Kinkazan, Miyagi Prefecture, Japan, 2006/vi, 99.0mm.

The true identity of this dignified, graceful, and spectacularly sculptured whelk has been much debated. This shell is characterised by three very strong, erected spiral keels (the third is below the suture line and may be very weak) and inhabit soft bottoms of great bathyal depths between -1000~3000m.



Neptunea nivea Okutani, 1981

BUCCINIDAE

-1300m, Cape Erimo, Shoya, Horoizumi District, Hokkaido, Japan, 2010/x, 104.4mm.

Despite its plain appearance, *Neptunea nivea* is a cold-water whelk most sought-after by collectors of the family Buccinidae, especially in Japan. This is because it is a bathyal species inhabiting very deep water around -1000~3000m, and as a result it very rarely appears on the market. A carnivorous and scavenging gastropod inhabiting soft muddy bottoms, it is supposedly endemic to a small part of Pacific Japan ranging from Miyagi Prefecture to southern Hokkaido, although its true range may extend to the Sea of Okhotsk. Most specimens have been obtained as trawl by-catches from either Kinkasan, Miyagi Prefecture or Cape Erimo, Hokkaido. The shell is ornamented by indistinct spiral ridges which is weakest on the body whorl, and bear a thin layer of greenish brown periostracum which is usually almost completely eroded away in adult specimens. The apex is usually corroded to a certain extent; the operculum is smaller than the aperture although a certain variation is seen in its size relative to the aperture. Typical shell length around 100mm., extremely large specimens may exceed 140mm. It may be confused with *Neptunea convexa* Goryachev, 1978, but differs from it by having a more inflated shell, deeper suture, and relatively shorter spire. It has been placed by some authors, such as Higuchi, 2006, in the genus *Tacita*; but it is currently generally accepted to be a member of *Neptunea*.



The species became discovered during a survey on the fauna Kinkazan to check if dumping low radioactive waste in the trench would be harmful. Don't know what was the result of the survey, but this species came to light..

Type locality: Trawled by the Soyo-Maru, St.R3,22/6/1977, 38°21'7N-143°25'6E, E. Kinkazan, Sanriku, west side of the Japan Trench, NE. Honshu, - 2930/3020 m

I still wonder if it is actually distinct from *N. amianta*, which is quite variable.



Leptoconus kawamurai (Habe, 1962)

CONIDAE

Naze, Amami Ōshima, Kagoshima Prefecture, Japan, 1989/vii, 51.4mm.

The « Kawamura's Cone » is an elegant Western Pacific conid with a relatively tall spire and tent-like pattern. Although it is widely accepted to distribute in the Ryukyu Islands from the Amami Islands (type locality) to southern Okinawa, morphologically similar specimens have been taken from Taiwan and even as far as Guam. Vast majority of specimens are dead-collected from sands pumped up from a few dozen metres deep for making beaches and harbour works in Okinawa, such specimens are uncomm.on. Live specimens are extremely rare and it was once even believed to be an extinct species, but the first live specimen was obtained in 1989 from Naze, Amami Ōshima Island, followed by a few more. A carnivorous and predatory gastropod probably feeding mostly on other molluscs, it inhabits rather shallow waters up to 50m deep. It is a There is a long debate about whether it is a geographic subspecies/form of *Leptoconus milneedwardsi* (Jousseau, 1894) or a separate species, although in the recent years it is generally treated as a full species in its own right. It differs from *L. milneedwardsi* by the consistently much smaller size (up to 100 mm. vs up to 180 mm. in shell length) and a much shorter spire. Typical shell length around 70mm., extremely large specimens may exceed 90mm.



Cymbiola perplicata (Hedley, 1902)

VOLUTIDAE

Lihou Reef, Coral Sea, Queensland, Australia, 1995/xii, 73.0mm.

The « Entangled Volute » is a delightful volute characterised by stunning golden axial lines, and is a much sought-after rarity among the volutes. The original description was based on three poor beached shells from Australian fishermen, but with no further specimens being found its true provenance remained a mystery. That is, until its re-discovery in the late 1970s by Mr. Tom Nielson of Yeppoon, Queensland, Australia and his team. Nielson had already re-discovered other rare shells, including another rare volute *Cymbiola thatcheri* (McCoy, 1868), using special shell dredges in the early 1970s on-board the chartered boat « Coralita ». His early searches for *C. perplicata* funded by Mr. John du Pont had ended in no avail, however; and it was only after repeated cruises (also on-board the « Coralita ») that he finally managed to locate and collect live specimens of *C. perplicata* in the Coral Sea. His early expeditions were recorded in a film entitled « In Search of the Perplicata », though virtually no remaining copies of it appear to exist. Today it is known to be an endemic of the Australian Coral Sea, and remains rather scarce still. A carnivorous gastropod like all volutes, it inhabits sandy bottoms of shallow to moderate depths around -2~40m. Typical shell length around 65mm., extremely large specimens may exceed 90mm.



Morum dennisoni (Reeve, 1842)

HARPIDAE

-200~250m, Trawled, Cuba, 2000/x, 52.0mm.

A truly magnificent orange-red parietal shield ornamented with white pustulation makes « Dennison's *Morum* » one of the most beautiful *Moruminae* species. A classic Caribbean rarity first described from John Dennison's cabinet, it was selected as one of S. Peter Dance's 50 « Rare Shells » (1969) and was virtually unobtainable until the late 20th century. Somewhat variable in size, colouration, extent of shield pustulation, and strength of shoulder spines. The general form varies also according to size, with larger specimens becoming more elongated with weaker shoulder spines. A carnivorous and scavenging gastropod inhabiting sandy to muddy bottoms, it is usually found in rather deep water around -50~200m deep. Its geographic range is quite wide, from North Carolina, USA to as far south as Brazil. Most specimens are caught as by-catches of shrimp trawlers. Today it is still somewhat rare, and due to the high demand large specimens in good condition continue to fetch considerable prices. Typical shell length around 45mm., extremely large specimens may exceed 65mm.

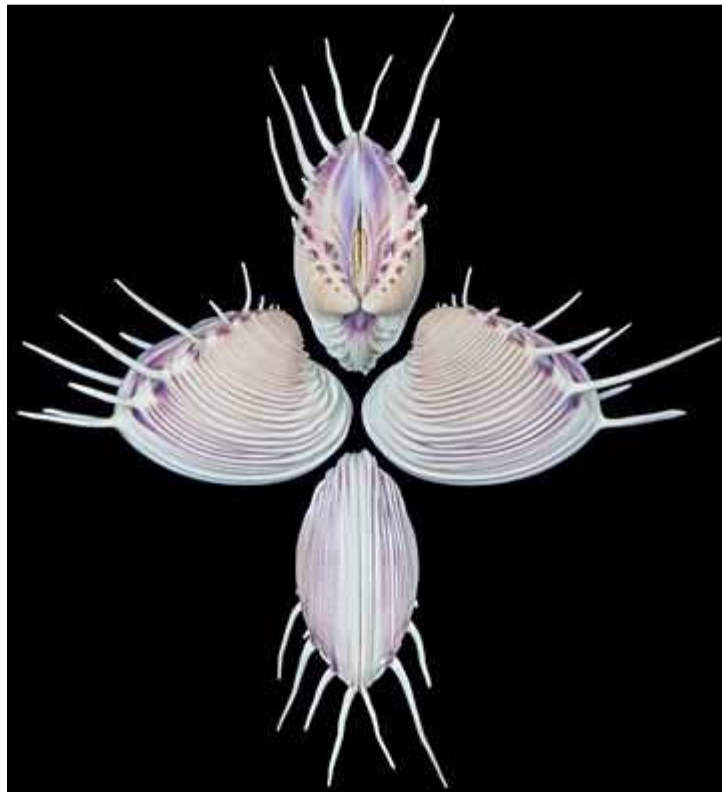


Hysteroconcha lupanaria (Lesson, 1831)

VENERIDAE

Guaymas, Mexico, 1968/x, 78.2mm.

The « Panamic Comb Venus » is an immediate standout among bivalves with two rows of long spines protruding from the posterior slope of each valve as it is very unusual for a non-spondylid bivalve to have long spines. Younger specimens tend to have longer, more intact spines; large specimens usually have most spines broken off. It is a locally common burrowing filter feeder living on sandy bottoms from intertidal to -5m depth, but due to its limited distribution specimens are uncommon on the shell trade market. Large specimens with good spines, especially, are quite rarely seen. In life it is buried with its long spines positioned upwards, possibly used as a defence against predators. Distributed in the Eastern Pacific Ocean from Mexico to Peru, it is very similar to its congeners *H. dione* (Linnaeus, 1758) and *H. multispinosa* (Sowerby II, 1851). *Hysteroconcha dione* tends to have shorter spines and is distributed only in the Western Atlantic Ocean, whereas *H. multispinosa* is also an Eastern Pacific species but has more prominent, erect ribs and more numerous spines. Typical shell length without spines about 40mm., extremely large specimens may exceed 65mm. and length including spines may exceed 90mm. It has long been placed in the genus *Pitar*, and is still often seen listed under that genus.



Tropidophora deburghiae (Reeve, 1861)

POMATIIDAE

High in tree tops, About 50km into mountainous primary forest accessible only by muddy trail, 40+ km north of Mananara on road to Maroantsetra, Coastal northeast Madagascar, 2000/x, 47.9mm.

A truly eccentric combination of shape and pattern makes « Mrs. de Burgh's Torpid » one of the most outstanding and famous out of many landsnail species endemic to the great island of Madagascar. It is endemic to northeastern Madagascar, living deep in rainforest and high on tree tops, making it a difficult species to collect. An assessment by the IUCN in 1996 concluded that it was an endangered species and although it is still considered rare and endangered today, little further information have become available to provide a reliable update on the current status of its population. The shell form is little-varied although the pattern vary slightly among specimens. It is often seen listed under the family Pomatiasidae, but Pomatiasidae is currently considered to be a junior synonym of Pomatiidae. Although a landsnail, its chalky operculum reveals its systematic position in the superfamily Littorinoidea, meaning it is in fact a close relative of periwinkles which have managed to invade the terrestrial ecosystem. Typical shell diameter around 45mm., very large specimens may exceed 55mm.



Perotrochus vicdani Kosuge, 1980

PLEUROTOMARIIDAE

-200~250m, Balut Island, Davao Occidental, Mindanao, Philippines, 2008/x, 56.0mm.

The « Victor Dan's Slit Shell » is a vibrant light-weight Western Pacific pleurotomariid ranging from the Philippines to Vietnam, although vast majority of specimens known originate from the Philippines. It was the first extant slit shell species to be discovered in the Philippines, being described ten years earlier than *Mikadotrochus gotoi* (Anseeuw, 1990). The form is quite variable in terms of spire height and steppedness, and so is the colouration in terms of strength of redness as well as the amount of flamm.ules. Specimens from the area between Balicasag and Siquijor tends to have more intense red colour than usual. A carnivorous grazer feeding mostly on sponges, it inhabits rather deep water around -100~400m in depth. Typical shell diameter around 50mm., extremely large examples are known to exceed 70mm. Although it used to be a very rare species in the past, thanks to deep-water tangle nets smaller sized specimens are only uncomm.on nowadays, although large specimens over 55mm. in shell diameter remains scarce. It is named in honour of Mr. Victor Dan, a famous shell enthusiast, collector, and dealer based in the Philippines.



Bayerotrochus africanus (Tomlin, 1948)

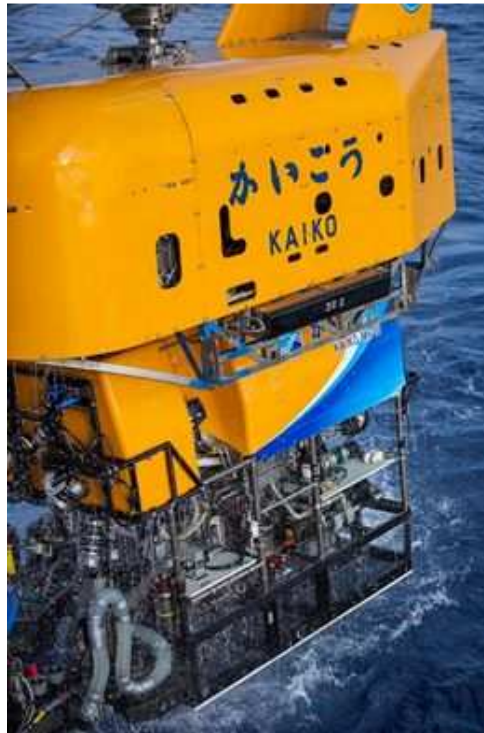
PLEUROTOMARIIDAE

-300m, Trawled, Durban, Natal, South Africa, 1986/x, 116.7mm.

The « African Slit Shell » is a large, light weight pleurotomariid native to eastern and southern Africa, ranging from around Mozambique to South Africa. Most specimens originate as trawl by-catch South Africa, and it appears to be an uncomm.on species. It is quite variable in colouration of the flamm.ules, ranging from pale to deep red. A carnivorous grazer feeding mostly on sponges like other slit shells, it inhabits sandy to muddy bottoms of rather deep water around - 150~400m in depth. It is quite similar to its comm.on congener *B. teramachii* (Kuroda, 1955) found in the western Pacific, but has a more strongly stepped spire and its spiral striations are much less beaded compared to *B. teramachii*. The shell therefore typically appear broader and smoother with higher gloss than *B. teramachii*. Although *B. teramachii* has been considered to be its subspecies in the past, both are currently recognised as separate species in their own right. Typical shell diameter around 110mm., though very large specimens may exceed 130mm.



Photos of the JAMSTEC flagship ROV « KAIKO Mk-IV » taken during the R/V « KAIREI » cruises KR15-16 and KR15-17.





Back from the two consecutive R/V KAIREI / ROV KAIKO Mk-IV cruises.





Bayerotrochus teramachii (Kuroda, 1955)

PLEUROTOMARIIDAE

-200~250m, Trawled, Makurazaki, Kagoshima Prefecture, Japan, 2010/vi, 90.6mm.

The « Teramachi's Slit Shell » is a brilliantly lustrous pleurotomariid ranging from Honshu, Japan to Taiwan to South China Sea. It is characterised by the golden surface with a metallic sheen, as well as numerous fine but strongly and regularly beaded spiral lirae. The delicately beaded sculpture is more or less consistent among specimens. The shell form, on the contrary, is quite variable especially the spire profile. It was previously considered a Western Pacific subspecies of *Bayerotrochus africanus* (Tomlin, 1948) but today it is widely accepted as a full species in its own right. Indeed, it is rather similar to many Indo-Pacific *Bayerotrochus* species including *B. africanus* but also others such as *B. westralis* (Whitehead, 1987) and *B. philpoppei* Anseeuw, Poppe & Goto, 2006; these may form a species complex but genetic data required for further insights is currently lacking. Once a rare species and comm.anded high prices but since deep-water trawlers in Japan and Taiwan started bringing large quantities to surface its price has plummeted, even more so after the Chinese trawlers started doing the same. It is now the second most comm.on pleurotomariid on the shell trade market, after *Mikadotrochus hirasei* (Pilsbry, 1903). A carnivorous grazer feeding mostly on sponges, it inhabits sandy bottoms of rather deep water around -200~600m. Typical shell diameter around 100mm., extremely large specimens may exceed 140mm. Its name honours the late Mr. Akibumi Teramachi, who is widely accepted as the greatest Japanese collector of the time. Teramachi was a painter who lived in Kyoto, and after he passed away his collection was bequeathed to Toba Aquarium on the condition of permanent storage. This included the holotype specimen of *B. teramachi*, which still resides in the Toba Aquarium Collection today. Since then Toba Aquarium has become famous for its affiliation with shell collecting and continues to have a shell dealer department today.



Lyncina kuroharai (Kuroda & Habe, 1961)

CYPRAEIDAE

-150m, Trawled, Okinoshima, Munakata, Fukuoka Prefecture, Japan, 1980/vii, 40.1mm.

The « Kurohara's Cowrie » is a lovely medium-sized cypraeid ranging from Honshu, Japan to East China Sea to Taiwan. A classic rarity among Western Pacific cowries, it can be safely separated from other superficially similar *Lyncina* species such as *L. schilderoorum* Iredale, 1939 and *L. sulcidentata* (Gray, 1824) by its very fine teeth, curved aperture, and inflated shape. It is a omnivorous grazer living among sponges and rubbles, usually in relatively deep water around -50~250m, although it is occasionally found as shallow as -10m. Very rarely such specimens are washed up on the beach, becoming a rare trophy of beachcombers. Though in recent years Chinese trawlers have brought up numerous specimens from the East China Sea making it much easier to acquire, it is very prone to imperfections such as growth scars and octopus holes and perfect specimens are still very scarce today. Typical shell length around 40mm., extremely large specimens are known to exceed 60mm. It is named in honour of Kazuo Kurohara of Japan.



Mikadotrochus beyrichii (Hilgendorf, 1877)

PLEUROTOMARIIDAE

-100~120m, Trawled, Mimase, Kōchi, Kōchi Prefecture, Japan, 1969/vi, 84.4mm.

The « Beyrich's Slit Shell » is a striking pleurotomariid endemic to Japanese waters, best known from the central portion of Honshu Island. Although the third to be formally described it is actually the earliest living slit shell recorded and illustrated in the recent literature, being included in Japanese books such as « Kigai-zufu » (Kenkado Kimura, 1775) and « Mokuhachi-fu » (Sekiju Musashi, 1843) long before *Perotrochus quoyanus* (Fischer & Bernardi, 1856) was discovered in the Caribbean Sea. These Japanese books were unknown to scientists outside the country then, however. This species was thus overlooked until Franz Martin Hilgendorf (1839-1904), a German zoologist, found a specimen in a souvenir shop of Enoshima, Kanagawa Prefecture, Japan in 1876. He described it the following year, naming it after Heinrich Ernst Beyrich (1815-1896), a famous German palaeontologist who first proposed the term 'Oligocene'. It has traditionally been a greatly celebrated rarity, especially among Japanese collectors, and remains scarce nowadays. After Hilgendorf reported its existence the British Museum (Natural History) in London commissioned the University of Tokyo to find a specimen. It was the eminent professional marine animal gatherer Kumakichi Aoki (1864-1940), working for the Misaki Marine Station, who successfully collected a living specimen in the following spring. He was rewarded with the prize of 40 Japanese yen, a huge sum back then. Upon receiving the prize Aoki supposedly exclaimed « I've become a millionaire! », which leads to this species being sometimes called « Cho-ja-gai » (Millionaire Shell) in Japan, even today. A carnivorous grazer feeding on sponges, it usually inhabits rocky bottoms around 100~300m deep but has been found as shallow as -30m, making it the shallowest living of all recent pleurotomariids. Strong, broad radial lirae on the shell surface are crossed by relatively infrequent axial ribs to generate the characteristic coarsely chequered sculpture. The frequency and extent of red flamm.ules vary according to localities, with specimens from Chiba Prefecture and Tokyo Bay having the darkest colouration. The shell form also vary somewhat by locality, for example shells from Kōchi Prefecture (shown) are usually broader than typical specimens from Chiba Prefecture. Typical shell length around 70mm., very large specimens may exceed 100mm.



Perotrochus atlanticus Rios & Matthews, 1968

PLEUROTOMARIIDAE

-200~250m, Trawled, Cabo de São Tomé, Rio de Janeiro, Brazil, 1998/x, 62.5mm.

The « Atlantic Slit Shell » is a gorgeous medium-sized pleurotomatiid endemic to southern Brazil, from around Rio de Janeiro to as far south as the Brazil-Uruguay border. The shell is heavily ornamented by finely beaded coarse spiral cords and numerous flamm.ules, the colouration of which vary from red to brown and the saturation vary from one specimen to another. The characteristic shape of adult shells is formed by the gradual shifr of the whorls being smooth-sided, as in the early teleoconch, to strongly inflated and bulging ones in the later stages. It is locally only uncomm.on and is perhaps the most easily obtainable Atlantic slit shell, although it is very susceptible to erosion and bore-holes, specimens in fine conditon are thus still considerably rare. A carnivorous grazer feeding on sponges, it inhabits sandy to muddy bottoms of rather deep water around -150~300m. Typical shell diameter around 65mm., extremely large specimens are known to exceed 85mm. The spire is variable in height although usually it is usually low; the name *Perotrochus notialis* (Leme & Penna, 1969) refers to a high-spired form and is now considered to be a junior synonym.



Halicardia nipponensis Okutani, 1957

VERTICORDIIDAE

-500~600m, Trawled, Sōma, Hamadōri, Fukushima Prefecture, Japan, 2006/viii, 32.0mm.

The exceptionally exquisite *Halicardia nipponensis*, with its unique shape formed by two strong radial ridges, is certainly one of the most unusual bivalves of all. It is a filter-feeding bivalve inhabiting muddy bottoms of deep-water ranging from -500~1500m, and is a renowned endemic of Japan only found the northern half of the Pacific Honshu. An incredibly coveted species, especially in Japan where its beauty is greatly celebrated, it is only very rarely obtained by deep-water trawling and comm. and high prices. When seen from the anterior view its shape resembles two hearts, the interior also carry heart-shaped hinge tooth. Furthermore, its side views are strongly reminiscent of the kanji (Chinese character) for « heart ». It is therefore known in Japan as the « Nippon-otohime-gokoro » (literally, « Heart of the Japanese Maiden Princess »), aptly named by Prof. Takashi Okutani. This brilliant wamei (Japanese name) is part of the reason why it is an especially popular shell in Japan. Although its congener *Halicardia maoria* Dell, 1978 from New Zealand is tentatively reported to be associated with deep-sea hydrocarbon seeps, it is unclear whether *H. nipponensis* does the same. Typical shell length around 32mm., extremely large specimens are known to exceed 40mm.



Perotrochus quoyanus (Fischer & Bernardi, 1856)

PLEUROTOMARIIDAE

-200~210m, Collected by submersible, Sandy Lane Bay, Barbados, 1998/vi, 52.4mm.

First discovered by Comm. andant Beau in the Marie-Galante Island, Guadeloupe in 1855, the legendary « Quoy's Slit Shell » was the first living pleurotomariid species formally exposed to science. The encounter of this species is among one of the most important landmarks in malacology and generated great excitement, as previously this important ancestral lineage of basal gastropods were considered long extinct; the finding of living species opened up wholly new possibilities in studying the evolution of gastropods. It was therefore selected as one of S. Peter Dance's 50 « Rare Shells » (1969). The first specimen (i.e., the holotype) was taken from a fisherman's pot set in deep-water, and it was inhabited by a hermit crab. This was closely followed by the exposure of *Entemnotrochus adansonianus* (Crosse & Fischer, 1861) and *Mikadotrochus beyrichii* (Hilgendorf, 1877), up until now some 30 living pleurotomariid species have been described. In fact, *M. beyrichii* was illustrated in the Japanese books such as « Kigai-zufu » (Kenkado Kimura, 1775) and « Mokuhachi-fu » (Sekiju Musashi, 1843) long before the detection of *P. quoyanus*, but these books were not known to scientists in the western world then. Today, *P. quoyanus* is known to have a rather wide distribution around the Caribbean Sea from Yucatan, Mexico to Virgin Islands to Venezuela. Furthermore there is one recognised subspecies, *P. quoyanus insularis* Okutani & Goto, 1985, described from the Bermuda Islands and has a much taller spire with more swollen whorls. Specimens with a similar form have since been found as far as Honduras, however. The name *Perotrochus gemma* Bayer, 1965 was previously considered to be a separate species but is now regarded as a gemmate form of *P. quoyanus* and thus a junior synonym of it. The shell is therefore rather variable in spire height and strength of surface sculpture (i.e., 'gemma'ation'), the colouration is also variable from rather pale to strongly flamed with reddish axial bands. It is a carnivorous grazer feeding mostly on sponges and usually inhabit hard substrates in deep water around -180~350m. Due to its deep habitat it is still a rare shell, especially live-collected in fine condition; such shells are virtually only obtainable using deep-water submersibles as trawls rarely operate near the rocky walls it inhabit. Typical shell length around 45mm., extremely large specimens may exceed 60mm.



Mikadotrochus salmianus (Rolle, 1899)

PLEUROTOMARIIDAE

-240m, Trawled, Tosa, Kōchi Prefecture, Japan, 1967/vi, Ex-Coll. Helen Boswell, 116.2mm.

The « Salmiana Slit Shell » is an elegant pleurotomariid with a blazing colouration and a characteristically tall spire, ranging from Honshu, Japan to Taiwan to Philippines. A much sought-after rarity, most specimens have generally come from Taiwan although recently Chinese fishermen have also trawled many (mostly poor) specimens from the East China Sea. It reaches the largest size in Tosa Bay, Japan where the shells are the thickest and with a rather pale colouration; the shells gradually thins down towards south with specimens from the Philippines being the lightest in build but with a dark colouration. Both Tosa Bay and Philippines specimens are still very scarce today, especially in large size, though in the East China Sea it is probably best described as uncomm.on. A carnivorous grazer feeding on sponges, it inhabits hard substrates of rather deep water around -100~400m. Typical shell length around 90mm., extremely large specimens are known to exceed 135mm. For many decades since its description it was confused with its congener Mikadotrochus beyrichii (Hilgendorf, 1877) due to the small quantity and poor quality of available specimens. As better specimens surfaced, however, its obvious differences with *M. beyrichii* quickly became apparent and it has become widely accepted as a valid species since the 1970s. A well-known synonym is *Mikadotrochus schmalzi* Shikama, 1961.



Entemnotrochus adansonianus (Crosse & Fischer, 1861)

PLEUROTOMARIIDAE

-120~130m, Collected by submersible, Half Moon Bay, West End, Roatán Island, Bay Islands, Honduras, 2009/ix, 129.3mm.

The majestic and magnificently flamed « Adanson's Slit Shell » is perhaps one of the most beautiful pleurotomariids, and also a renowned and celebrated classic rarity among them. As the first of S. Peter Dance's 50 « Rare Shells » (1969) a photo of one of the oldest surviving specimens, purchased by Samuel Archer in Barbados in the 1800s, serves as the book's cover. A rather widely ranging species in the western Atlantic Ocean, it is best known from the West Indies and Caribbean Sea but the full geographical distribution ranges from as far as Bermuda down to Brazil. Specimens from Bermuda differs from all others in having a more vertically compressed shell of much smaller size (to 100mm.), the spire also appears much more strongly stepped as the whorls are strongly shouldered. These Bermudian specimens are thus separated as a valid subspecies, *E. adansonianus bermudensis* Okutani & Goto, 1983. It is a carnivorous grazer feeding on sponges like the majority of pleurotomariids, and inhabits vertical rocky walls of rather deep water around 100~300m in depth. Even with all these knowledge about its ecology it is still a very rare shell on the international market nowadays because the steep rock walls it inhabit is well protected from traditional fishing methods. Dredging or trawling only uncover dead-taken or crabbed specimens, and traps have been effective in gathering only crabbed shells. Most live-taken specimens in fine quality, like the one shown, have therefore been carefully collected by underwater submersibles. The subspecies *E. a. bermudensis* is rarer still, with virtually no live taken examples so far known. The pattern is somewhat variable, although most specimens carry alternating red and pale patches. Large specimens tends to have less sharp, saturated colouration. Typical shell diameter around 110mm., although extremely large examples are known to reach a staggering size of 190mm. It is the second largest of all living slit shells, only surpassed by its Pacific congener *E. rumphii* (Schepman, 1879). Currently these two species are the only recognised valid species of the genus *Entemnotrochus*.



Kendrickiana veitchi (Smith, 1971)

PENICILLIDAE

Low tide, Broome, Kimberley, Western Australia, Australia, 203.1mm.

The « Veitch's Wateringpot » is a strange and wonderful penicillid endemic to Western Australia and Southern Australia, Australia; best known from the Great Australian Bight. It is a member of the bivalve superfamily Clavagelloidea, characterised by their remarkable behaviour of switching from growing the true shell to building a calcareous tube, called the adventitious tube. At the earliest stages of life after settlement it bears a normal bivalved shell, which is still attached to the outside of the adventitious tube and visible; although in this species it is largely incorporated into the tube. Uniquely among penicillids its adventitious tube is strongly bulbous at the « watering-pot » end, divided into hundreds of small tubes, and is not distinctively fringed like most other species. A filter-feeding species, it appears to be restricted to soft bottoms of seagrass beds (such as *Posidonia* sp.) and inhabit subtidal waters down to about 50m deep. In life it lives vertically buried with the « watering-pot » end down. Although probably only uncomm.on locally, it is rarely seen in the international shell trade market. Previously it has been placed in the genus *Brechites* and then *Foegia*, but after detailed anatomical investigation a new genus, *Kendrickiana*, was erected to house it; it is currently the only species placed in that genus. Typical length of the adventitious tube around 200mm., although very large specimens are known to exceed even 370mm.



Paramoria guntheri (Smith, 1886)

VOLUTIDAE

-21m (-70 ft), In sandy rubble, By diver, Thorny Passage, South Australia, Australia, 54.5mm.

The deliciously patterned « Gunther's Volute » is a celebrated classic rarity among the volutes, endemic to southern Australia. Initially only known from a handful of dead-collected specimens, a live specimen was first discovered in May 1973 Port Lincoln, South Australia. Photographs of this specimen was published, revealing to the world the equally beautiful animal, covered in a web-like pattern of similar colouration as the shell. A carnivorous and predatory gastropod, it inhabits sandy to muddy bottoms of shallow to moderate depths around -10~50m. Today it is still considerably rare and highly sought-after by collectors. The attractive pattern is rather variable and the axial lines vary considerably in frequency among specimens. The two spiral bands may be solid or dotted when present, but they may also be completely absent. The form without spiral bands is rarer and was originally described as a separate species *Voluta adcocki* Tate, 1889; now considered a synonym but is still widely used as a form name in shell trade. Furthermore, the shoulder nodes are also rather variable in strength. Typical shell length around 45mm., extremely large specimens may exceed 65mm.



Netastoma darwinii (Sowerby II, 1849)

PHOLADIDAE

Inside sand rocks, San Jorge Gulf, Caleta Olvia, Santa Cruz, Argentina, 2004/i, Coll. Andres R. Bonard, 39.2mm.

The « Darwin's Piddock » is a spectacular South American pholadid with a very peculiar shape, ranging from southern Brazil to Argentina. A rock-burrowing bivalve, it repeatedly rotates its shells using a set of specially adapted muscles to mechanically grind a tubular burrow in soft rocks, which it then reside within for the rest of its life. It is a filter-feeder inhabiting very shallow to shallow waters down to about 15m deep, during feeding it extends its siphons out of the burrow but rest of the body remains protected by the rock. A rather rare species, perhaps owing to the fact that it is difficult to locate, and even more difficult to extract intact from its rocky burrow. Typical shell length around 30mm., very large specimens may exceed 40mm. The genus *Netastomella* was erected by Carpenter in 1865 to house this eccentric species, but it is now deemed to be an unnecessary replacement name for genus *Netastoma*, its current genus.

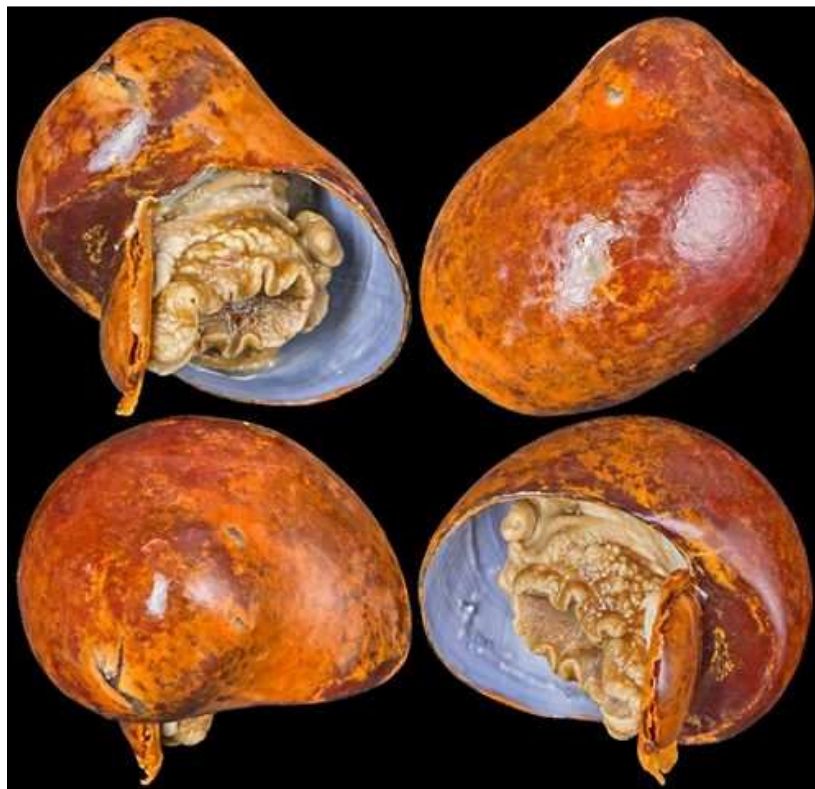


Gigantopelta aegis Chen, Linse, Roterman, Copley & Rogers, 2015

PELTOSPIRIDAE

-2785m, 'Tiamat Chimney', 37°47.03'S, 49°38.97'E, Longqi hydrothermal vent field, Southwest Indian Ridge, ROV Kiel 6000 Dive 142 on-board RRS James Cook expedition JC67, 2011/xi/29, 40.2mm.

The « Aegis Shield » is a large hydrothermal vent endemic peltospirid known only from the Longqi (aka Dragon) hydrothermal vent field, Southwest Indian Ridge, Indian Ocean; which is a bathyal site around -2700~2800m in depth. It houses chemosynthetic endosymbiont bacteria in a much enlarged oesophageal gland, and appear to rely on these for nutrition. Interestingly both its shell and operculum are covered in a thick layer of iron oxide (i.e., rust), on the operculum especially this layer is a circular slab that can reach a thickness of 5mm. It is thus another « iron-armoured snail » like the 'scaly-foot gastropod' *Chrysomallon squamiferum* Chen et al., 2015. Most intriguingly however the 'scaly-foot', which it lives side-by-side with, has iron sulfide coating instead of iron oxide; it is not known why the two large peltospirids living in the same environment use different iron compounds to coat their exterior surface. Furthermore, its congener *G. chessoia* Chen et al., 2015 from Antarctic vents does not have such iron coating at all. The function (if any) of this coating is yet unclear, although microbial activity likely contribute to its formation. The specific epithet « aegis » refers to the renowned powerful mythical shield of Athena and Zeus from the Greek mythology; named for its great thickness and also the well-polished appearance which fits well with the description of the legendary shield which is sometimes described as « mirror-like ». The bluish-white shell is quite thin, covered by a rather thick periostracum which is in turn covered by the thick rust layer. With an average shell length of 35mm. and very large specimens reaching 44mm., it is a gigantic peltospirid only exceeded in size by *C. squamiferum* and *G. chessoia*. Although a comm.on species in its habitat, due to the extreme difficulty in collecting specimens from hydrothermal vents, it is unfortunately a virtually unobtainable species for personal collection.



Gigantopelta chessoia Chen, Linse, Roterman, Copley & Rogers, 2015

PELTOSPIRIDAE

-2646m, 'Cindy's Castle' hydrothermal vent site, 56°05.31'S, 30°19.10'W, E2 segment, East Scotia Ridge, By ROV Isis Dive 189 on-board RSS James Cook cruise JC80, 2012/xii/12, 45.9mm.

The « ChEsSO's Shield » is a large hydrothermal vent endemic peltospirid known only from the Antarctic deep-sea hydrothermal vents in E2 and E9 segments of the East Scotia Ridge, South Sandwich Islands. The vent sites it inhabits are bathyal, around -2400–2600m in depth range. It houses chemosynthetic endosymbiont bacteria in a much enlarged oesophageal gland, and appear to rely on these for nutrition. With an average shell length of around 35mm. and very large specimens exceeding 45mm., it is not only the largest peltospirid but also the largest member of the clade Neomphalina. Its size record is closely followed by the 'scaly-foot gastropod' *Chrysomallon squamiferum* Chen et al., 2015 (reaching 45.0mm.) and its congener *Gigantopelta aegis* Chen et al., 2015 (reaching 44.2mm.). The shell is rather thin but rigid, and covered by a thick olive to brown periostracum of a similar thickness. The operculum is unusually large for the family, most of which have reduced operculum or completely lost it, and covers the entire aperture. The genus name « *Gigantopelta* » is taken from « Giganto- », which means « giant » but is also an reference to the legendary Giants of the Greek mythology; and « pelta » meaning « shield », referring to the large operculum as well as the family name Peltospiridae. The specific epithet « *chessoia* » is taken from the ChEsSO (Chemosynthetic Ecosystems of the Southern Ocean) project, primarily funded by the Natural Environment Research Council, United Kingdom, which in 2010 first discovered and surveyed the Antarctic vents it inhabits. ChEsSO was part of the ChEss (Biogeography of Deep-Water Chemosynthetic Ecosystems) project in the Census of Marine Life initiative. Although a dominant species in its habitat, due to the extreme difficulty in collecting specimens from hydrothermal vents it is unfortunately a virtually unobtainable species for personal collection.

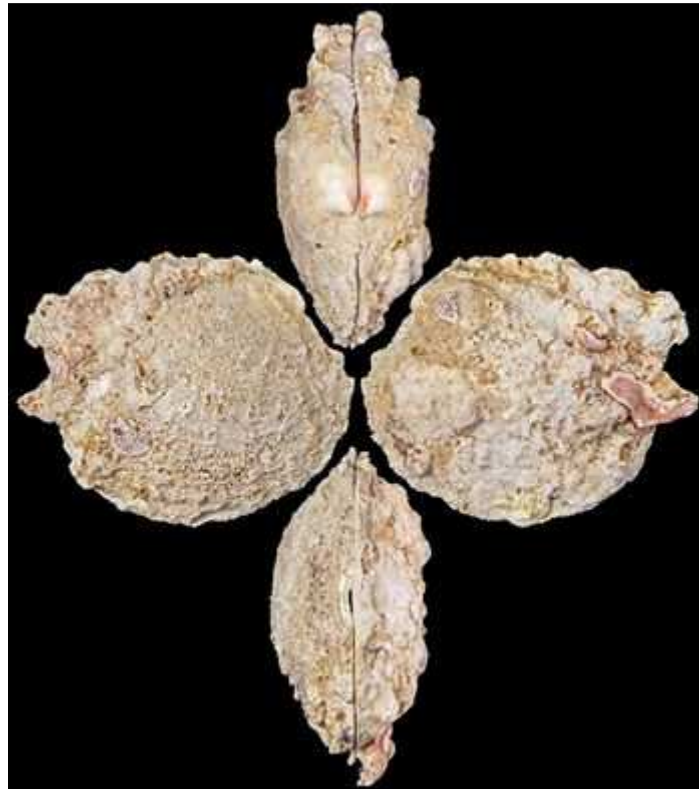


Samarangia quadrangularis (Adams & Reeve, 1850)

VENERIDAE

Dived, Zanpa-Misaki, Yomitan, Okinawa Island, Okinawa Prefecture, Japan, 2006/vi, 59.3mm.

The « *Samarangia Clam* » is a highly unusual venus clam with a peculiar habit of cementing sand grains over its shells to form 'pseudo-shells' that completely conceal the true shells, termed arenaceous coating. The sand grains are first held together by a mucus layer, and later become permanently concreted by aragonitic calcium carbonate. The function of this rather thick coating has been argued to be protective and camouflage, although no direct evidence has been presented. Surface of the arenaceous coating is ornamented with a number of prominent radial ribs, the strongest few being clearly nodulous. The underlying true shell is actually completely smooth and overlaid by a thin periostracum, the only way to see it is by removing the coating through intensive polishing. Its distribution range is quite wide in the Western Pacific from the Coral Sea to Honshu, Japan to Indonesia. Previously its range was thought to extend as far as Mauritius and Reunion, but recent studies have separated the Indian Ocean and Red Sea population as a distinct species -- *Samarangia lewinsohni* Mienis, 2011. A filter-feeding bivalve inhabiting sandy bottoms of rather shallow waters around -10~50m, it is not uncommon throughout its range. Typical shell length around 70mm., very large specimens may exceed 100mm.



Neancistrolepis glabra Habe & Ito, 1973

BUCCINIDAE

-730~740m, 44°12'E 144°29'E, Trawled, Abashiri, Hokkaido, Japan, 2006/vii, 57.2mm.

Neancistrolepis glabra is a cold-water whelk with smooth, glossy periostracum ranging from Hokkaido, Japan to the Okhotsk Sea. A carnivorous and often scavenging gastropod, it inhabits sandy to muddy bottoms of quite deep water around -600~800m. It is a very rarely seen species on the international shell trade, even locally in Japan it is considered a rare species. In fully adult specimens, the outer lip thickens slightly and characteristically flares out, extending anteriorly. The periostracum is darker coloured in adults than juveniles and peels rather easily when dried. The operculum is teardrop shaped and as usual for the genus *Neancistrolepis* it is much smaller than the aperture, though not as small as in the genus *Parancistrolepis*. Typical shell length around 100mm., very large specimens may exceed 140mm.



Spondylus crassisquama Lamarck, 1819

SPONDYLIDAE

-35~40m, Panama Bay, Panama, 2005/viii, 143.8mm.

Much better known by the name *Spondylus princeps* Broderip, 1833 which was recently synonymised with the current name, the showy « Pacific Thorny Oyster » gains its vernacular name from its distribution range in the Pacific Americas, from Baja California to Peru. Being rather variable in spine development and colouration it has a couple further synonyms including *S. basilicus* Reeve, 1856 which refers to an orange form, and *S. dubius* Broderip, 1833. *Spondylus leucacanthus* Broderip, 1833 with more sparse spines which are usually white was traditionally considered to be a form of this species but currently separated out as a valid species on its own right. A filter-feeding sessile bivalve like all spondylids, it lives attached to hard substrates around moderate depths of -10~50m. Typical shell length including spines around 100mm., very large specimens are known to exceed 170mm. Although a locally comm.on species, specimens of fine quality are uncomm.on on the international shell trade market.



Chrysomallon squamiferum Chen, Linse, Copley & Rogers, 2015

PELTOSPIRIDAE

-2785m, Longqi vent field, 37°47.03'S 49°38.97'E, Southwest Indian Ridge, Indian Ocean, 43.1mm.

The 'scaly-foot gastropod' is an iconic vent endemic gastropod known only from the Indian Ocean deep-sea hydrothermal vents. The foot, uniquely among gastropods, carry numerous corneous dermal sclerites often mineralised with iron sulfide along with the shell surface, making it the only extant metazoan known to use iron in the skeleton. First discovered at Kairei vent field, Central Indian Ridge (CIR), it has subsequently also been found in Solitaire field, CIR (Mauritius) and Longqi field, Southwest Indian Ridge (SWIR). The Solitaire population has white sclerites instead of black due to lack of iron in them, most likely due to differences in the vent fluid composition. The function of sclerites has been speculated to be protective or detoxification (by accumulation of sulfide waste), but their true function is yet unknown. It is a holobiont hosting thioautotrophic (i.e., sulfur-oxidising) chemosynthetic endosymbionts in a much enlarged oesophageal gland, and appear to rely on these for nutrition. With shell length that averages at around 35mm. and exceeds 45mm. in large individuals, it is a very large peltospirid compared to most others which are below 15mm. in shell length. Although discovered as early as 2001, a publication containing a formal description and name was not published until 2015.



Chrysomallon squamiferum Chen, Linse, Copley & Rogers, 2015

PELTOSPIRIDAE

-2607m, Solitaire vent field, 19°33.41'S 65°50.89'E, Central Indian Ridge, Indian Ocean, Mauritius, 35.2mm.

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Chrysomallon squamiferum Chen, Linse, Copley & Rogers, 2015

PELTOSPIRIDAE

-2422m, Kairei vent field, 25°19.218S, 70°02.424E, Central Indian Ridge, Indian Ocean, 39.1mm.

The 'scaly-foot gastropod' is an iconic vent endemic gastropod known only from the Indian Ocean deep-sea hydrothermal vents. The foot, uniquely among gastropods, carry numerous corneous dermal sclerites often mineralised with iron sulfide along with the shell surface, making it the only extant metazoan known to use iron in the skeleton. First discovered at Kairei vent field, Central Indian Ridge (CIR), it has subsequently also been found in Solitaire field, CIR (Mauritius) and Longqi field, Southwest Indian Ridge (SWIR). The Solitaire population has white sclerites instead of black due to lack of iron in them, most likely due to differences in the vent fluid composition. The function of sclerites has been speculated to be protective or detoxification (by accumulation of sulfide waste), but their true function is yet unknown. It is a holobiont hosting thioautotrophic (i.e., sulfur-oxidising) chemosynthetic endosymbionts in a much enlarged oesophageal gland, and appear to rely on these for nutrition. With shell length that averages at around 35mm. and exceeds 45mm. in large individuals, it is a very large peltospirid compared to most others which are below 15mm. in shell length. Although discovered as early as 2001, a publication containing a formal description and name was not published until 2015.



Cymbiola perplicata (Hedley, 1902)

VOLUTIDAE

-30m, Dived on reef, Lihou Reef, Coral Sea, Australia, 60.0mm.

The « Entangled Volute » is a delightful volute characterised by stunning golden axial lines, and is a much sought-after rarity among the volutes. The original description was based on three poor beached shells from Australian fishermen, but with no further specimens being found its true provenance remained a mystery. That is, until its re-discovery in the late 1970s by Mr. Tom Nielson of Yeppoon, Queensland, Australia and his team. Nielson had already re-discovered other rare shells, including another rare volute *Cymbiola thatcheri* (McCoy, 1868), using special shell dredges in the early 1970s on-board the chartered boat « Coralita ». His early searches for *C. perplicata* funded by Mr. John du Pont had ended in no avail, however; and it was only after repeated cruises (also on-board the « Coralita ») that he finally managed to locate and collect live specimens of *C. perplicata* in the Coral Sea. His early expeditions were supposedly recorded in a film entitled « In Search of the Perplicata », though virtually no remaining copies of it appear to exist. Today it is known to be an endemic of the Australian Coral Sea, and remains rather scarce still. A carnivorous gastropod like all volutes, it inhabits sandy bottoms of shallow to moderate depths around -2~40m. Typical shell length around 65mm., extremely large specimens may reach 85mm.



Cyrtopleura costata (Linnaeus, 1758)

PHOLADIDAE

Dug out from intertidal mud, Low tide, Cedar Key, Florida, USA, Collected by Edward Nieburger, 1976/v/1, 172.4mm.

This delicate bivalve of otherworldly beauty is aptly named the « Angel Wing », and has attracted the adoration and fascination of shell collectors for hundreds of years. Each thin and almost translucent wing-like valves carry 24-27 strong radial ribs which carry numerous beads that convincingly look like feathers on the wing. It has a rather wide distribution range from Massachusetts, USA to as far south as Brazil, although vast majority of specimens on the market originate from Florida, USA. A large filter-feeding pholadid inhabiting muddy bottoms of very shallow water down to about -5m in depth, it is most common in intertidal waters just below the low-water mark and usually burrow deep into the mud, up to about a metre. The animal is bulky with a powerful foot as well as a hefty fused siphon which is so large that the two valves cannot be closed and instead permanently gape apart when alive. Each valve carries on the inside a apophysis, spoon-like appendage which is a point of attachment for the foot musculature. As usual for the genus *Cyrtopleura* it has a small butterfly-like mesoplax and also a large, entirely corneous protoplax (both shown) but lacks a metaplax. These accessory plates help cover part of the animal which would be exposed otherwise, due to the large gape in its valves, and is a common feature for members of the family Pholadidae. When alive both valves are covered by a thin, brown periostracum which is often worn near the umbo. Although it is a common species, large specimens with both the mesoplax and especially the protoplax preserved are very difficult to acquire. Separated single valves are commonly washed ashore on beaches and is a beachcomber's favourite. Typical shell length around 130mm., extremely large specimens may reach 200mm. Its meat is edible and in Mexico, Cuba, and Puerto Rico it is harvested commercially for food and supports important fisheries. Aquacultural research has shown that it is a fast growing species and reaches 50-70mm. shell length within six months of settlement.



Textilia adamsonii (Broderip, 1836)

CONIDAE

-20~30m, Dived, Rurutu Island, Austral Islands, French Polynesia, 1998/i, 41.0mm.

With truly spellbinding patterns the « Rhododendron Cone » is a great classic rarity among the conids and one of the most sought-after by collectors. One of S. Peter Dance's 50 « Rare Shells » (1969), it is still a very difficult shell to obtain today in fine condition. Although it is often beached after typhoons pass, but such specimens are typically worn with badly damaged lip. A predatory gastropod like all conids, it is a piscivorous species which hunt fishes using venom injected from its harpoon-like radula. It inhabits sandy bottoms of coral reefs and lagoons and may be found from low intertidal waters down to moderate depths around -60m deep. The shell characteristically carry three broad spiral bands with sparse nebulous patterns which alternate with another three narrower spiral bands with small triangular spots. It has a rather wide distribution range in the Pacific Ocean ranging from Coral Sea to French Polynesia, and varies slightly in form, size, as well as pattern depending on the locality. Specimens from the Marquesas Islands, for example, are rather large and instantly recognisable by their exceptionally intense colouration and more cylindrical (rather than conical) form. Its vernacular name comes from a famous synonym, *Conus rhododendron* Jay, 1839, which is very appropriate but unfortunately must give way to Broderip's earlier name. Typical shell length around 35~40mm. depending on the locality, extremely large specimens are known to exceed 55mm.



Angaria sphaerula (Kiener, 1838)

ANGARIIDAE

Panglao Island, Bohol, Philippines, 2010/x, 70.3mm.

With its astonishing ornamentation the « Kiener's Delphinula » is perhaps the most beautiful angariid, and one of the most exquisite of all gastropods. For a long time since its description it remained a very rare shell, even well into the 20th Century; S. Peter Dance chose it as one of his 50 « Rare Shells » (1969), describing it as « undoubtedly scarce and undeniably beautiful » (p.51). Today, however, it has been revealed to be a rather comm.on species native to the tropical Western Pacific, best known from the Philippines where most specimens originate. An extremely variable species in spine formation, its spines can vary greatly in length, recurvedness, and in structure from a simple tube to being extensively webbed. It is also quite variable in colouration, the two comm.on colours being red and green; an individual may change its colour during its life, as in the specimen shown which shifted from red to green. Large specimens of the form with frilly, webbed spines like flower petals are rare because the frills are exceedingly fragile and prone to damage; such specimens, especially when wholly red, are in great demand and comm.and high prices. A grazing gastropod feeding on algae, it inhabits rocky surfaces of rather deep waters around -50~250m, its deep habitat contributed to its apparent rarity prior to the invention of tangle nets in the Philippines. Typical shell length around 60mm. including spines, very large specimens may approach 100mm.

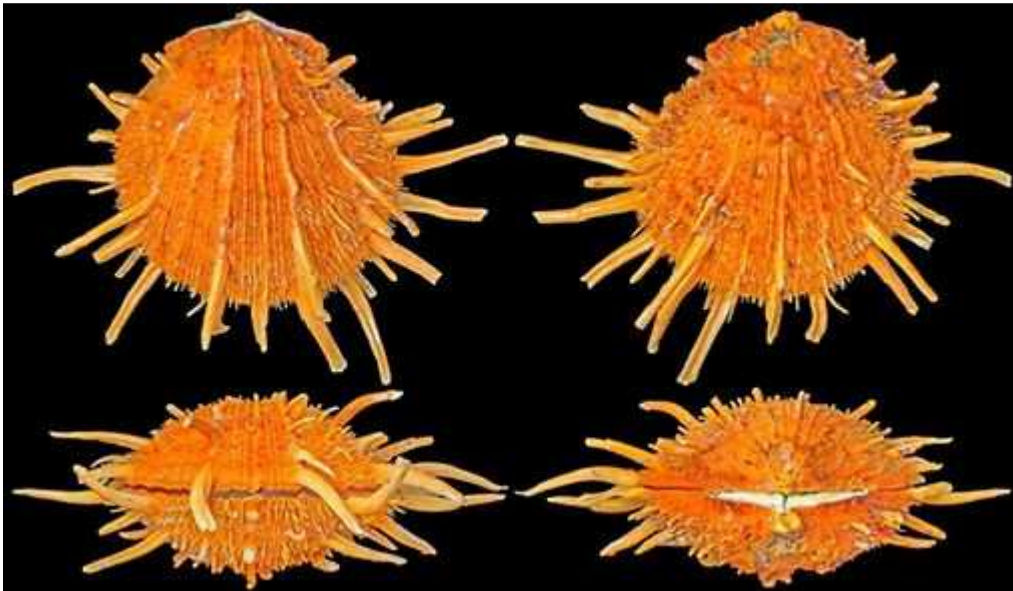


Spondylus regius Linnaeus, 1758

SPONDYLIDAE

-60~80m, By lobster gillnets, Sakai, Minabe-Cho, Wakayama Prefecture, Japan, 1980/iii, 213.5mm.

The « Regal Thorny Oyster » is a glorious spondylid native to the western Pacific, ranging from Japan to Philippines. It is an exceedingly famous species and collector's item due to its large size, long spines, and gorgeous colouration; chosen by S. Peter Dance as one of his 50 « Rare Shells » (1969). Used to be a very rare species until the 20th Century but today it is a comm.on shell, to the extent that it is often seen sold as home decoration. Giant or exceptional specimens, however, are still much prized and fetch high prices. Most specimens are reddish in colour with pale spines but uncomm.only wholly orange specimens (as shown) are found, and rarely also yellow ones. Specimens from deep water often have very long spines which may be spatulate and undulating at tips, as well as more fine spines between the main ribs. This form has been given the name *Spondylus cumingii* Sowerby II, 1847, now considered a synonym of *S. regius*, and these are also much favoured by collectors. A sessile filter-feeding species living attached to hard substrates, it inhabits shallow to rather deep water ranging between -5~100m in depth. Typical shell length including spines 160mm., extremely large specimens may exceed 220mm. The depicted specimen is a superb deep water orange shell from Japan with all fine spines perfectly preserved.



Nodipecten magnificus (Sowerby I, 1835)

PECTINIDAE

-6~7m, Dived, Fernandina Island, Galápagos Islands, 2000/x, 97.2mm.

The « Magnificent Scallop » is a truly flamboyant pectinid and a famous endemic species of the Galápagos Islands. A much celebrated collector's item, it is a rarity on the shell trade market despite being locally not uncomm.on because Galápagos Islands is not only difficult to access but also a protected area with strict regulations implemented on collecting. A filter-feeding bivalve, it inhabits shallow sandy bottoms among reefs around -2~50m deep and often attaches itself to hard substrates using byssus threads. The number of ribs is generally between 12 and 13, quite numerous for the genus *Nodipecten*. Young shells (as shown) usually produce small nodules on the ribs as well as white markings but this stops after a certain size and ribs then become uniform in colouration and lack nodules. The normal colouration is a striking dark red but occasionally orange specimens are found, rarely also brown ones. Typical shell length around 170mm., very large specimens may exceed 220mm.



Beringius miyauchii Habe & Ito, 1972

BUCCINIDAE

-400~450m, Trawled, Urup Island, Kuril Islands, 2014/viii, 109.1mm.

The « Miyauchi's Neptune » is a cold-water buccinid with fascinating sculpture native to the Sea of Okhotsk, ranging from northern Hokkaido, Japan to the Kuril Islands. It is a very rare species and is extremely difficult to acquire in fine condition. Many consider it to be a form of *Beringius frielei* Dall, 1895 but it is clearly distinct from that species with much stronger sculpture, a much more slender shell, and shallower suture. It is also often treated as a subspecies of *B. frielei*, although this possibility cannot be excluded the geographical distribution of the two species overlap and it is perhaps best to consider them as separate species. A carnivorous and scavenging gastropod, it inhabits soft bottoms of rather deep water ranging between about -100~500m in depth. The apex is always corroded in adult specimens. Typical shell length around 100mm., very large specimens may exceed 130mm.



Austrasiatica hirasei (Roberts, 1913)

CYPRAEIDAE

-100~150m, Balut Island, Davao Occidental, Mindanao, Philippines, 2009/iv, 48.0mm.

The « Hirase's Cowrie » is an exceedingly elegant cypraeid ranging from Kii Peninsula, Japan to Philippines to Queensland, Australia. One of the 'three famed cowries' of Japan along with congener *A. langfordi* (Kuroda, 1938) and *Nesiocypraea teramachii* (Kuroda, 1938), it is a much coveted rarity and collector's item. Although in the recent years many specimens have surfaced from the East China Sea and those have been traded with relatively low prices, high quality specimens are still costly. Truly Australian specimens, especially, are extremely scarce. An omnivorous nocturnal gastropod, it inhabits relatively deep water around -100~200m. Typical shell length around 50mm., extremely large specimens may exceed 65mm. It is named in honour of the eminent pioneering Japanese collector Yoichiro Hirase. The first specimen is said to have been discovered from the hands of a young girl in the fishing village of Kii-Tanabe, Wakayama Prefecture, Japan; hence its wamei (Japanese vernacular name) is « Otome-dakara », meaning « Maiden Cowrie ».



Otukaia kiheiziebisu (Otuka, 1939)

CALLIOSTOMATIDAE

-800~850m, Trawled, Minamisōma, Fukushima Prefecture, Japan, 2013/v, 35.1mm.

Characteristically ornamented with three pleating keels, the « Kiheizi's Top » is an extremely striking calliostomatid and a very famous classic rarity of Japan. It is endemic to Japan with its range restricted to the Pacific side of southern Hokkaido to Honshu to Shikoku. Although its feeding habits are not well known it is most likely a carnivorous grazer feeding on cnidarian and other sessile organisms. Most specimens are collected as trawling by-catch from soft bottoms of deep water around -200~1000 deep, but it is very rare throughout its range and is a highly sought after species. Typical shell length around 30mm., very large specimens as shown may exceed 35mm. It was christened 'kiheiziebisu' after a famous Japanese collector, Mr. Kiheizi Ōshima, who first collected it from the fish market of Chōshi, Chiba Prefecture; 'ebisu' literally means 'top shell' in Japanese. It is also the type species of genus *Otukaia*, as designated by Ikebe, 1942. *Otukaia ikukoae* Sakurai, 1994 is a southern form with finely granulated keels instead of smooth ones, it used to be considered as a separate species but is now understood as merely a form and thus treated as a junior synonym.



With JAMSTEC R/V NATSUSHIMA and ROV Hyper-Dolphin, before the research cruise NT15-13. Photo by Mr. Makoto Sugimura, Enoshima Aquarium.

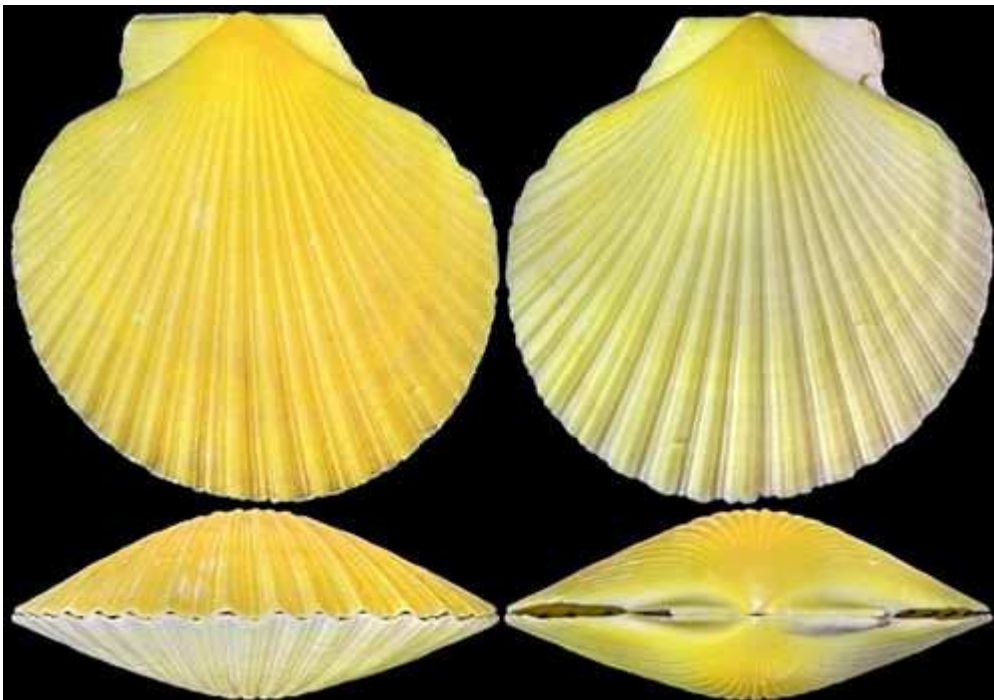


Zygochlamys delicatula (Hutton, 1873)

PECTINIDAE

-100m, Otago Peninsula, South Island, New Zealand, 1993/xii, 62.7mm.

The « Southern Queen Scallop » is a vividly coloured pectinid endemic to New Zealand, mainly distributed on the continental shelf of South Island, in the subantarctic waters southward of Kaikoura, Canterbury. Its size is large for the genus *Zygochlamys*, with an average shell length around 60mm. and very large specimens exceeding 75mm. Due to this relatively large size and the fact that it is a rather abundant species, it is exploited commercially for food and is the only commercially important *Zygochlamys* species. A filter-feeding species living on soft bottoms, juveniles first settle attached on marine growth such as bryozoans or other mollusc shells. It is most abundant around moderate depths between -150~200m, but may be found across a wider bathymetric range of -70~300m. The colouration may vary from pastel yellow to reddish, and the upper valve is much more intensely coloured compared to the lower valve.

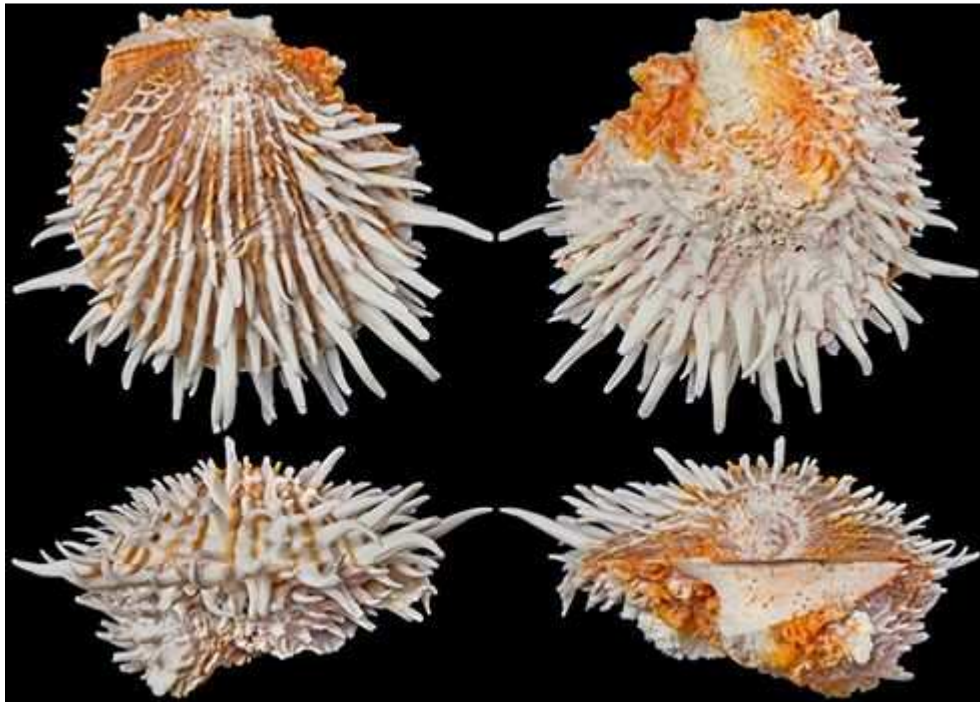


Spondylus echinatus Schreibers, 1793

SPONDYLIDAE

Cebu Island, Central Visayas, Philippines, 1983/xii/27, 95.1mm.

Spondylus echinatus is a delightfully spined thorny oyster widely ranging across the Indo-West Pacific, south of Amami Islands, Japan. It is a very variable species in terms of spine development and colouration, which has resulted in a number of synonyms being given. A very famous one is *Spondylus castus* Reeve, 1856 and it is often still referred to as that, since it is listed in many books under that name. The brown shelled and white spined form as shown has been known as *Spondylus albibarbus* Reeve, 1856. Both Anton, 1838 and Chenu, 1844 gave it the name *Spondylus albus*, but both are synonyms. Furthermore, a densely spinous form was given the name *Spondylus spectrum* Reeve, 1856. The juvenile shell is characteristically white with small black patches. A filter-feeding bivalve which lives a sessile lifestyle with the right valve attached on hard substrates, it is a common species found from low intertidal zone down to about -20m deep. Typical shell length around 90mm., very large specimens may exceed 130mm. *Spondylus zonalis* Lamarck, 1819 was traditionally considered to be a form of this species, but is now considered to be a separate full species in its own right.



Haliotis midae Linnaeus, 1758
HALIOTIDAE
South Africa, 175.1mm.

The « Midas Ear Abalone », locally known as « Perlemoen », is a large haliotid endemic to South Africa with a beautifully radiating wave-like sculpture. A grazing gastropod feeding primarily on encrusting algae as juveniles and a variety of seaweed and drift algae as adults, it is a comm.on species inhabiting moderately exposed rocky shores from intertidal waters down to about -30m deep. It is the only comm.ercially important abalone species in South Africa, traditionally harvested for the meat and exported to Asian markets where the demand for its meat is very high. Since the 1960s it started to show signs of over-exploitation, and the stocks declined rapidly after entering the 21st Century leading to the South African government closing the fishery completely in February 2008. For the same reason it was listed in CITES Appendix III by South Africa on May 2007, although it was then deleted on June 2010. Nevertheless, illegal fishing and poaching continues today and products are often exported from nearby countries such as Namibia and Mozambique. Captive-bred aquacultural business also exist, producing live specimens often seen for sale on the markets of Hong Kong and China. Its shell is comm.only sold as home decor in the polished and dyed state, natural shells in good condition are surprisingly difficult to find. In its natural habitat it is usually heavily encrusted by marine overgrowth and the characteristic undulating sculpture is often completely concealed. The dorsum colouration may vary from yellowish to dark red, the internal is iridescent and often carry bluish patches in large specimens. Typical shell length around 150mm., extremely large specimens may exceed even 220mm.



Cardita crassicosta Lamarck, 1819

CARDITIDAE

-10~25m, Zamboanga, Zamboanga Peninsula, Mindanao, Philippines, 2013, 45.3mm.

The « Large-Ribbed *Cardita* » is an exceedingly beautiful and colourful western Pacific carditid ranging from Taiwan to Indonesia to Australia. It is tremendously variable in colouration which can be anything from white to red to yellow to violet to very dark brown, and is therefore popular among collectors to collect a set of many specimens to exhibit the whole palette. Although it is a comm.on species some colour forms, such as purple, are rare. The form and sculpture is generally quite consistent; specimens may or may not have dark lines on top of their base colours, in most cases between ribs but sometimes also over the ribs. A suspension feeding bivalve, it inhabits sandy bottoms of intertidal and shallow subtidal waters down to about -40m deep. Typical shell length around 45mm., extremely large specimens may exceed even 70mm.



Fissidentalium metivieri Scarabino, 1995

DENTALIIDAE

-200~250m, Trawled, Madagascar, 2000/x, 126.0mm.

The « Metivier's Tusk » is an elegantly curved tusk shell with a restricted distribution in the southwest Indian Ocean, virtually all known specimens originate from rather deep water of - 200~800m around Madagascar where it is locally not uncomm.on. With the largest specimens exceeding 180mm. in shell length it is the largest of all currently known recent scaphopod or tusk shell species. Typical specimens are much smaller and average at around 130mm., but even that is extremely large for a scaphopod. A selective deposit-feeder like other dentaliids, it presumably feeds on small organisms such as diatoms and foraminiferans and lives almost completely buried head-down in soft bottoms, leaving only the very posterior tip of its shell for water exchange and waste expulsion. It locates food using the numerous ciliated tentacles, known as captacula, surrounding the head. The captacula uses cilia to transport smaller food particles and can also retract to bring larger food items to the mouth. Although the curvedness of the shell may vary slightly, it is generally consistent in both the sculpture and the white colouration. The apex or posterior aperture is characterised by a slit-like opening in this species.



Harpa costata (Linnaeus, 1758)

HARPIDAE

-4~5m, Mauritius, 2009/x, 64.5mm.

The illustrious shell of the « Imperial Harp », with its elegantly ornamentation of numerous ribs, is arguably one of the most fascinating and elegant of all molluscs. Though it is a classic rarity chosen by S. Peter Dance as one of his fifty « Rare Shells » (1969), it was only truly rare before the early 1900s when its provenance was revealed in Mauritius. Today we know its distribution is indeed a very restricted one in the Mascarene Basin, ranging from Mauritius to Reunion to eastern Madagascar; vast majority of specimens originate from Mauritius, where it is probably best described as locally uncomm.on. However, as there are legal restrictions to collecting in Mauritius and the fact that high quality specimens are scarce, its price remains high and continues to be one of the most sought-after species in Harpidae. Like other *Harpa* species it is a carnivorous and predatory gastropod feeding on small crustaceans, mainly crabs, and it inhabits sandy bottoms of shallow water down to about -15m deep. Typical shell length around 65mm., though the largest specimen known reaches a staggering size of 111mm. Though it is an unmistakable, instantly recognisable species with a little-varied general form, the width and frequency of ribs vary greatly. This led to a form with widely spaced ribs being described as *Harpa laetifica* Melvill, 1916, and a form with very dense ribs was given the name *Harpa multicostata* Sowerby I, 1822; both are now considered to be synonyms. Another well-known synonym is *Harpa imperialis* Lamarck, 1822, from which its comm.on name originate. Furthermore, a local form from southeast Madagascar with supposedly stronger-than-usual yellow colouration in the aperture was recently named *Harpa costata* f. *lutea* Bozzetti, 2012; but this was described as a form and thus carries no taxonomic validity under the current International Code of Zoological Nomenclature.



Vulsella vulsella (Linnaeus, 1758)

PTERIIDAE

-10~25m, Bohol Island, Central Visayas, Philippines, 2013, 80.6mm.

The « Sponge Finger » is a strange pteriid with a most interesting way of life of being embedded in sponges. This extraordinary sponge-bivalve relationship is obligatory and host-specific with the host being *Spongia* sp., an undescribed species, and is believed to be mutually beneficial to both animals. The bivalve settles on the sponge, and then remarkably loses the byssus to rely on the sponge for life, becoming endozoic. A cluster of *Vulsella* serves as an endoskeleton for the sponge to grow, while the sponge covers them and protect them from potential predators. Recent studies further revealed that the sponge builds an internal canal system to take advantage of the bivalve's exhalent flow and increase its own filtering rate -- the two filter-feeding species work together to gather food more efficiently. This phenomenon is comm. only observed across the very wide range of *V. vulsella* across the Indo-West Pacific, southwards from Honshu, Japan; in shallow water around -2~30m in depth. Its shape and pattern is very variable but larger individuals tend to grow long shells resembling a finger, hence its comm.on name. Typical shell length around 70mm., very large specimens may exceed even 115mm. Though *Vulsella*'s true systematic position has always been a topic of debate (some even gave it its own family, *Vulsellidae*), it was traditionally placed in *Malleidae*. Recent phylogenetic studies of the superfamily *Pterioidea*, however, revealed it to be distant from the true *Malleidae* but closer related to a mixed *Pteriidae*-*Isognomonidae* clade. *Isognomonidae* was thus synonymised with *Pteriidae*, and *Vulsella* was moved to *Pteriidae*.



Ceratostoma foliatum (Gmelin, 1791)

MURICIDAE

-6~12m (-20~40 ft), SCUBA dived on rocks, Cuyler Harbour, San Miguel Island, Channel Islands, Santa Barbara, California, USA, Coll. Rick Negus, 1991/viii, 59.4mm.

The « Leafy Hornmouth » is a gorgeously winged northeastern Pacific murex ranging from Alaska, USA to British Columbia, Canada to California, USA; it is perhaps best known from California, where it is a representative member of a great muricid diversity. A carnivorous and predatory gastropod mostly feeding on bivalves and barnacles, it is found on rocky substrates from the lower intertidal zone down to about -60m deep. Although not uncommon, it is not easy to find a collectible specimen with both good size and wings. The colouration can range from white to dark brown with banded specimens also occurring and is variable regardless of locality. The form, especially of the varices, is very variable but more consistent according to environment and locality; for example in southern California most specimens have flat flanged varices while those from northern Channel Islands (as shown) have strongly fluted varices that resemble *Ceratostoma burnetti* (Adams & Reeve, 1849) from western Pacific. The extent of varice development also varies according to the environment and thus locality. Typical shell length around 60mm., very large specimens may exceed 100mm.



Foegia novaezelandiae (Bruguière, 1789)

PENICILLIDAE

Subtidal from sand and rubble bottom, Shelly Beach, Pallarenda, Queensland, Australia, 68.2mm.

Foegia novaezelandiae is a small watering-pot clam best known from Western Australia but also recorded from Japan; although it bears the name « *novaezelandiae* » it is actually not found in New Zealand. It is an adventitious tube-building bivalve like other members of the superfamily Clavagelloidea, which in the very earliest stages of life bears a normal bivalved shell but soon stops growing it and switches to building a calcareous tube. A locally common filter-feeding species, it inhabits soft bottoms of shallow intertidal and subtidal water to -10m deep and lives vertically buried with the « watering-pot » end down. It is unique among the family to inhabit hypoxic sediments and may be associated with chemoautotrophic bacteria, which forms a thin layer on its pedal disc. The true shells are largely hidden from surface of the tube in this species, as it is mostly covered by the secreted tube material. It is the type species of genus *Foegia* and since a new genus, *Kendrickiana*, was erected to house *K. veitchi* (Smith, 1971) it is the only species remaining in that genus. The typical length of the adventitious tube is around 80mm., very large specimens may exceed 100mm.



Babylonia pieroangelai Cossignani, 2008

BABYLONIIDAE

-160m, Trawled, East China Sea, 2015, 83.4mm.

Babylonia pieroangelai is a large and eye-catching babyloniid ranging from southern Japan to East China Sea to Taiwan, characterised by a strongly toothed fasciole. It was recently separated from the superficially similar *Babylonia perforata* (Sowerby II, 1870) based on its deeper suture, much more angulated shoulder, larger size, and more elongated form. Though still considered by some as a subspecies or even synonym of *B. perforata*, generally it is accepted as a valid species in its own right for now; understanding the true relationship between these two names require further evidence. Distribution of the two do not overlap, with *B. perforata* having a more southwesternly restricted distribution from Burma to Thailand to Cambodia. It is an uncomm.on carnivorous and scavenging gastropod inhabiting sandy to muddy bottoms, its depth range is around -100~200m which is very deep for the genus *Babylonia*. Typical shell length around 75mm., very large specimens may exceed 85mm.



Volva volva (Linnaeus, 1758)
OVULIDAE

Punta Engaño, Lapu-Lapu city, Mactan, Central Visayas, Philippines, 2009/viii, 136.0mm. The « Shuttle volva » is an unusual ovulid with both anterior and posterior siphonal canal elegantly and distinctly extended. Thanks to these it attains the largest size of all known recent ovulids, with an average shell length of around 100mm. and the very largest exceeding even 180mm.; though the size is quite variable among individuals. A carnivore and an ectoparasite of octocorals, it particularly favours members of the family Veretillidae as its host. Naturally it is associated with veretillid octocorals and often found living on them, in shallow to moderately deep sublittoral water around -10~200m in depth. It is a comm.on species with a very wide range across the Indo-West Pacific, it can be found from Eastern Africa to the southern half of Japan to Australia. Though the shell is easily recognisable, the siphonal canals are rather variable and may be strongly bent and the body whorl is sometimes weakly angulated. It should be easily separable from other recognised Volva species by its typically much longer siphonal canals.



Haustellum kurodai (Shikama, 1964)
MURICIDAE

-80~100m, By tangle nets, Panglao Island, Bohol, Philippines, 2007/xi, 111.4mm. The « Kuroda's Snipe's Bill » is an elegant Western Pacific muricid with a long siphonal canal, ranging from the Arafura Sea to the Philippines. A carnivorous and predatory gastropod, it is nocturnal and inhabits sandy bottoms around -10~80m deep. Though some authors used to consider it a synonym of *Haustellum haustellum* (Linnaeus, 1758), it is actually clearly separable from that species based on shell characteristics, especially the protoconch which is characteristic of lecithotrophy in *H. kurodai* and planktotrophy in *H. haustellum*. It is most similar and sometimes confused with another Philippines species, *H. vicdani*, which differs by having a completely smooth siphonal canal with no spines, as well as having a generally more purple colouration. Typical shell length around 120mm., very large specimens may exceed 145mm.



Ginebis crumpii (Pilsbry, 1893)
CALLIOTROPIDAE

-300~350m, Trawled Tosa, Kōchi Prefecture, Shikoku, Japan, 1990/x, 31.5mm. The « Crump's Margarite » is a striking calliotropid with a pearly surface attractively ornamented by rows of spiny knobs. Ranging from Honshu, Japan to East China Sea to Taiwan, it is a deposit feeder inhabiting sandy to gravelly bottoms of rather deep water around -50~300m. Although an uncomm.on species, its supplies have recently increased significantly as specimens are frequently turning up as by-catch from Chinese fishing vessels. A rather small *Ginebis*, its typical shell length is around 30mm. with very large specimens exceeding 40mm. The genus name *Ginebis* literally means « silvery top » in Japanese.



Members of the family Calliotropidae usually have naturally pearly shells, this is not polished. When alive the shell is usually covered with a layer of (partly worn) thin periostracum and some marine deposits. Here's a living specimen of *Ginebis argenteonitens*, you can see the pearly shine through the perio.



Timbellus miyokoae (Kosuge, 1979)
MURICIDAE

-50m, By Dave Aque from tangle nets, Samal Island, Davao Region, Mindanao, Philippines, 2008/i, 61.4mm.

The « Miyoko Murex » is a highly sought-after muricid with spectacular wing-like varices. First described from Mactan Island, Philippines, almost all known records are from within the Philippines; although specimens attributed to the same name have been found as far as the Solomon Islands. The normal colouration of the Philippines shells is rusty brown overlaid by some white hands, but the Solomon shells are pure white. When first described and few specimens were available, many considered it as a form of the superficially similar *Pterynotus loebbeckei* (Kobelt, 1879). As more specimens surfaced, however, its status as a distinct species became undeniable. Today it is no longer rare, in fact it is known to be quite common in the Philippines and even specimens with very good wings have become easily obtainable. A carnivorous and predatory gastropod feeding on bivalves and other invertebrate animals, it inhabits rather deep water around -50–200m in depth. Typical shell length around 60mm., very large specimens may reach 75mm. Though originally described in the genus *Pterynotus*, it was recently moved to *Timbellus*, its current genus.



Mikadotrochus hirasei (Pilsbry, 1903)

PLEUROTOMARIIDAE

-200m, Ukujima, Gotō Islands, Nagasaki Prefecture, Japan, 98.1mm., 2001/x.

The « Hirase's Slit Shell » is a thick-shelled pleurotomariid with flamboyant flame-like patterns, native to the Western Pacific. It generally ranges from central Honshu, Japan to East China Sea and Taiwan, though very rare records exist from as far south as the Philippines. A carnivorous grazer feeding on sponges and soft corals, it is found in rather deep water around -50~300m. As it is a relatively comm.on species especially from Japan to East China Sea and frequently brought up as by-catch in this area, it is a famous species and perhaps the most easily obtained species of the slit shells, most species of which are very rare and difficult to obtain. Quite variable in shell form especially the height/width ratio and the swollenness of whorls though rather consistent in sculpture and pattern, the name *M. h. yamamotoi* Yamamoto, 1993 is a synonym given to a compressed form. An uncomm.on albinistic form is known across its range. Typical shell diameter is around 70mm., very large specimens may exceed 120mm. It is most similar to the much rarer *Mikadotrochus beyrichii* (Hilgendorf, 1877) endemic to Japan, but they are easily distinguished by both sculpture and pattern.



Lobatus goliath (Schröter, 1805)
STROMBIDAE

Dived, Natal, Rio Grande do Norte, Brazil, 305.0mm.

With an average shell length of 300mm. and a staggering record size of 380mm., the aptly named « Goliath Conch » is the largest strombid species alive today. A herbivorous gastropod living in shallow water down to about -50m deep, it is found mostly on sandy bottoms and primarily feeds on algae and seagrass. Although generally considered to be endemic to Brazil, recent findings reported the presence of two small populations in Barbados as well, presumably recently settled through a rare dispersal event. Its handsome shell is distinctively adorned with a very extensively flared outer lip and thin layer of golden brown periostracum. During recent years it has been moved around a few genera as part of the extensive revision of the family Strombidae, including *Strombus*, *Eustrombus*, *Titanostrombus*, before finally settling in *Lobatus*, its current genus. Though a locally common species in Brazil, it is not easy to acquire a large and operculated specimen with a perfect, unfilled lip.



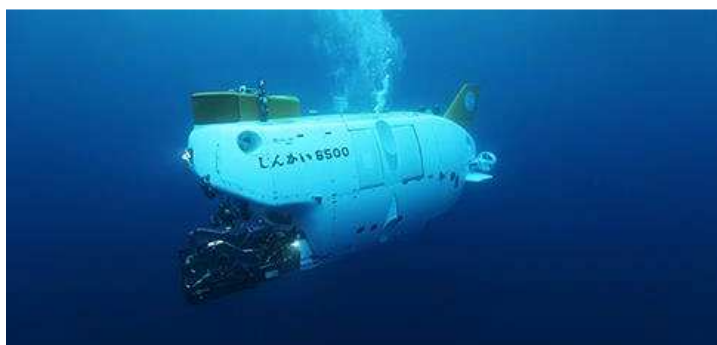
Pseudovertagus nobilis (Reeve, 1855)
CERITHIIDAE

-20m, Bohol Island, Central Visayas, Philippines, 127.5mm.

The « Noble Creeper » is a lovely and large cerithiid widely ranging in the Indo-West Pacific region from Mozambique / Madagascar to Tahiti and best known from the Philippines. A common species feeding on algae and detritus, it inhabits sandy to rubble bottoms around -10~80m deep. It is a little-varied species and its shiny, smooth surface and the delicate columellar lip behind the rather long, elegantly recurved siphonal canal renders it unmistakable even among other *Pseudovertagus* species. Typical shell length around 130mm., very large specimens may even exceed 170mm. That makes it not only the largest *Pseudovertagus* species, but also one of the largest extant members of the family Cerithiidae.



A TV series is being filmed at JAMSTEC



Calliostoma springeri Clench & Turner, 1960
CALLIOSTOMATIDAE

-500m, Florida, USA, 29.0mm., Ex-coll. Andrea Nappo

The « Springer's Top » is an attractively beaded and showy calliostomatid native to the Caribbean region ranging from Florida, USA to the Gulf of Mexico. An uncommon to rare species much sought-after by collectors, it inhabits relatively deep water around -200~500m. Although presumably a carnivorous grazer like most other deep-water calliostomatids, little is known about its ecology. Somewhat variable in form especially according to age, small specimens usually have much stronger keel on their body whorl. The shell surface carries a golden iridescence and is quite shiny. Typical shell diameter around 20~25mm., very large specimens may exceed 30mm. Though often treated as a subspecies or form of *Calliostoma benedicti* Dall, 1889, the holotype of *C. benedicti* is quite different in being much smaller (17.5mm. shell diameter) than the average *C. springeri* and has a much smaller umbilicus. It is also much lighter in colouration, though this may be due to status of preservation. Most specimens sold as *C. benedicti* on the market match *C. springeri* well and do not match *C. benedicti*; the true *C. benedicti* appears to be extremely elusive. It is possible that the holotype of *C. benedicti* is an unusual form of the same species as *C. springeri*, but more investigation is needed to decide the true relationship between these two names.



Exciting new paper in PLOS ONE finally gives a formal name to the « H Crab » from Antarctic deep-sea hydrothermal vents! It will be known as *Kiwa tyleri*, honouring the eminent deep-sea biologist Prof. Paul Tyler (University of Southampton, UK). This species occurs in vast numbers around vent effluents, and is fascinating because it 'farms' ectosymbiont bacteria on the dense hairs of its underside, and rely on these for nutrition. It is only the third described species of the yeti crab family (Kiwaidae)

Adaptations to Hydrothermal Vent Life in *Kiwa tyleri* , a New Species of Yeti Crab from the East..

Hydrothermal vents in the Southern Ocean are the physiologically most isolated chemosynthetic environments known. Here, we describe *Kiwa tyleri* sp. nov., the first species of yeti crab known from the Southern Ocean. *Kiwa tyleri* belongs to the family Kiwaidae and is the visually dominant macrofauna...

JOURNALS.PLOS.ORG

A new lead-authored paper published today reveals the genetic connectivity among all three known populations of the 'scaly-foot gastropod' (*Chrysomallon squamiferum*). Especially noteworthy is the low connectivity indicated between the Southwest Indian Ridge and Central Indian Ridge, which has implications for upcoming seafloor mining already planned for the Southwest Indian Ridge. This study is the first to investigate connectivity between hydrothermal vents across two mid-ocean ridges in the Indian Ocean. Please let me know if you would like to have a copy

Chen C, Copley JT, Linse K, Rogers AD (2015). Low connectivity between 'scaly-foot gastropod' (Mollusca: Peltospiroidae) populations at hydrothermal vents on the Southwest Indian Ridge and the Central Indian Ridge. *Organisms Diversity & Evolution*, doi:10.1007/s13127-015-0224-8.

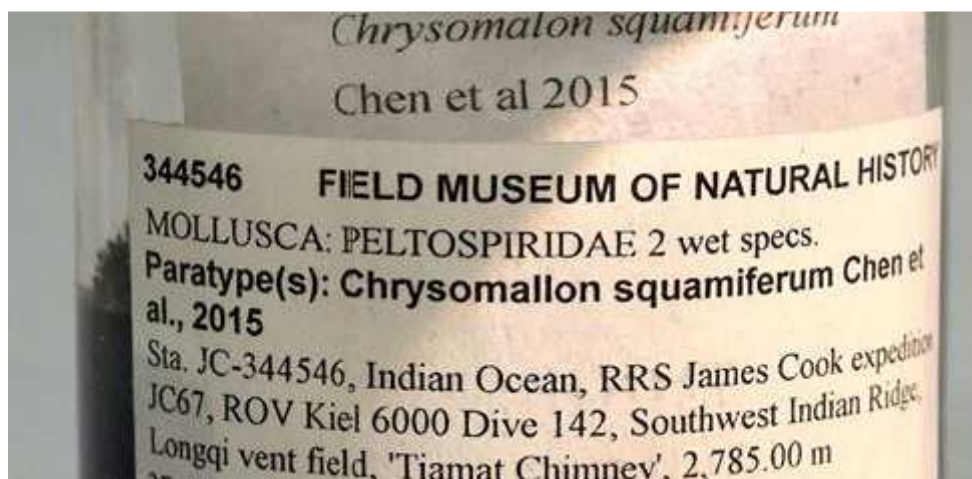


Internal organ systems of the 'scaly-foot gastropod' (*Chrysomallon squamiferum*) uncovered! A new lead-authored paper by myself is now published in the journal *Frontiers in Zoology*, where we used 3D tomographic reconstruction and traditional dissection to reveal its detailed anatomy.

Among other extraordinary features, it has a gigantic 'dragon heart' occupying a whopping 4% of the body volume (mind you, the average heart volume in a human being is only 1.5%)!!!! The paper is open access and freely available online.

Chen C, Copley JT, Linse K, Rogers AD, Sigwart JD (2015). The heart of a dragon: 3D anatomical reconstruction of the 'scaly-foot gastropod' (Mollusca: Gastropoda: Neomphalina) reveals its extraordinary circulatory system. *Frontiers in Zoology* 12:13; doi:10.1186/s12983-015-0105-1.

Emily Graslie @ The Field Museum wrote a great post on the 'scaly-foot gastropod' paratypes we deposited there! They are clearly taking good care of the specimens.



Scaly-foot gastropod (*Chrysomallon squamiferum*)..

Scaly-foot gastropod (*Chrysomallon squamiferum*) 2.78 kilometers (1.7 miles) underneath the surface of the Indian Ocean, hydrothermal vents are spewing out water around 350°C (660°F). Even in these..

THEBRAINSLOOP.TUMBLR.COM

Glad *Chrysomallon* is getting more public interest, even if the article is mostly based on photo of a plastic toy.



This Deep Sea Snail Is Unlike Anything You've Ever Seen Before, Trust Me

You are nowhere near as awesome as this snail.

VIRALNOVA.COM

Vasula melones (Duclos, 1832)
MURICIDAE

Lowtide on rocky substrate inside reef crevice, Jacó, Costa Rica, 1972, 41.8mm. The « Gourd Rock Shell » is a comm.on muricid inhabiting intertidal to shallow littoral rocky shores of Pacific Ocean, ranging from Mexico to Peru including the Galápagos Islands. A carnivorous gastropod, it preys upon a wide variety of other invertebrates such as bivalves, gastropods, and polychaetes. Although generally spherical in form with a very inflated body whorl, morphology of the shoulder is rather variable and some individuals have angled, raised shoulder. The colouration consists of variable amount of dark brown to black blotches on a cream background, and is very variable among individuals. Typical shell length around 40mm., very large specimens may exceed 60mm.



The Earth Story's post on *Chrysomallon squamiferum* Chen et al., 2015



Cancellaria indentata Sowerby I, 1832
CANCELLARIIDAE

-37m (-20 fms), From shrimp fisherman, Gulf of California, Topolobampo, Sinaloa, Mexico, 31.2mm.

The « Toothed Nutmeg » is an attractive cancellarid with strong axial and radial ridges forming raised mesh-like sculpture, typical of the family. An eastern Pacific species, its distribution ranges from Gulf of California to Ecuador (including the Galápagos Islands) and is a suctorial-feeding carnivorous gastropod inhabiting hard surfaces from -10m down to about -100m deep. A locally comm.on species, the shell length averages at about 30mm. but extremely large examples may exceed 40mm. The strength of sculpture is somewhat variable but overall it is a little-varied and easily recognised species.



Harpulina arausiaca (Lightfoot, 1786)
VOLUTIDAE

The « Vexillate Volute » is a beautifully banded volute with a restricted range ranging from southern India to Sri Lanka, and by far best known from Sri Lanka. A carnivorous and predatory gastropod, it inhabits soft bottoms of moderate depths around -15~30m. A locally moderately uncomm.on species, it occurs in several forms as the pattern is very variable. The form with clear, thick horizontal bands and no vertical bands is much sought-after by collectors; although another similar form with alternating thick and thin horizontal bands is perhaps rarer. The form with many short vertical bands intercrossing with horizontal ones is known as f. vexilla (Gmelin, 1791), and is quite comm.on. Typical shell length around 70mm., very large specimens may exceed 90mm. Description by Mr. Chong Chen.

Guildfordia triumphans (Philippi, 1841)

TURBINIDAE

-100~200m, Ilan County, Taiwan, 58.4mm.

The « Triumphant Star Turban » is a striking turbinid with a 'star-burst' arrangement of spines. Though its wide range extends from Japan to south as far as Queensland, Australia, it is often regarded as a symbolic species of Japan and is depicted on the logo of the Malacological Society of Japan. It is a hervivorous / detritivorous gastropod inhabiting sandy to muddy bottoms of moderately deep water around -100~300m. A comm.on species throughout its range, although specimens with all spines intact are uncomm.on. Typical shell length around 45mm., very large specimens may exceed 65mm. In genus *Guildfordia* it usually has an intermediate spine length between the other two comm.on species *G. aculeata* Kosuge, 1979 and *Guildfordia yoka* Jousseume, 1888; and is usually easily recognised from the spine length.



Epitonium ancillotoi Cossignani & Cossignani, 1998
EPITONIIDAE

-100~150m, From tangle nets, Balut Island, Davao Occidental, Philippines, 26.5mm. *Epitonium ancillotoi* is a lovely wentletrap with delicate varices known from Philippines to Australia, with vast majority of specimens originating from Philippines. A moderately comm.on carnivorous gastropod, it feeds exclusively on sea anemone like many epitoniids do. It inhabits sandy bottoms around the depth of -10~150m and is found closely associated with the sea anemone species which it feeds on, such as *Heteractis crispa* (Ehrenberg, 1834) and *Macrodactyla doreensis* (Quoy & Gaimard, 1833). It closely resembles *Epitonium irregulare* (Sowerby II, 1844) and often mistaken for it, but *E. irregulare* has smooth intervarical spaces lacking the dense fine spiral lines that characterise *E. ancillotoi*. The shell is most often uniformly white in colour, although some specimens carry irregular brown patches (as shown). Typical shell length around 30mm., very large specimens may exceed 40mm.



A co-authored paper has just been published on the online journal PLOS ONE (<http://bit.ly/1DCnBXW>). What happens to local ecosystem if you make an artificial hydrothermal vent by deep-sea drilling? We investigated this in Okinawa Trough, Japan by monitoring the benthic area across a 40-months period after a drilling event. Through quantifying the visible changes in benthos fauna we found many interesting facts such as *Shinkaia crosnieri* squat lobsters are able to literally...

PLOS ONE

RESEARCH ARTICLE

Post-Drilling Changes in Seabed Landscape and Megabenthos in a Deep-Sea Hydrothermal System, the Iheya North Field, Okinawa Trough

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Abstract

There has been an increasing interest in seafloor exploitation such as mineral mining in deep-sea hydrothermal fields, but the environmental impact of anthropogenic disturbance to the seafloor is poorly known. In this study, the effect of such anthropogenic disturbance by scientific drilling operations (ICDP Expedition 327) on seabed landscape and megabenthic habitat was surveyed for over 3 years using remotely operated vehicle video observation in a deep-sea hydrothermal field, the Iheya North field, in the Okinawa Trough. We focused on observations from a particular drilling site (Site CD014) where the most dynamic change of landscape and megabenthic habitat was observed among the drilling sites of ICDP Exp. 327. No visible hydrothermal fluid discharge had been observed at the sedimentary seafloor at Site CD014, where *Colpistegina* clam colonies were known for more than 10 years, before the drilling event. After drilling commenced, the original *Colpistegina* colonies were completely buried by the drilling sludges. Several months after the drilling, although high temperature hydrothermal fluid began to discharge from the sedimentary subsurface in the area of over 20 m from the drill holes, 'artificially' creating a new hydrothermal vent habitat. Widespread microbial mats developed on the seafloor with the diffusing hydrothermal fluids and the gizzard crab *Shinkaia crosnieri* endemic to vents dominated the new vent community. The previously soft, sedimentary seafloor was hardened probably due to barite/gypsum mineralization or sulfidation, becoming rough and uncolonized with many faunal after the drilling operation. Although the effects of the drilling operation on seabed

PLOS ONE | DOI:10.1371/journal.pone.0122895 April 22, 2015 1/20

Chrysomallon squamiferum Chen, Linse, Copley & Rogers
PELTOSPIRIDAE

Left to right: -2450m, Kairei vent field (25°19.239S, 70°02.429E), Central Indian Ridge, Indian Ocean; -2785m, Longqi vent field (37°47.03'S, 49°38.97'E), Southwest Indian Ridge, Indian Ocean; -2606m, Solitaire vent field (19°33.413S, 65°50.888E), Central Indian Ridge, Indian Ocean, Mauritius.

The 'scaly-foot gastropod' is an iconic vent endemic gastropod known only from the Indian Ocean deep-sea hydrothermal vents. The foot, uniquely among gastropods, carry numerous corneous dermal sclerites often mineralised with iron sulfide along with the shell surface, making it the only extant metazoan known to use iron in the skeleton. First discovered at Kairei vent field, Central Indian Ridge (CIR), it has subsequently also been found in Solitaire field, CIR (Mauritius) and Longqi field, Southwest Indian Ridge (SWIR). The Solitaire population has white sclerites instead of black due to lack of iron in them, most likely due to differences in the vent fluid composition. The function of sclerites has been speculated to be protective or detoxification (by accumulation of sulfide waste), but their true function is yet unknown. It is a holobiont hosting thioautotrophic (i.e., sulfur-oxidising) chemosynthetic endosymbionts in a much enlarged oesophageal gland, and appear to rely on these for nutrition. With shell length that averages at around 35mm. and exceeds 45mm. in large individuals, it is a very large peltospirid compared to most others which are below 15mm. in shell length. Although discovered as early as 2001, a publication containing a formal description and name has never been published until 2015.



The iconic 'scaly-foot gastropod' from hydrothermal vents of Indian Ocean finally gets a name! The description paper I lead-authored is now published online in Journal of Molluscan Studies (Advanced access: <http://bit.ly/1D52Svg>). The 'scaly-foot gastropod' was given the name *Chrysomallon squamiferum* gen. et sp. nov., and its relationship to other neomphalines were explored using both morphological and molecular methods.

Chen C, Linse K, Copley JT, Rogers AD (2015). The 'scaly-foot gastropod': a new genus and species of hydrothermal vent-endemic gastropod (Neomphalina: Peltospiridae) from the Indian Ocean. *Journal of Molluscan Studies*. Advance Access published April 20, 2015, doi:10.1093/mollus/eyv013.



Coronium acanthodes (Watson, 1882)
MURICIDAE

Trawled from deep water, Argentina, 65.1mm., F

The « Watson's Trophon » is a prickly muricid native to the temperate southwestern Pacific ranging from southern Brazil to Falkland Islands to Chile, with some records the Antarctic Peninsula also. A carnivorous and predatory gastropod, it inhabits soft bottoms of rather deep water around -80~400m. The yellowish white colouration, general form, and sculpture is usually consistent but development of varices varies among individuals. Originally placed in the genus *Trophon*, it was recently reassigned to *Coronium* based on protoconch and egg capsule morphology, both of which resemble *Coronium coronatum* (Penna-Neme & Leme, 1978). It is a large trophon, perhaps the largest in the region, with an average shell length of 80mm. and giants may reach 120mm.



Triplodon corrugatus (Lamarck, 1819)
HYRIIDAE

-2m, By local divers, Amazon River, Macapá, Amapá, Brazil, 76.8mm.

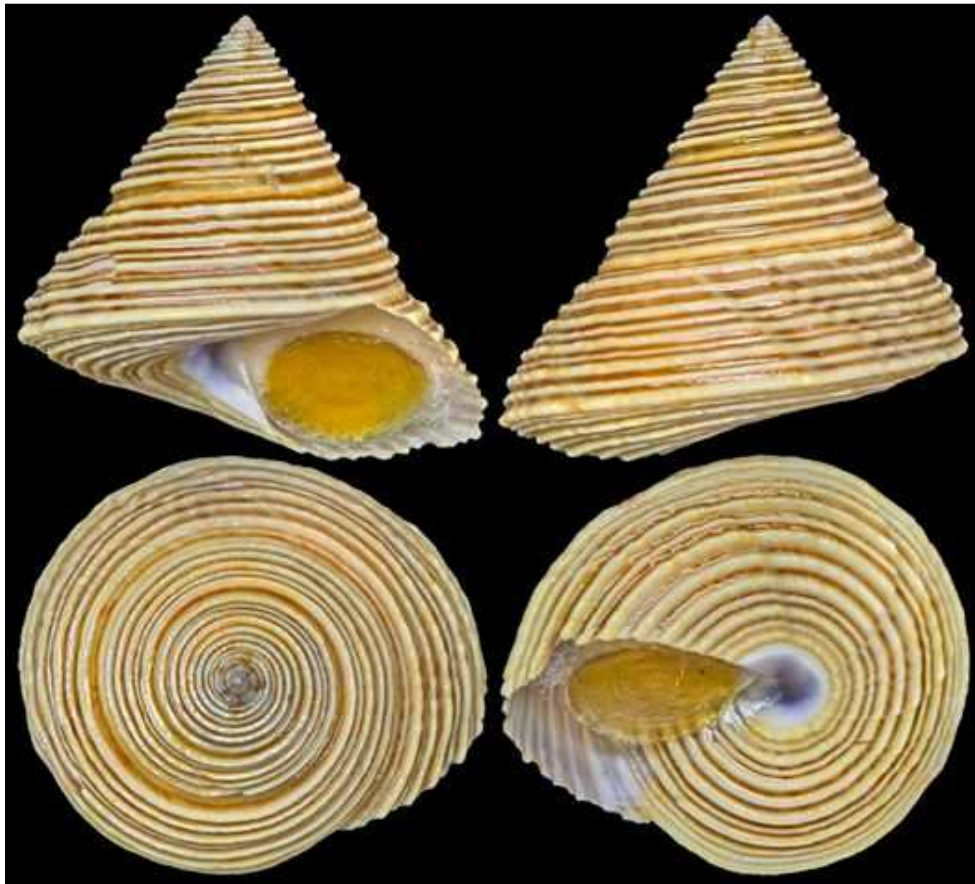
Triplodon corrugatus is a marvelously shaped unionoid freshwater mussel native to northern South America, ranging from Brazil to Peru to Venezuela, including the Amazon basin. Although characterised by the raised wing-like projections in both posterior and anterior parts of both valves, the extent of these projections actually vary greatly among individuals. It is a locally common filter-feeding bivalve inhabiting soft sediments of shallow freshwater habitats. As is the norm in unionoids it is known to go through a glochidia larval stage parasitising fish gills/fins before settling down to assume an adult life style. Typical shell length around 80mm., very large specimens may exceed 120mm.



Calliostoma canaliculatum (Lightfoot, 1786)
CALLIOSTOMATIDAE

-1.5~3m (-5~10 ft), SCUBA dived on kelp (*Macrocystis* sp.) growing from seabed -10.5m (-35 ft) deep, Santa Cruz, California, USA, 30.2mm.

Characterised by numerous strong spiral cords and a sharply keeled base, the « Channeled Top Shell » is a handsome eastern Pacific calliostomatid ranging from southern Alaska, USA to Baja California, Mexico. A moderately comm.on omnivorous gastropod mainly feeding on hydroids and bryozoans, it is part of the kelp forest comm.unty and is usually seen in the shallow canopy of kelp plants to about -20m deep. Its main predator is seastar and it is known to secrete a toxic, yellowish mucus as a defence mechanism upon contact with a seastar. Typical shell length around 30mm., very large specimens may exceed 40mm.



Boreotrophon xestra Dall, 1918
MURICIDAE

-80~200m, From shrimp nets, Jumunjin, Gangneung, Gangwon-do, South Korea, 48.1mm.

Boreotrophon xestra is a delicately beautiful muricid ranging from Sea of Japan and the northern half of Pacific Japan to Kuril Islands and Bering Sea. A somewhat uncommon predatory gastropod, it inhabits sandy to muddy bottoms of rather deep water around -100~400m. The shell, especially the shouldered varices, are very fragile and susceptible to erosion; good quality specimens are therefore quite hard to obtain. The siphonal canal may be straight or curved to left. Typical shell length around 30mm., extremely large specimens sometimes exceed 45mm.



Boreotrophon pacificus Dall, 1902
MURICIDAE

-80~200m, From shrimp nets, Jumunjin, Gangneung, Gangwon-do, South Korea, 40.5mm. The « Northwest Pacific Trophon » is an attractively sculptured muricid supposedly ranging widely from Sea of Japan to Bering Sea to Pacific coast of USA, but best known from the northwest Pacific including Japan and Russia. A predatory gastropod inhabiting sandy to muddy bottoms, it is found from shallow subtidal waters down to about -200m deep. The colouration varies from white to yellowish, and it is also variable in number of varices per whorl as well as direction of the anterior siphonal canal. Though locally rather comm.on, the shell is fragile and often eroded, making quality specimens uncomm.on. Typical shell length around 20mm., very large specimens may exceed 40mm.



Turriconus excelsus (Sowerby III, 1908)
CONIDAE

-150~200m, From tangle net, Balut Island, Davao Occidental, Philippines, 73.5mm. The « Illustrious Cone » is one of the most coveted rare cones of all, and surely one of the most attractive. It is a very famous species included in S. Peter Dance's fifty « Rare Shells » (1969), only three specimens were known then and none of them fresh. A predatory gastropod feeding on polychaete worms living in rather deep water of about -100~400m, it has a wide distribution range in the Indo-Pacific ranging from Burma to Philippines to Japan to northern Australia to Solomon Islands. Most specimens seen on the market today comes from Balut and Aliguay islands of Philippines. Average shell length around 75mm., gigantic specimens may exceed 100mm. Its colour and pattern are both quite variable and the now synonymised name *T. nakayasui* (Shikama & Habe, 1968) was given to a form with less patterns than usual. It is the rarest of the trio of three famed cones characterised by tall, stepped spires; the other two being *Cylinder gloriamaris* and *Leptoconus milneedwardsi*.



Conchocele bisecta (Conrad, 1849)
THYASIRIDAE

-250~350m, On mud bottom, By tangle nets, eastern South Korea, 20.2mm.

The « Giant Cleftclam » is an extremely large (probably the largest extant) thyasirid very widely distributed in the northern Pacific Ocean, ranging from East China Sea to Russia to Oregon, USA. It is a chemosymbiotic bivalve hosting both methane and sulfur oxidising endosymbionts in a much enlarged gill, and relies on these for energy. Although it is a well-documented member of the Pacific methane seep community often co-occurring with other chemosymbiotic bivalve genera such as *Calyptogena* and *Acharax*, it is also found in reducing sediments rich in methane and sulfides outside seeps. It occurs across a wide bathymetric range from -50m down to more than -1500m deep. Both the specific epithet and common name comes from the deep ridge or cleft on the posterior end of the shell, a feature common in Thyasiridae but most prominent in genus *Conchocele*. The shell shape changes drastically throughout life stages; the anterior shell margin protrudes beyond the beak in young specimens (as shown here), but becomes flat to strongly concave in adults. Adult shells are also more elongated and much thicker. Typical shell length is around 90mm. but extremely large specimens exceeding 165mm. are known. Recent specimens are very rare due to its restricted habitat, especially large live-taken ones, although virtually identical Cenozoic fossils are not uncommon. *Conchocele disjuncta* Gabb, 1866 described from Pliocene fossil of California, USA is widely regarded as a synonym.



Ceratostoma burnetti (Adams & Reeve, 1849)
MURICIDAE

-25m, Dived on mussel bed, Busan, South Korea, 99.8mm.

The « Burnett's Murex » is a showy muricid with extensive wing-like varices. Ranging from Yellow Sea to the Russian Aleutians, it is most famously known from South Korea for which it has become a symbolic species. A carnivorous and predatory gastropod feeding on bivalve molluscs such as oysters, it inhabits hard substrates and bivalve beds from intertidal waters down to about -40m deep. Though once considered a classic rarity, it is now known to be rather comm.on in its local habitat especially in South Korea and Japan. It is actually very variable in varice development, fine quality specimens with wide and intact varices (mostly from South Korea) are uncomm.on; the short-winged form has been described as f. *coreanica* (Adams, 1854) and is considerably rarer. The colouration is usually beige but may vary from whiteish to very dark brown, a banded form also occurs but only very rarely. Typical shell length around 90mm., extremely large specimens are known to exceed 130mm.



Carinaria cristata (Linnaeus, 1767)
CARINARIIDAE

Shallow water, southern part of Mozambique, 39.0mm., F.

The elegant « Glassy Nautilus » is a classic rarity of historical fame in shell collecting, chosen by S. Peter Dance as one of the four famous rarities in his « Shell Collecting: An Illustrated History » (1966). Its strange form and beauty attracted attention of conchologists at once since its description and for more than 100 years from the mid-18th to 19th Century it was one of the most coveted species of all, comparable to *Cylindrus gloriamaris* (Chemnitz, 1777), with prices reaching 3,000 livres. Since the beginning of the 20th Century, however, it has become much forgotten by the collecting community. The extremely fragile and highly translucent shell is minute compared to the impressively sized animal that is not only the largest *Carinaria* but also the largest heteropod of all, attaining a body length over 680mm. A holoplanktic (i.e., planktic for its entire life) pelagic gastropod with a very wide range covering the entire Indo-Pacific, it is an active predator of a variety of zooplankton, mainly thaliaceans, chaetognaths, copepods, and other planktic gastropods. Like most planktic gastropods it migrates vertically through the water column diurnally and may thus be found from the sea surface down to a few hundred metres deep. The shell is still rarely seen in the market today especially with intact protoconch and decent aperture, but much of this apparent rarity is due to the lack of attention and demand it had once received as the animal is not uncommon in its natural environment. Typical shell length around 35mm., very large specimens may exceed 70mm. The protoconch is tightly coiled but the teleoconch relaxes to a slightly curved pyramidal cap; it can be distinguished from other *Carinaria* species by the less curved shell and the extremely low keel.



Pandora pulchella Yokoyama, 1926
PANDORIDAE

-250~350m, On mud bottom, By tangle nets, eastern South Korea, 47.5mm., F/F+.

Pandora pulchella is a pandorid ranging from Sea of Japan to Russia with intriguing form and sculpture; it can be distinguished from other pandorids in the region by the strongly recurved shape and large size. It is in fact better known from Cenozonic fossils which are practically identical to the recent specimens, and was originally described from such fossils originating from oil-fields in Akita Prefecture, Japan. Unlike the fossils which are relatively common in especially in Japan, recent specimens (particularly live-taken ones) appear to be very scarce. A burrowing bivalve, in life it positions itself with the convex left valve down inside muddy substrates, and is a filter-feeder inhabiting rather deep water around -100~400m. It is often placed in the subgenus *Heteroclidus*, which many authors consider to be a full genus. Typical shell length around 45mm., very large specimens may exceed 55mm.



Scaphella dohrni (Sowerby III, 1903)
VOLUTIDAE

Gulf of Mexico, 55.1mm., F/F+.

Ex-coll. Carol Brunner

The « Dohrn's Volute » is an attractively patterned volute with about eight rows of almost equally spaced dark square patches on the body whorl. Ranging from eastern Florida to Gulf of Mexico to southern Cuba, it is a carnivorous and predatory gastropod inhabiting sandy bottoms of rather deep water around -100~500m. An uncomm.on species, it is usually dredged dead and prone to growth scars; live-taken specimens in good quality are rare. The early whorls may be shouldered, bearing a single row of closely spaced nodules. Typical shell length around 70mm., very large specimens may exceed 130mm.



With the famous specimen of the « Sunburst Star Turban » *Astraea heliotropium* (Martyn, 1784), collected in Cook's Strait, New Zealand during Captain James Cook's second circumnavigation (1772-1775). The same ship that collected this specimen became the first ship to cross the Antarctic Circle in history, during the same voyage. More than 240 years since collection it is still in fantastic condition, as if collected yesterday. Ex-coll. Henry Seymer (1745-1800), currently housed in the University Museum of Zoology, Cambridge, UK. This exact specimen is illustrated in Peter S. Dance's book « Shell Collecting: An Illustrated History » (1966) and also mentioned in « Rare Shells » (1969).



Co-authored paper published in the journal Deep Sea Research Part II! Not molluscs this time -- it is about life history traits of hydrothermal vent squat lobsters (Munidopsis spp.). Free access to the full-text online through this link: <http://authors.elsevier.com/a/1Qgaw3RueHDJ1A>.

Nakamura M, Chen C, Mitarai S (2015). Insights into life-history traits of Munidopsis spp. (Anomura: Munidopsidae) from hydrothermal vent fields in the Okinawa Trough, in comparison with the existing data. Deep Sea Research Part I: Oceanographic Research Papers, 100: 48-53.



Lead-authored paper accepted! Finally, the 'scaly-foot gastropod' will get a name, 14 years since first discovery! Not only is it the only gastropod with true dermal sclerites, but it is also the only extant metazoan to use iron in its skeleton.

Chen C, Linse K, Copley JT, Rogers AD (In press). The 'scaly-foot gastropod': a new genus and species of hydrothermal vent-endemic gastropod (Neomphalina: Peltospiridae) from the Indian Ocean. Journal of Molluscan Studies.



Scutellastra cochlear (Born, 1778)
PATELLIDAE

Low tide, On rocks, Port Elizabeth, Eastern Cape, South Africa, 48.5mm.

The « Pear Limpet » (or « Spoon Limpet ») is a patellid ranging from river mouth of the Orange River and across the Cape Province to Durban, South Africa; aptly named for its very distinctive shape resembling a pear. It is a locally abundant species forming prominent dense colonies on the eulittoral zone of rocky shores, preferring exposed shores with strong wave motion. A herbivorous gastropod, each individual establishes a limpet scar on the rock and occupies the same position throughout the life; juveniles comm. only establish on the shells of adult limpets until they are large enough to establish their own limpet scar. It primarily feeds on the coralline algae *Spongites yendoi* (Foslie) Chamberlain, 1993 and individuals are known to farm *S. yendoi* in algae gardens around the limpet scar, and protect these gardens territorially. The limpet-algae relationship may be mutualistic as *S. cochlear* excludes other alga species from the shore in favour of *S. yendoi* and the limpet excretions provide additional nitrogen for the algae, increasing its productivity. Exterior of the shell bears radial ribs but is often strongly encrusted, the interior is white with a varying strength of blue, the muscle scar is black. Typical shell length around 50mm., very large specimens may exceed 70mm.



Spondylus tenellus Reeve, 1856
SPONDYLIDAE

-80~200m, Trawled from sand/mud bottom, Lakes Entrance, Gippsland, Victoria, Australia, 63.6mm., 1986.

The « Scarlet Thorny Oyster » is a lovely spondylid endemic to Australia, widely ranging across the entire southern coast from Jurien Bay, Western Australia to southern Queensland, including Tasmania. A sessile filter-feeding bivalve living attached to hard substrates, it is found in subtidal and offshore waters of moderate depths around -20~80m and often inhabits rock crevices. Like many spondylids it is a very variable species in spine development, shell form, and colouration: from white to pink to orange to wine red. Typical shell length around 70mm., very large specimens may exceed 110mm. An uncomm.on species, it takes some luck to find a high-quality specimen with long spines.



Cymatium femorale (Linnaeus, 1758)
RANELLIDAE

-3-6m, Dived, La Tortuga Island, Venezuela, 117.4mm., 2013.

The « Angular Triton » is a handsome ranellid instantly recognisable by its strongly raised shoulder. It is native to the Caribbean Sea and adjacent waters, ranging from southern Florida, USA to Brazil. A carnivorous and predatory gastropod primarily feeding on echinoderms, it typically inhabits shallow water from extreme low-tide down to about -50m and is locally comm.on. Typical shell length around 120mm., very large specimens may exceed 170mm. Its range partly overlaps with the closely related *Cymatium raderi* D'Attilio & Myers, 1984 and is often confused with it. The two are in fact easily separable, however, as *C. raderi* is much larger on average (comm.only exceeds 200mm. which *C. femorale* never reaches) and the varices of *C. raderi* are much more smooth and less angulate, lacking in strong protuberances seen on the varices of *C. femorale*.



Cymatium ranzanii (Bianconi, 1850)
RANELLIDAE

-12m (-40 ft), Somalia, 160.2mm., 1975.

The « Ranzani's Triton » is a famous rarity among the ranellids and one of S. Peter Dance's fifty Rare Shells (1969). Although described in 1850, it has a remarkable history of being « lost » for more than a century in literature until re-discovered by K. J. Grosch when diving in Mozambique in 1953. The remarks on Grosch's find was published by William K. Emerson and Anthony D'Attilio, who identified the species, in 1962. The angular but low shoulder and two distinct dark patches on the parietal callus together separates it from other *Cymatium* species without difficulty. A carnivorous and predatory gastropod, it inhabits shallow water to about -40m depth and ranges from Northern Arabian Sea to Mozambique including Southern Red Sea. It appears to be most comm.on in Somalia where vast majority of specimens originate, and is still moderately rare today as a result from the difficulty in obtaining material from the area due to piracy and political instability. The average shell length is about 160mm., but giants are known to exceed 240mm.



Septa marerubrum (Garcia-Talavera, 1985)
RANELLIDAE

-15m, Dived, Sinai Peninsula, Egypt, 38.0mm.

The « Red Sea Triton » is a striking ranellid endemic to the Red Sea. Originally described as a full species but in the earlier years many considered it to be a Red Sea subspecies of the certainly closely related *Septa rubecula* (Linnaeus, 1758); today it is generally accepted as a full species. Although indeed similar to *S. rubecula*, *S. marerubrum* can be easily distinguished from the more coarse sculpture as it has wider and taller spiral cords bearing much more irregular and larger gemm.ae. General form of the shell is very variable though the sculpture less so. A carnivorous and predatory gastropod, it inhabits very shallow water from low tide down to about -20m deep. Typical shell length around 35mm., very large specimens may reach 50mm. Though uncomm.on on the shell trade market due to its restricted distribution, it is locally a comm.on species in its natural habitat.



Biplex perca Perry, 1811
RANELLIDAE

-350m, Trawled from sand/gravel/mud bottom, East China Sea, Zhejiang, China, 83.5mm., 2014.

The « Maple Leaf Triton » is a most eccentric ranellid widely distributed across the Western Pacific region, from Japan to northern Australia and across the central Western Pacific islands. It is replaced by its sister species *Biplex bozzettii* Beu, 1998 with a consistently wider shell from southern India and westward into the Indian Ocean. A common carnivorous species, it is mostly found on sandy to gravelly bottoms around -50~200m deep although occasionally deeper. The shell is much compressed in the dorsal-ventral direction and has regular wing-like varices every 180 degrees, resulting in a flat and wide leaf-like shell; aptly described as « maple leaf » in the English vernacular name. The varices are fragile and prone to damage, it is difficult to find a large specimen with intact varices. The intervarical space carry beaded sculpture but the beading is normally not consistent throughout, unlike *B. bozzettii*. Typical shell length around 65mm. but it is very variable in size and giant specimens may reach even 100mm.



Bayerotrochus westralis (Whitehead, 1987)
PLEUROTOMARIIDAE

-600~1000m, Trawled on sand and mud, Rowley Shoals, Western Australia, Australia, 103.2mm., 1983.

The « Western Australian Slit Shell » is a pearly pleurotomariid best known from the northern half of Western Australia, Australia where vast majority of specimens originate from. Its definitive range extends northwards to the Ashmore and Cartier Islands, although there are records from as far north as southern Japan. The shell surface has a characteristic iridescent pearly sheen, and is usually pale white to yellowish brown and decorated with occasional axial flamm.ules. Young specimens often have a strongly angulate body whorl. Dark coloured specimens with dense orange flamm.ules are also occasionally found. The slit is typical of the genus *Bayerotrochus*: short but rather wide and occupying around one-fifth of the circumference of the body whorl. An uncomm.on species, it is a carnivorous grazer primarily feeding on sponges and inhabit sandy to muddy bottoms of quite deep water around -300~1000m, averaging around -500m. Typical shell length around 85mm., very large specimens are known to exceed 130mm.



Chicomurex globus Houart Moe & Chen, 2015
MURICIDAE

-200m, By tangle nets, Surigao Straits, Mindanao, Philippines, 35.7mm., PARATYPE

Chicomurex globus is a medium sized *Chicomurex* ranging from Okinawa, Japan to Philippines to Vanuatu and New Caledonia. Named for its rounded outline, it has long been confused with *C. gloriosus* (Shikama, 1977) [*C. gloriosus* is the species often referred to as '*C. venustus*' from Philippines and elsewhere, the true *C. venustus* (Rehder & Wilson, 1975) is restricted to the Marquesas]. It differs from *C. gloriosus* by the globous shape resulting from broader shell with shorter siphonal canal, more shouldered and smaller shell; it also has a very distinctive dorsally recurved spine on the siphonal canal. The shell is variable in colouration, from cream to tan to white. Often carry dark blotches, and may be banded like *C. gloriosus*. Presumably a carnivorous species like other congeners, it inhabits moderate depths around -20–200m. Typical shell length around 40mm., very large specimens may reach 53mm.



Mikadotrochus gotoi (Anseeuw, 1990)
PLEUROTOMARIIDAE

-200m, By tangle net, Taguin, Balut Island, Davao Occidental, Philippines, 44.5mm.

The « Goto's Slit Shell » is a lovely and gemmate western Pacific pleurotomariid ranging from Amami Islands, Japan to Philippines. A carnivorous grazer feeding mainly on sponges, it inhabits hard substrates of rather deep water around -150~400m. Vast majority of specimens are less than 50mm. in shell length, averaging at about 45mm. In the Philippines these young specimens are only uncommon, although large specimens in excess of 55mm. are rare. Outside the Philippines it is a rare species in any size, although this is likely due to lack of tangle net deployments. Extremely large specimens may exceed 65mm. Young specimens have strongly keeled whorls, while large specimens have noticeably more inflated and round whorls. Always has alternating reddish and white patches under the selenizone, although the overall colouration may vary slightly. It is named in honour of Mr Yoshihiro Goto of Japan, an enthusiastic conchologist with a special interest in the Pleurotomariidae in which he named several new species, for example *Perotrochus anseeuwi* Kanazawa & Goto, 1991 and *P. metivieri* Anseeuw & Goto, 1995.



imnia patula (Pennant, 1777)
OVULIDAE

-50m, Trawled, Devon, Southwest England, United Kingdom, 25.4mm.

The « Poached Egg Shell » is a beautiful and frail ovulid ranging from Norway to Canary Islands, and into the Mediterranean Sea. A carnivore and ectoparasite of octocorals and hydroids, it lives in moderately deep sublittoral water around -20~120m. Its most comm.on hosts are the soft coral *Alcyonium digitatum* L., 1758 (« Dead Man's Fingers »), the sea fan *Eunicella verrucosa* (Pallas, 1766), and the hydroid *Tubularia indivisa* L., 1758. The shell is variable in colouration from white to cream to dark orange as well as shape of the extremities, while the mantle is decorated with brown streaks and spots. Although a comm.on species in its natural environment, it is an uncomm.on to rather rare species on the shell trade especially in good condition. Typical shell length around 20mm., very large specimens like the one shown may exceed 25mm. Its type locality is Weymouth, Dorset, England.



Arrhoges occidentalis (Beck, 1836)
APORRHAIIDAE

-100m, Trawled, Chebucto Head, Nova Scotia, Canada, 53.0mm.

The « American Pelicanfoot » is graceful aporrhaid and the only extant species native to the western Atlantic, ranging from Greenland to Nova Scotia, Canada to North Carolina, USA. It is also the only extant species in the genus *Arrhoges*, although many do not consider this a full genus and still place it in *Aporrhais*. Compared to the other living aporrhais its outer lip is simple with only a single projection, while others have multiple spines. It is a herbivorous and detritivorous species feeding on microalgae and detritus, and inhabits sandy to muddy bottoms of a rather wide bathymetric range around -10~400m deep. It is a rather rare species in the shell trade, especially live collected specimens of good quality as it is usually a rough shell; most specimens are trawled Atlantic Canada. It is very variable in spire height; specimens with slender spire bearing relatively few axial ridges has been described as f. *mainensis* (Johnson, 1930), while those with very high spire has been named f. *labradorensis* (Johnson, 1930). Typical shell length around 50mm., very large specimens may exceed 65mm.




A paper I co-authored, « The mitochondrial genome of the deep-sea snail *Provanna* sp. (Gastropoda: Provannidae) », has been published in the journal Mitochondrial DNA (early online: <http://dx.doi.org/10.3109/19401736.2014.1003827>). Please do let me know if you are interested in a PDF copy.



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MITOGENOME ANNOUNCEMENT

The mitochondrial genome of the deep-sea snail *Provanna* sp. (Gastropoda: Provannidae)

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Abstract

The genome (28k bp) of *Provanna* sp. (Gastropoda) was sequenced using an Illumina MiSeq/150, and the mitogenome was assembled. The newly sequenced mitogenome was 16,149 bp in length, consisting of 31 typical animal mitochondrial genes with the usual conserved mitochondrial genes order. 10 mitochondrial genes were excluded on the basis of their size and/or sequence. To ascertain the phylogenetic position of the deep-sea *Provanna* sp., we used various well-regarded 13 mitochondrial protein-coding genes in Bayesian inference, maximum likelihood, and maximum parsimony analyses with bootstrap of selected gene/locus. The resultant phylogenetic trees supported the placement of *Provanna* sp. in the superfamily Albobaculoidea of the clade Albobaculoidea of Gastropoda, providing new data for understanding the phylogeny of these deep-sea snails.

Keywords

Deep-sea gastropods, mitogenome, *Provanna*, Provannidae

History

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Provanna is a family of snails inhabiting chemosynthetic hydrothermal vents as hydrothermal vents, hydrothermal vents, cold seeps, and whale falls (Brady & Brock, 2009; Colgan et al., 2007; Qian & Bracken, 2011). It belongs to the superfamily Albobaculoidea within Littoridinimorpha (Qian et al., 2014), but the family is paraphyletic (Colgan et al., 2012). In the present study, we described the mitogenome of *Provanna* sp., the second representative of the family Provannidae and the first of the genus *Provanna*, to which the latest sampling of representatives of Provannidae and to better understand the phylogenetic position of the family of deep-sea gastropods.

Snails were collected from a methane seep on the continental slope of the South China Sea (22°56'N, 113°11' E, 1112 m depth) during the national scientific R/V *Shan* cruise on 19 June 2013 and were identified as closely related to *Provanna* sp. LR2 based on the morphology of the shell and

Table 1. Characteristics of *Provanna* sp. mitochondrial genes.

Gene	Start	Stop	Length (bp)	Introns (nt)	Start codon	Stop codon	Strand
cox1	447	3222	786	43			NS
cox2	1284	4702	3418	4	ATG	TAA	NS
cox3	1460	3112	1652	2			NS
hsp70	1421	3494	2073	0			NS
hsp90	1496	3348	1852	4			NS
hsp100	1473	3340	1867	1			NS
hsp70	1636	3390	1754	1	ATG	TAA	NS
hsp90	1663	3366	1703	0			NS
hsp100	1689	3330	1641	0	ATG	TAA	NS
hsp70	1710	3476	1766	22	ATG	TAA	NS
hsp90	1680	3378	1697	0	ATG	TAA	NS
hsp100	1700	3435	1735	0			NS
hsp70	1674	3334	1660	1	ATG	TAA	NS
hsp90	1617	3312	1695	34			NS
hsp100	1630	3414	1784	0			NS
hsp70	1610	3411	1801	0			NS
hsp90	1616	3411	1795	0			NS
hsp100	1616	3411	1795	0			NS
hsp70	1616	3411	1795	0			NS
hsp90	1616	3411	1795	0			NS
hsp100	1616	3411	1795	0			NS

(continued)

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MITO 

Beringius turtoni (Bean, 1834)
BUCCINIDAE

-150m, Flandern Ground, North Sea, Scotland, United Kingdom, 127.8mm. F++.

The « Turton's Whelk » is a large and elegant circum-arctic cold-water buccinid best known from North Sea Yorkshire, United Kingdom to the west coast of Norway. It was first discovered and described by William Bean, using material dredged from deep water Dogger Bank, North Sea. It is named after a British conchologist of the time, William Turton. A carnivorous / scavenging gastropod, it inhabits rocky to muddy bottoms of moderately deep water around -20~250m. It is a rather rare species, especially in large and good condition like the specimen shown; as most specimens have obvious growth scars, apex knocked off, or have lost the periostracum. Although the sculpture is quite consistent, the shell form varies greatly; especially in terms of the shell breadth to height ratio. Typical shell length around 110mm., very large specimens may exceed 140mm. *Beringius ossiania* (Friele, 1879) is currently considered a junior synonym.



A paper I lead authored, « How the mollusc got its scales: convergent evolution of the molluscan scleritome », is now published in the Biological Journal of the Linnean Society (early online, <http://dx.doi.org/10.1111/bij.12462>)! Please let me know if you would like to have a PDF copy



Septa closeli (Beu, 1987)
RANELLIDAE

-3~5m, By SCUBA diver, Nacala Bay, Mozambique, 47.8mm.

The « Closel's Triton » is a rather dusky coloured *Septa* species endemic to the Indian Ocean, ranging from Sri Lanka to South Africa. It is the most comm.on *Septa* species in Indian Ocean where other members of the genus are rare. Presumably carnivorous like other ranellids, it inhabits very shallow to moderate depths from lowtide zone down to about -20m in the coral reefs. Very similar to the closely related *S. hepatica* (Röding, 1798), which it was initially considered a variety of. It is differentiated from *S. hepatica* by its darker varices without distinct stripes and more dissolved, less distinct dark bands between spiral cords. The overall colouration however is quite variable from cream to dark brown, though is on average darker and less vivid than *S. hepatica*. A layer of hairy periostracum covers the shell when alive. A large *Septa* species, very large specimens may exceed 60mm. although most specimens average at around 45mm.



Septa bibbeyi (Beu, 1987)
RANELLIDAE

-10~15m, Olango Island, Central Visayas, Philippines, 39.1mm.

The « Bibbey's Triton » is an intensely crimson ranellid that appears to be endemic to the Philippines. A rather common carnivorous gastropod, it inhabits moderately shallow water in reefs around -10~30m deep. When alive it is covered by a layer of hairy periostracum as is typical in Ranellidae. Although similar to the closely related *S. rubecula* (Linnaeus, 1758) which it was initially confused, it has a more inflated and more coarsely beaded body whorl with a much longer anterior siphonal canal. In addition the white spiral band and the adjoining white patch on varices always cover two spiral ribs or more, which is wider than that of a typical *S. rubecula*. A medium-sized *Septa*, the typical shell length is around 40mm, although giant specimens may exceed 50mm. It is named after Loyal J. Bibbey who first noticed its distinctiveness from *S. rubecula*.



Septa hepatica (Röding, 1798)
RANELLIDAE

-20~25m, Eastern Samar, Samar Island, Eastern Visayas, Philippines, 44.8mm.

The « Black Striped Triton » is a strikingly coloured ranellid very widely distributed throughout the Indo-West Pacific region. A comm.on carnivorous gastropod, it inhabits shallow to moderate depths of around -10~40m in the reefs. The signature black colouration in the interspaces of spiral ribs always present throughout to the body whorl, but the background colouration vary from cream to red. Although in the closely related species *S. rubecula* (L., 1758) the black intercord characteristic is also sometimes present, *S. rubecula* always has a pronounced white patch on the upper part of each varix and can be easily distinguished. A thick hairy periostracum conceals the brilliant colouration when the animal is alive, making it surprisingly difficult to locate. It is the second largest *Septa* species, with giant specimens exceeding 65mm. Typical specimens however averages at around 45mm. It is renowned as one of the « Three Beautiful Snails » in Japan, along with *S. rubecula* and *S. flaveola* (Röding, 1798).



Septa flaveola (Röding, 1798)
RANELLIDAE

-25m, Olango Island, Central Visayas, Philippines, 43.1mm.

The « Golden Triton » is a beautiful ranellid widely distributed in the Indo-Pacific, best known from the Philippines. It is moderately comm.on in the Philippines but uncomm.on in the rest of Western Pacific, and very rare in the Indian Ocean. A carnivorous gastropod, it inhabits rocky surfaces and among coral rubbles in the reefs of moderate depths around -10~50m. The live animal carry a rather thick layer of bristly periostracum, characteristic of the family Ranellidae. It is probably the largest species in genus *Septa* with gigantic specimens reaching 80mm., although vast majority averages at around 45mm. It is a renowned species in Japan where it is known as one of the « Three Beautiful Snails », along with congeners *S. rubecula* (Linnaeus, 1758) and *S. hepatica* (Röding, 1798).



Septa rubecula (Linnaeus, 1758)
RANELLIDAE

-10~15m, Dived, Bohol Island, Central Visayas, Philippines, 43.8mm., 2012.

The « Robin Redbreast Triton » is a comm.on but lovely ranellid with a very wide distribution throughout the Indo-West Pacific region. A carnivorous gastropod like other Septa species, it lives beneath or among corals of the reefs in shallow to moderate depths of around -5~30m. When alive the brilliant intense red colour is hidden under a layer of bristly periostracum, rather thick and chestnut yellow in colour. There is usually a diffused white band around the fifth spiral cord. Typical shell length around 40mm., very large specimens may exceed 55mm. It is similar to a number of other Septa species such as *S. bibbeyi* (Beu, 1987) and *S. hepatica* (Röding, 1798), and is sometimes confused with them. In Japan it is reknowned as one of the « Three Beautiful Snails », along with *S. flaveola* (Röding, 1798) and *S. hepatica*.



Septa mixta (Arthur & Garcia-Talavera, 1990)
RANELLIDAE

Philippines, From old collection, 32.3mm.

Septa mixta is perhaps the most enigmatic species of the ranellid genus Septa. Due to its superficial similarity to the closely related *S. rubecula* (Linnaeus, 1758) and *S. occidentalis* (Mörch, 1877) it has been much confused with them (hence 'mixta'). Compared to *S. rubecula* it has 1. an absolutely sharp and crisp white band covering the entire length of the fifth (and only the fifth) spiral cord; this band is usually more diffused and spread out to intercord space and adjacent spiral cords in *S. rubeculum* (sharp band similar to *S. mixta* is not unknown but rare). 2. The spiral cords are much stronger with larger beads and more coarsely sculptured dorsum. 3. The form is more angulate in appearance. Compared to *S. occidentalis*, *S. mixta*'s dorsum is less scabrous in sculpture and there is usually only one strong intervarice node; the very sharp white band is often still a good indicator. Widely distributed from the northern Indian Ocean to New Caledonia, it is presumably a carnivorous gastropod like its congeners and inhabits moderate depths around -20~50m. Many specimens identified as *S. mixta* are misidentified *S. rubecula*, and true specimens of *S. mixta* appear to be very rare. Typical shell length around 30mm., very large specimens may exceed 45mm.



Some species of the ranellid genus *Septa*. First row: *Septa rubecula* (Linnaeus, 1758), *Septa flaveola* (Röding, 1798), *Septa closeli* (Beu, 1987), *Septa hepatica* (Röding, 1798); Second row: *Septa mixta* (Arthur & Garcia-Talavera, 1990), *Septa bibbeyi* (Beu, 1987), *Septa peasei* (Beu, 1987). Size of *S. rubecula* is 43.8mm.



Here are some of mine, including *marrerubrum* bottom row second from the right. Still missing *mixtum*.



Chicomurex globus Houart Moe & Chen, 2015
MURICIDAE

-150m, Trawled, Lipata, Surigao, Philippines, 39.5mm., 2013 (specimen examined for description but not in the type series) .

Chicomurex globus is a medium sized *Chicomurex* ranging from Okinawa, Japan to Philippines to Vanuatu and New Caledonia. Named for its rounded outline, it has long been confused with *C. gloriosus* (Shikama, 1977) [*C. gloriosus* is the species often referred to as '*C. venustus*' from Philippines and elsewhere, the true *C. venustus* (Rehder & Wilson, 1975) is restricted to the Marquesas]. It differs from *C. gloriosus* by the globous shape resulting from broader shell with shorter siphonal canal, more shouldered and smaller shell; it also has a very distinctive dorsally recurved spine on the siphonal canal. The shell is variable in colouration, from cream to tan to white. Often carry dark blotches, and may be banded like *C. gloriosus*. Presumably a carnivorous species like other congeners, it inhabits moderate depths around -20–200m. Typical shell length around 40mm., very large specimens may reach 53mm.



Left to right: *Chicomurex venustus* (Rehder & Wilson, 1975) HOLOTYPE (USNM 707241 <http://collections.mnh.si.edu/search/iz/?irn=449941>), *Chicomurex gloriosus* (Shikama, 1977), *Chicomurex globus* Houart Moe & Chen, 2015.



Chicomurex pseudosuperbus Houart Moe & Chen, 2015.
MURICIDAE

-200m, Balut Island, Davao Occidental, Philippines, 64.5mm., PARATYPE.

Chicomurex pseudosuperbus is a large *Chicomurex* ranging from Okinawa, Japan to Philippines to New Caledonia and Queensland, Australia. Majority of specimens have come from the central Philippines where it is comm.on, outside Philippines it is uncomm.on to moderately rare. It was named *pseudosuperbus* because it has been misidentified as *C. superbus* in the recent literature. It has been confused with *C. lani* Houart Moe Chen, 2014 [which was thought to be *C. superbus* (Sowerby III, 1889) until the rediscovery of its holotype, *C. superbus* is now a senior synonym of *C. problematicus* (Lan, 1981)] but has a larger shell, more adressed suture, longer siphonal canal, more obvious axial nodes, and a more scabrous shell. It differs from the true *C. superbus* by having a narrower, higher spired shell with narrower secondary cords; also importantly the spiral cords are not as clearly overlaid with brown line as in *C. superbus*. It is presumably a carnivorous gastropod like other *Chicomurex* and inhabits moderate depths around -60~200m. Typical shell length around 65mm., very large specimens may reach 85mm.



Left to right: *Chicomurex superbus* (Sowerby III, 1889), *Chicomurex lani* Houart Moe & Chen, 2014, *Chicomurex pseudosuperbus* Houart Moe & Chen, 2015.



Chicomurex gloriosus (Shikama, 1977)
MURICIDAE

-100~200m, By tangle net, Tinina, Balut Island, Davao Occidental, Philippines, 51.5mm., 2013/xi

Chicomurex gloriosus is a medium sized Chicomurex ranging widely across the Indo-West Pacific region ranging from Reunion and Mauritius to Indonesia to Philippines to Japan to Papua New Guinea. It has been considered a junior synonym of *C. venustus* (Rehder & Wilson, 1975) and confused with that species for a long time but recently after careful comparison with *C. venustus* from the Marquesas, its type locality, a number of consistent and reliable features was found to differentiate them (Houart Moe & Chen, 2015). These include *C. gloriosus* being much larger, not as stocky, and has longer siphonal canal as well as higher intervarical nodes. Furthermore, *C. gloriosus* is much less scabrous and the two differ in positions of the coloured spiral bands when they are present. Houart Moe & Chen (2015) reinstated the name *C. gloriosus*, and the true *C. venustus* is now considered to be endemic to the Marquesas. It is a common carnivorous gastropod inhabiting moderately deep water around -50~200m, and is very variable in colouration from cream to pink to red to brown. Darker coloured spiral band often present. Typical shell length around 45mm., very large specimens may reach 60mm.



Left to right: Chicomurex venustus (Rehder & Wilson, 1975) HOLOTYPE (USNM 707241 <http://collections.mnh.si.edu/search/iz/?irn=449941>), Chicomurex gloriosus (Shikama, 1977), Chicomurex globus Houart Moe & Chen, 2015.



Paper published in the Venus volume 73 (1-2)! This includes the description of two new species of Chicomurex: *C. globus* Houart Moe & Chen, 2015 and *C. pseudosuperbus* Houart Moe & Chen 2015; and also reinstates the name *C. gloriosus* (Shikama, 1977) for the Philippines specimens previously referred to as *C. venustus* (Rehder & Wilson, 1975), which is a different species restricted to the Marquesas Islands. Many thanks to Roland and Chris!! Please let me know if you would like a PDF copy.

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Description of Two New Species of *Chicomurex* from the Philippine Islands (Gastropoda: Muricidae) with Update of the Philippine Species and Rehabilitation of *Chicomurex gloriosus* (Shikama, 1977)

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Abstract: Four species of *Chicomurex* are discussed and illustrated. Two new species are described from the Philippines, with geographical distribution extending to New Caledonia for one. *Chicomurex gloriosus* (Shikama, 1977) is reinstated as a valid name and *C. venustus* (Rehder & Wilson, 1975) is restricted to the Marquesas Islands. Seven species are listed from the Philippines.

Keywords: Muricidae, *Chicomurex*, rehabilitation, new species, Indo-West Pacific

Introduction

Radwin & D'Amico (1976) considered *Chicomurex* Arakawa, 1964 a synonym of *Phyllonotus* Swainson, 1833 and only *Chicomurex fasciatus* (Sowerby, 1841) was then included, as *Phyllonotus fasciatus*, from the Philippines. However this was not later widely accepted as the two genera differ in both shell and snail characteristics, and *Chicomurex* has been recognised as a valid genus by subsequent authors (Houart, 1992; Merle *et al.*, 2011).

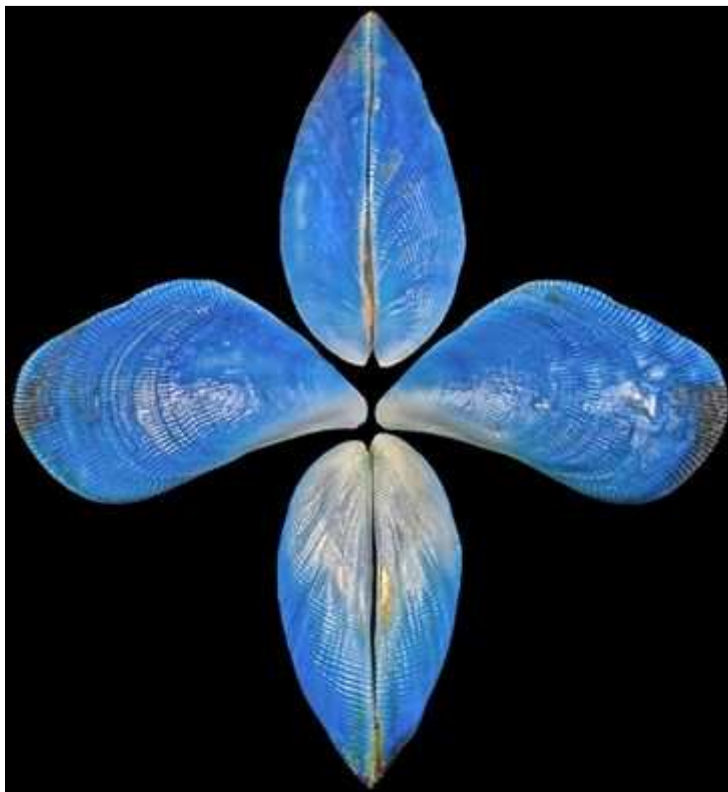
Springsteen & Leoberts (1986) illustrated four species from the Philippines as *Chicomurex superbus* (Sowerby, 1839), *C. fasciatus* and *C. venustus* Rehder & Wilson, 1975 and *C. superbus problematicus* (Lin, 1981). Houart (1992) illustrated five species of *Chicomurex* from the Philippines as *C. fasciatus*, *C. problematicus*, *C. superbus*, *C. sarachi* (Houart, 1981) and *C. venustus*; he also considered *Chicomurex gloriosus* Shikama, 1977 a synonym of *C. venustus*. These species were confirmed by Houart (2008) with the exception of *C. sarachi* which was no longer included in the Philippines malacological fauna. The illustration of *C. sarachi* in Houart (1992, fig. 432) is correct but it has not been recorded from the Philippines since then and its presence needs to be confirmed. Merle *et al.* (2011) reinstated *C. sarachi* but their illustrated specimens from the Philippines (Merle *et al.*, 2011: pl. 78, figs. 11-12) are probably specimens of *Nagaria volucae* (Houart, 1986) or a related species. See discussion and Table 2 for a summary of these and other misidentifications. Recently also, Houart (2013) described two new species from north of Mindanao, south of Leyte and off Bohol. Houart *et al.* (2014) proved *C. problematicus* to be a junior subjective synonym of *C. superbus*. The species illustrated as *C. superbus*, mainly occurring in Taiwan and Japan, was misidentified in all recent publications and remained without any valid name; it was then described as *C. linei* Houart, Mooi & Chen, 2014.

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Septifer bilocularis (Linnaeus, 1758)
MYTILIDAE

Low tide, Attached to rocks, South China Sea, China, 31.2mm.

The « Ledge Mussel » is an abundant mytilid widely distributed in the Indo-Pacific, ranging from Japan to Australia to Red Sea. A filter-feeding species, it lives attached to hard substrates such as rock or dead coral using byssus threads in very shallow to shallow water ranging from intertidal zone to about -15m deep. Extremely variable in colouration and pattern, the colour may be anything from black to blue to green to red. The most stunning form is possibly the almost entirely bright blue form as shown, although this colour is by no means rare in this species. The shell form, especially the convexness, is variable too and influenced by environmental factors. Individuals subjected to strong wave action generally have more convex shells than individuals in sheltered areas. Typical shell length around 40mm., although extremely large specimens may exceed 65mm.



Provanna nassariaeformis Okutani, 1990
PROVANNIDAE

-3500m+, Hydrothermal vent site, Mariana Trough, Northern Mariana Islands, 11.5mm.

Provanna nassariaeformis is a deep-sea provannid endemic to hydrothermal vents of the western Pacific Ocean. A detritus grazing gastropod, it is known from both Mariana Trough and Manus Back-Arc Basin where it inhabits great depths up to -3700m. The shell is very squat and wide for the genus, the white ostracum is covered by a golden brown periostracum which is usually further coated by a thick layer of hydrothermal deposits. The body whorl of adults carry about 20 axial ribs which crosses with four to five spiral ribs of similar strength, forming a cancellate and beaded sculpture. The apex is always corroded, leaving only two to three whorls in the adults. Typical shell length around 10-12mm., there appears to be little variation in size of adult specimens. Although it is only uncomm.on in the vent fields where it inhabits, the extreme depths make it very inaccessible and difficult to obtain.



Tenorioconus mappa ([Lightfoot], 1786) granarius (Kiener, 1847)
CONIDAE

-50m, North coast, Colombia, 46.4mm., 1996/vi

Tenorioconus granarius ranging from Panama to Venezuela is widely accepted as a subspecies of the beautiful Caribbean cone T. mappa; although sometimes considered a full species. It can be differentiated from other subspecies of T. mappa by its reduced colour patches, whitish grey to violet base colouration, high spire; and usually strong granulation as the name suggests. The deeper water specimens tend to have a taller spire (shown). It is a carnivorous and predatory vermivorous gastropod which mainly feeds on polychaete worms, such as fireworms (family Amphinomidae). A somewhat uncomm.on species, it inhabits sandy to muddy bottoms around - 3~50m deep. Individuals aggregate to mate and spawn in the summ.er months of June to August, then depositing egg masses on hard substrates such as rocks or dead corals. Typical shell length around 50mm., extremely large specimens may exceed 70mm.



Bathybembix aeola (Watson, 1879)
CALLIOTROPIDAE

-450~550m, Trawled, Futaba-cho, Fukushima Prefecture, Japan, 41.2mm., F, 2013/iv.

The « Changing Margarine » is a beautiful 'trochid' now classified in Calliotropidae, best known from Japan where it ranges from Aomori Prefecture to the Kyushu Island but supposedly the distribution extends to East China Sea. A deposit feeding gastropod, it inhabits sandy to muddy bottoms of deep water around -300~1200m. It is known to have the ability of selectively ingesting fine particles, using the extraordinarily fine and long marginal teeth of its rhipidoglossate radula as a rake-like apparatus to filter out larger particles from ingestion. This is an effective and energetically efficient adaptation in deposit feeding as the gastropod digests the organic coating on grain surface, and finer grains have a larger surface area to volume ratio. Although only uncomm.on in Japan, but it is rarer and difficult to find in the international market. The shell carries a yellowish green periostracum, the apex is always corroded. Typical shell length around 40mm., very large specimens may exceed 50mm.



Pterynotus pellucidus (Reeve, 1845)
MURICIDAE

Sakai Harbour, Minabe-Cho, Wakayama Prefecture, Japan, 50.2mm., 2011/iv.

The « Pellucid Murex » is a delicately winged muricid with a very wide range throughout the Indo-West Pacific, from east Africa to New Caledonia to southern Japan. The shell is white to pinkish, carries three varices on each whorl with lamellose ventral surface and scalloped edge. A carnivorous and predatory gastropod feeding on sessile animals, it inhabits rocky substrates in shallow to moderate depths around -10~100m deep. Although a comm.on species, most adult specimens tend to have severely damaged varices and fine examples are uncomm.on. Typical shell length around 45mm., giant specimens may exceed 60mm.



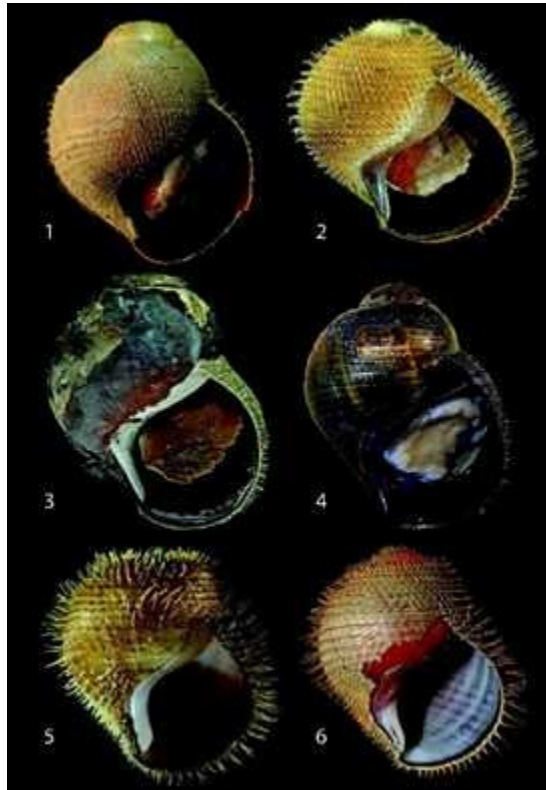
Alcithoe tigrina Bail & Limpus, 2005
VOLUTIDAE

-450m (-1500ft), Trawled by a prawn boat, Bay of Plenty, North Island, New Zealand, 118.1mm., 1993/iii

The « Tiger Volute » is an elegant volute endemic to the northeastern New Zealand, with a restricted range from Bay of Plenty to Cape Kidnappers. It is an uncommon species in Bay of Plenty, though is very rare south of it. A carnivorous and predatory gastropod inhabiting muddy bottoms, it is known from a rather wide bathymetric range from -100~600m. Typically uniformly cream or straw in colouration but sometimes has 'lightning' pattern composed of thin brown axial bands like the holotype, hence the name 'tigris'. Typical shell length 110mm., very large specimens may exceed 130mm. It was originally described as a subspecies of *Alcithoe larochei* Marwick, 1926, but as the range of two overlap (*A. larochei* ranges from northern South Island to North Island) they are now recognised as separate species. The two are quite similar but *A. larochei* is much broader, more solidly built and shouldered, and never carry the 'lightning' pattern.



The genus *Alviniconcha* is a group of charismatic deep-sea vent gastropods, and has been known to comprise of several cryptic species. Except *Alviniconcha hessleri* Okutani & Ohta, 1988 all have remained undescribed -- until now!



The most « hardcore » snails in the ocean, *Alviniconcha*, live in the hottest and most acidic waters around the mouth of chimneys of hydrothermal vents.

Elliptio spinosa (Lea, 1836)
UNIONIDAE

Specimen in the collection of Ryan Hwang. Original photographs by Ryan Hwang, image processing and text written by Chong Chen.

Altamaha River, At the U.S. Route 301 bridge, Doctortown, Long County, Georgia, U.S.A., 58.0mm., 1963

The « Altamaha Spiny mussel » is a truly charismatic and enthralling freshwater pearl mussel famed for its distinctively robust and elongate spines. It is endemic to the Altamaha River and its tributaries in Georgia, U.S.A. and its type locality is the river's mouth near Darien. A filter-feeding bivalve, it seems to be limited to fast-flowing portions of the river and are often buried five to ten centimetres below the surface. Once ago before the mid-1900s it was a comm.on species, but today like many other freshwater mussels its numbers have dwindled significantly due to habitat degradation and it has become very rare indeed. Also used to be more wide-spread with the range covering lower Ocmulgee, Oconee, and Ohoopsee rivers, but none has been found outside the main Altamaha River since 2001. The largest number found in a single site since 1990 is only nine individuals and it is now limited to no more than five sites. In 2011 it was listed as an Endangered species in the USFWS under the Endangered Species Act of 1973 (although it has been listed as Endangered in Georgia before then), and also listed as Endangered in the IUCN Red List in 2012. Like other unionids it is known to go through a glochidia larval stage parasitising fish gills/fins, but it is yet unclear what its host fish species is (or are); making its conservation challenging as unionids often have specific hosts and it is necessary to conserve the host fish together with the mussel. Typical shell length around 70mm., very large specimens may exceed 110mm. The periostracum is shiny and greenish yellow in young specimens but becomes a very dark brown in gerontic specimens. The number of spines varies greatly, usually between one to five.



Scelidotoma gigas (Martens, 1881)
FISSURELLIDAE

-20~25m, Coast of Yagi, Hirono-cho, Iwate Prefecture, Japan, 82.3mm., 2014/vii.

The « Giant Tugali Limpet » is a very large fissurellid native to northwest Pacific, with a distribution ranging from northern Korea and Japan (north of Fukushima Prefecture) to Sakhalin. A rather uncomm.on algae-grazing herbivorous species, it inhabits hard rocky substrates of intertidal to shallow subtidal waters down to about -30m deep. Although the shell is not colourful, its soft parts are vivid and brightly coloured in orange to red and the foot is larger than the shell. A shallow notch in the anterior end of the shell proves that it is a slit limpet, but this feature is often very inconspicuous in gerontic specimens. Typical shell length around 70mm., very large specimens may exceed 95mm. It used to be placed in the genus *Tugali* (hence the comm.on name), but is now moved to *Scelidotoma*. Although the external appearance is similar to abalones, its flesh is said to taste bitter and vile when raw and tasteless when cooked. It is one of the host species of the symbiotic scale worm (Polychaeta: Polynoidae) *Arctonoe vittata* (Grube, 1855), which lives in the pallial groove of the host. The host helps the worm move about and protects it from predators, the worm does not feed on the host and in return helps the host fight predators such as sea stars by biting them.



Calliostoma foveauxanum (Dell, 1950)
CALLIOSTOMATIDAE

-150m, 14.5km (9 miles) Cape Saunders, Otago, South Island, New Zealand, 44.4mm., 1993.

The « Foveaux Top » is a large and handsome calliostomatid endemic to a small part of New Zealand, ranging from the southern South Island to Stewart Island and the Snares. An uncommon species, it is a carnivorous grazer mostly feeding on hydroid cnidarians. It is best known from moderate depths of -50~200m but ranges deeper with records exist from exceeding -500m. Authors who accept the finer breakdown of Calliostomatidae place this species in the New Zealand endemic genus (or subgenus) *Maurea*. Typical shell length around 50mm., very large specimens may reach 65mm. The specific epithet is taken from the type locality, the Foveaux Strait. It is most similar to *Calliostoma spectabile* (Adams, 1855) from the Antipodes Islands of New Zealand, but *C. foveauxanum* has finer sculpture and the earlier teleoconch are less convex in form. *Calliostoma eminens* Marshall, 1995 is another closely related species from Antipodes Islands but is easily distinguished by its much deeper suture and very sloped shoulder.



Buccinum kashimanum Okutani, 1964
BUCCINIDAE

-800~900m, Trawled, Kinkasan, Miyagi Prefecture, Japan, 85.1mm., F, 2008/vi.

The « Kashima-nada Whelk » is a large cold-water buccinid endemic to the Pacific Japan, ranging from Kagoshima Prefecture to Hokkaido. The inflated white shell is thin and fragile, with a light yellowish brown periostracum which are usually pustulate. It is extremely variable in the development of spiral ribs and has several forms ranging from completely lacking (the depicted form) to two very strongly raised ribs (holotype form) to having numerous weak ribs. The overall form is less variable, although may be considerably more elongate than the depicted form; the name *Buccinum boucheti* Tiba, 1984 (replacement name for *Buccinum concinnum* Tiba, 1980 which is a junior homonym of *B. concinnum* Dillwyn, 1817) was given to the elongate form, now a synonym of *B. kashimanum*. It is a locally uncomm.on carnivorous / scavenging gastropod inhabiting sandy to muddy bottoms of deep water ranging from -500~2000m. Typical shell length around 80mm., very large specimens may exceed 100mm. Although it very rarely appears on the fish market, it is one of the most delicious Japanese *Buccinum* species. It is named after its type locality Kashima-nada, a section of the Pacific Japan ranging from Oarai, Ibaraki Prefecture to Inubousaki (= Cape Inubo), Chiba Prefecture.



Eugeniconus nobilis skinneri (da Motta, 1982)
CONIDAE

-15~20m, Dived, Bali Island, Indonesia, 41.1mm., 2004/x.

The « Skinner's Cone » is a flamboyant conid known from a small part of Indonesia ranging from Bali to Sumbawa. It is considered either a subspecies or colour form of the « Noble Cone » *Eugeniconus nobilis* (Linnaeus, 1758), which is very variable in pattern and ranges more widely from Andaman Islands to Timor.



Bathymodiolus mauritanicus von Cosel, 2002.
MYTILIDAE

-1200m, Trawled by the M.P. « Peixe de Mar », Methane seep site, 18°41'N 16°45'W, Nouakchott / Banc d'Arguin, Mauritania, 98.6mm., 1994/i.

Bathymodiolus mauritanicus is a deep-sea mussel endemic to cold seeps of the Atlantic Ocean. Unusually for a bathymodioline it was not described from samples collected during submersible dives but instead using specimens trawled commercially from -1000~1200m Mauritania. Since its description it has been discovered at many more sites on both eastern and western Atlantic ranging from the Barbados prism to the Angola margin, and is therefore considered a bathyal amphi-Atlantic species with a depth range around -1000~1700m. It is likely to rely on endosymbiotic bacteria inhabiting its gills for a large part of the nutrition like other *Bathymodiolus* species, while also being capable of filter-feeding. It is a member of the *Bathymodiolus childressi* Gustafson, Turner, Lutz & Vrijenhoek, 1998 complex, recognised from recent phylogenetic studies as being a separate clade from *Bathymodiolus sensu stricto* (ie. the clade characterised by *Bathymodiolus thermophilus* Kenk & Wilson, 1985) and contains further species from the Western Pacific and New Zealand, such as *Bathymodiolus platifrons* Hashimoto & Okutani, 1994 and *Bathymodiolus tangaroa* Cosel & Marshall, 2003. The species in this complex differ from *Bathymodiolus s.s.* morphologically by having low, almost terminal umbones, smaller adductor scar, among other features. The genus *Bathymodiolus* as a whole is now known to be paraphyletic as other mytilids (e.g., *Adipicola crypta* (Dall, Bartsch & Rehder, 1938)) appears nested among *Bathymodiolus* species in phylogenetic analyses, and thus erection of a new genus is likely required in the future to house the *B. childressi* complex. Currently many authors enclose the genus in quotation marks for this complex to indicate their questionable genus-level placement. In fact the entire subfamily Bathymodiolinae requires a revision in the near future, and recent evidences suggest that Bathymodiolinae perhaps should be incorporated into Modiolinae. Typical shell length around 90mm., very large specimens may exceed 110mm. Although it is common where it is found its bathyal habitats are inaccessible and thus it is very rarely seen in the shell trade. Nonetheless, a considerable number of specimens trawled Mauritania in 1994 (including the depicted specimen) have made it to the market, making it easier to obtain than other *Bathymodiolus* species.



Lyria cloveriana Weaver, 1963.
VOLUTIDAE

-20~25m, From net of local fisherman, Tangalla, Sri Lanka, 89.4mm., 2014/vi.

The « Clover's Lyria » is a pleasing and well sought-after volute endemic to Sri Lanka. A carnivorous and predatory gastropod, it inhabits sandy to muddy bottoms of moderate depths around -20~80m. Although once ago a rare species, it is only somewhat uncomm.on today thanks to many being bought up as by-catch of local fisheries. The shell is rather variable in stoutness but general pattern and the characteristically bulbous protoconch are distinctive features. Typical shell length around 75mm., giant specimens are known to surpass 95mm. It was named after the renowned American conchologist and shell dealer Phillip W. Clover, who is still very much active today.



Vasum rhinoceros (Gmelin, 1791)
TURBINELLIDAE

SCUBA dived, On shallow reef, Nungwi, Zanzibar Island, Tanzania, 82.4mm., 2011.

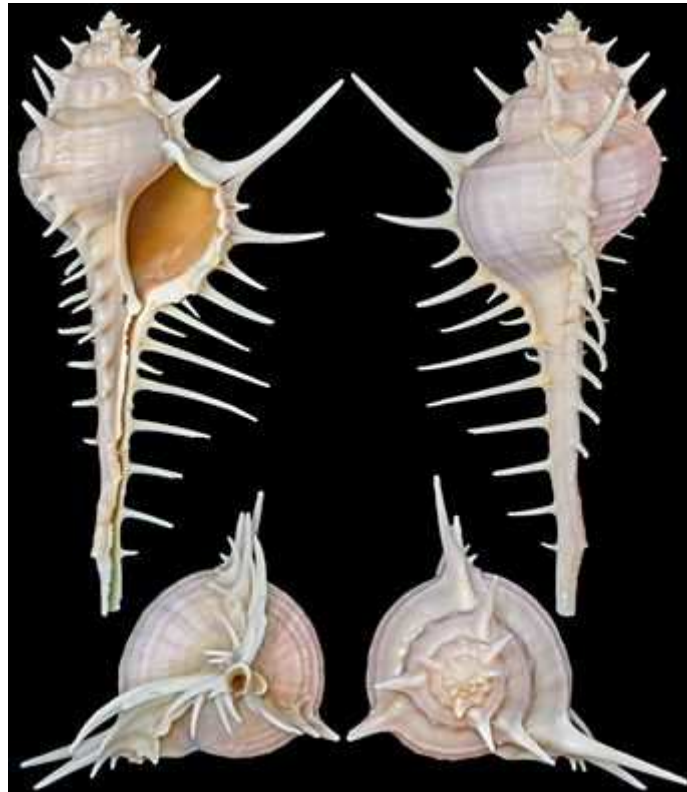
The « Rhinoceros Vase » is a very thick and heavy vase shell endemic to a small part central east Africa, ranging from Kenya and Tanzania including Zanzibar Island. It is a carnivorous and predatory gastropod primarily feeding on polychaetes and sipunculans. A shallow water dweller, it may be found from intertidal waters down to approximately -20m deep and inhabits sandy to rocky to weedy bottoms just within fringing coral reefs. Although a locally comm.on species, it is uncomm.on on the market due to its restricted range. It is generally a rough shell and is very variable in pattern and form, especially knobyness. The depicted specimen is a particularly spiny form known only from Tanzania which strongly reminiscent of the rare *Vasum stephanti* Emerson & Sage, 1988 from Somalia. There is also a rare golden form endemic to Zanzibar Island with a uniformly yellow shell and a golden columella, lacking the usual brown pattern. In some geronic specimens the anterior part of the outer lip strongly flares. Typical shell length around 70mm., very large specimens are known to exceed 100mm.



Murex echinodes Houart, 2011
MURICIDAE

Beached, Between Ras Al Sawadi and Dibah, Gulf of Oman, Oman, 116.5mm., Dead/F+.

Murex echinodes is a recently described Murex species endemic to a small part of northwest Indian Ocean, from Gulf of Oman to Kuwait. It is part of a complex which also includes Murex scolopax Dillwyn, 1817, Murex somalicus Parth, 1990, and Murex megapex Neubert, 1998; and was considered as a form of M. scolopax until 2011 when Roland Houart remarked on their consistent differences and described it as a new species. Adult specimens are most easily differentiated from M. scolopax by the existence of a short but obvious second primary spine (P2 sensu Merle, 2005), which is lacking in adult M. scolopax (also M. somalicus). Compared to the very rare M. megapex only known from the types, it has a much smaller protoconch with less whorls (1.6-1.75 vs 3 in M. megapex) and lacks the lattice sculpture on the earlier whorls. There are many more intriguing distinctions between the species in this complex listed in the description paper (Houart, 2011) such as ontogenic differences, readers are referred there for further information. It is a carnivorous and predatory gastropod inhabiting shallow water from the very low tide zone to about -50m deep, and is uncommon to rather rare. The colouration is white to light tan, fresh collected specimens often have brown flammules all over the shell. Typical shell length around 110mm., very large specimens may exceed 150mm.



Busycon coarctatum (Sowerby I, 1825)
BUCCINIDAE

-80m, Trawled on muddy sand bottom, Cabo Catoche, Yucatán Peninsula, Quintana Roo, Mexico, 113.9mm., 2007/i.

The handsome « Turnip Whelk » is a *Busycon* whelk with stunning flame patterns, endemic to the Yucatan Peninsula and Bay of Campeche in Mexico. It is a classic rarity selected by S. Peter Dance as one of his 50 « Rare Shells » (1969), the first traceable specimen appeared in the early 19th Century and was in the collection of Charles Bennet (ie. the 4th Earl of Tankerville). After the death of Tankerville this specimen became the basis for its description (ie. the holotype) by Sowerby I in 1825, but for 125 years after the description it was so rare that « money could not buy it ». Although it has become more available today it is still a rarely offered species and very uncommon in collections, especially so outside North America. It is a carnivorous and scavenging gastropod inhabiting moderately depths around -40~120m; most specimens are trawled on sandy to muddy bottoms. A little-varied species, its squat whorls and the narrowly confined anterior siphonal canal are unique among the genus *Busycon* and makes it unmistakable. Typical shell length around 130mm., very large specimens may exceed 180mm.



Tellina foliacea Linnaeus, 1758
TELLINIDAE

-2~5m, Phi Phi Islands, Krabi Province, Thailand, 94.2mm., 2012

The « Foliated Tellin » is an extremely beautiful tellinid ranging from Amami, Japan to Philippines to northern Australia. Famous for its wonderful colouration resembling that of autumn leaves or the sunset, it is widely coveted by beachcombers and shell collectors alike. It is a filter-feeding and burrowing bivalve inhabiting shallow sandy bottoms around -2~30m deep, freshdead shells are regularly washed up on the beach. It is quite comm.on throughout its distribution, most specimens originate from Thailand and Philippines. It is currently placed in subgenus *Phylloda*, which some authors consider a full genus. Typical shell length around 75mm., very large specimens may exceed 110mm.



Tellina spengleri Gmelin, 1791
TELLINIDAE

Very low tide, Sand flats, Andaman Sea, Trang Province, Thailand, 67.5mm., 2012.

The « Spengler's Tellin » is a curiously shaped Western Pacific tellinid ranging from Okinawa, Japan to around Borneo and Indonesia. The two valves are strongly bent in the opposite direction and it is thus arc-shaped when viewed from the umbo. The shell is intricately sculptured with numerous strong concentric and ending in a row of spines in the posterior angle, as well as more rows of spines on the posterior slope and the anterior-dorsal edge. A common burrowing filter-feeding bivalve inhabiting sandy to muddy bottoms of shallow water from low tide zone to about -20m, shells are often washed on shore after the animal dies. Typical shell length around 60mm., very large specimens may exceed 80mm.



Acesta philippinensis (Bartsch, 1913)
LIMIDAE

-1000m, Trawled by fisherman, South China Sea, China, 211.4mm., 2005.

The « Philippines Giant Lima » is a spectacular deep water Western Pacific limid ranging from Honshu, Japan to Taiwan to East and South China Seas to Philippines to Borneo. Populations from the northern half of the distribution (South China Sea being the boundary) has wider, heavier valves and slight differences in sculpture (such as the depicted specimen); these were given the name *A. marissinica* (Yamashita & Habe, 1969) which is regarded as a form and junior synonym of *A. philippinensis* today. It is a filter-feeding bivalve inhabiting sandy to muddy bottoms of deep to very deep water around -200~1200m, mostly from -400~1000m. Although actually locally comm.on especially in East and South China Sea, it is quite uncomm.on on the market due to the depth; it is also a rough species and quality specimens are difficult to obtain. Typical shell length around 160mm., very large specimens may attain 220mm.



Astraliium calcar (Linnaeus, 1758)
TURBINIDAE

-5m, Dived on rock, Olango Island, Central Visayas, Philippines, 53.5mm.

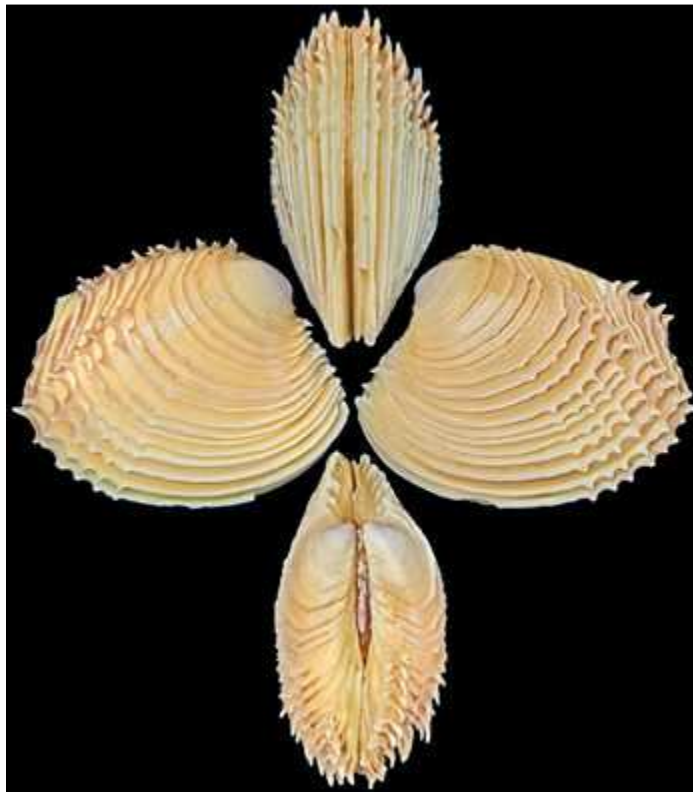
The « Wheel-like Star » is a handsomely spinous turbinid ranging from Okinawa, Japan to Philippines to Malaysia to Queensland, Australia. An algae-grazing gastropod inhabiting mostly hard substrates such as rocks, it is a very comm.on shallow water dweller inhabiting very shallow intertidal water to about -30m deep. The number of spines per whorl may vary from eight to 14; the length also vary greatly and long-spined specimens are often referred to as *A. calcar* f. *aculeatus* (Gmelin, 1791). In natural condition it is almost always heavily encrusted by various overgrowth and cleaning can be a time consuming and laborious task. Typical shell diameter around 35mm., very large specimens may reach 60mm.



Circomphalus yatei (Gray, 1835)
VENERIDAE

Mahurangi Regional Park, Auckland, North Island, New Zealand, 52.2mm., 1988/vii

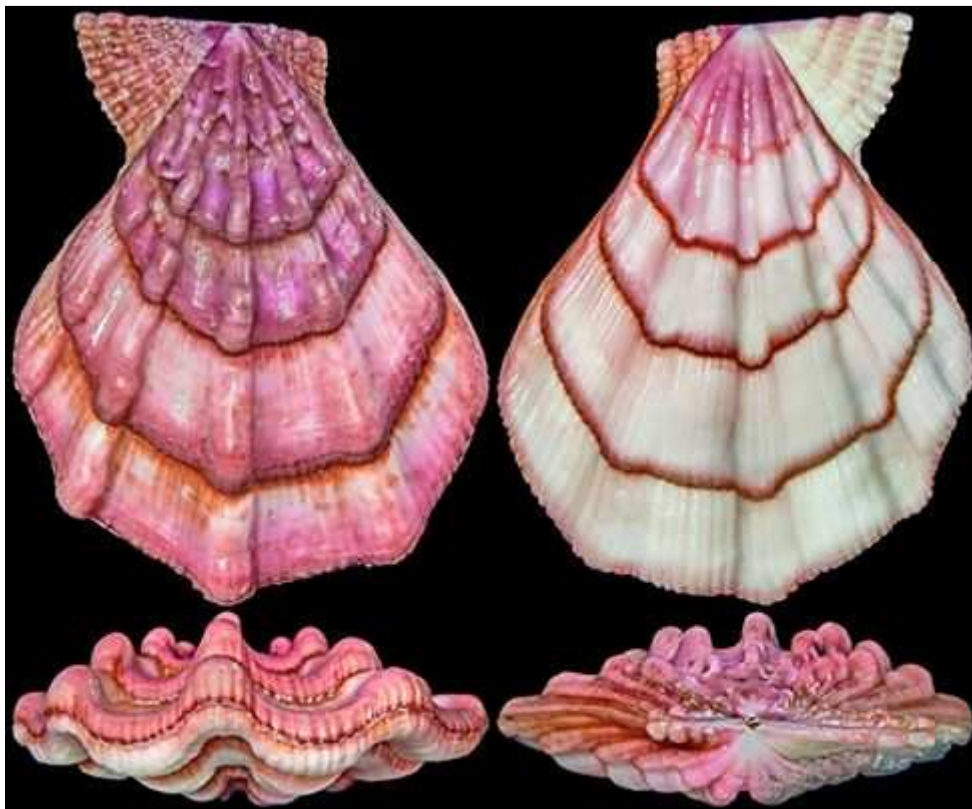
The « Frilled Venus » is a delicately stunning venerid endemic to New Zealand, found around North, South, and Stewart islands. It is a filter-feeding species inhabiting sandy bottoms with a narrow bathymetric range around -5~15m in the shallow water. Although locally comm.on, clean specimens with mostly intact frills are uncomm.on. Somewhat variable in frequency of the concentric ribs; and the colouration may range from off-white to yellowish or reddish brown. It is often washed ashore in considerable numbers after the storm but majority of such specimens have been badly damaged by the time they reach the beach. Typical shell length around 50mm., extremely large examples may attain 65mm. It is still often seen placed in its old genus *Bassina*.



Swiftopecten swiftii (Bernardi, 1858)
PECTINIDAE

-50m, Trawled on mud and seaweed bottom, Japan Sea, Japan, 103.9mm., 2014/viii

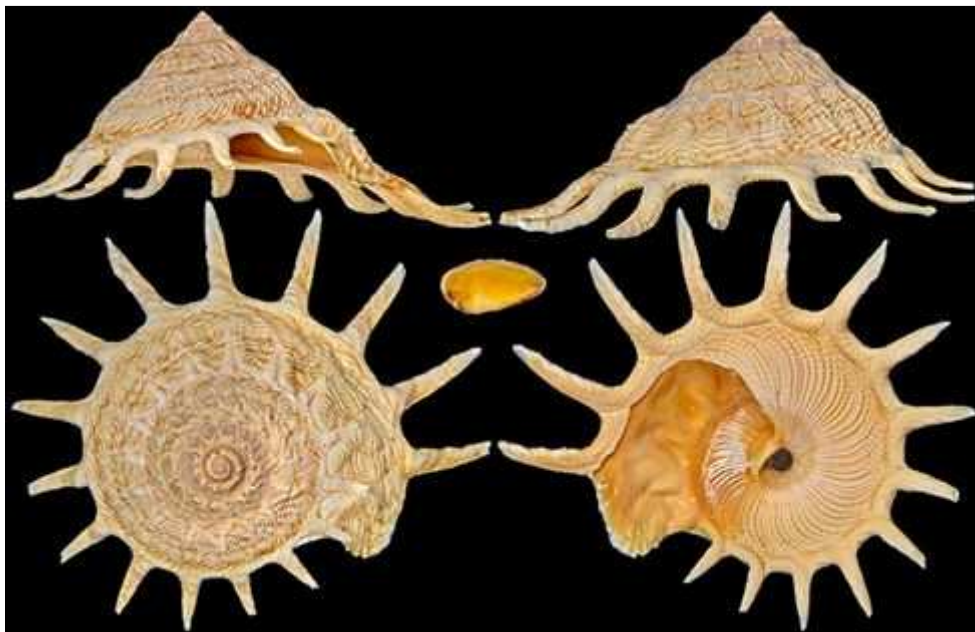
The « Swift's Scallop » is a colourful and attractive medium-large pectinid distributed from Japan Sea to northeast Japan to Sakhalin, Russia. Although quite distinctively shaped, it is very variable in knobiness depending on number of growth pauses the specimen has had, each pause forming a row of knobs. The colouration may differ from bright yellow to purple to red to dark brown, and it is very popular among collectors for this reason. In the most frequent colouration (shown), the left valve is a reddish purple and the right valve is white. A comm.on filter-feeding bivalve, it inhabits mostly rock and gravel bottoms of shallow water from lowtide depths down to about -50m. Typical shell length around 80mm., very large specimens may exceed 120mm. It is considered a delicacy in the Japonic region, particularly Hokkaido where it is fished and eaten along with *Mizuhopecten yessoensis* (Jay, 1857).



Stellaria solaris (Linnaeus, 1764)
XENOPHORIDAE

-40~60m, Tôlanaro (ie. Fort Dauphin), Madagascar, 100.6mm., 2014.

The « Sun Carrier » is an unforgettable xenophorid resembling closely a stylised drawing of the sun. Adults produce long radial spines in regular frequency in place of various foreign materials such as shells and rocks often seen in other members of the family; although juveniles do actually exhibit this behaviour, not all specimens retain the early attachments to adult stage. The first publication record of it goes back to 1705 in Georg E. Rumphius's book « The Ambonese Curiosity Cabinet »; this was pre-Linnaeus days and Linnaeus described it formally in 1764. Although at least one of Linnaeus' cited figures was not of this species but a turbinid, he did supposedly have a specimen which is now in the University of Uppsala and enjoys lectotype status. It was rare until the early 20th Century but today it is considered not uncommon, although the spines are fragile and good quality specimens are hard to come by. It is a deposit feeding omnivore mainly feeding on algae and foraminiferan, and lives on sandy to muddy bottoms of moderate depths around -20~200m. Its distribution range is very wide throughout the Indo-West Pacific region, ranging from South Africa to Indonesia to Taiwan. Specimens from Vietnam are famous for being large with dense and long spines. The name *S. solaris* f. *paucispinosa* Kosuge & Nomoto, 1972 is applied mostly to population from South Africa and adjacent waters, which usually has less spines per whorl (13~15) and coarser, stronger sculpture. Typical shell length around 100mm. including spines, extremely large specimens may exceed 135mm.



Spondylus gaederopus Linnaeus, 1758
SPONDYLIDAE

-15m, Dived, Attached to stone, Kythnos Island, Greece, 62.2mm., 2014/xi

The « European Thorny Oyster » is a beautifully ornamented spondylid native to the Mediterranean Sea, Black Sea, and the adjacent northeastern Atlantic to northwest Africa. As is the norm with spondylids it lives a sessile life with left valve cemented to a hard substrate, and is a filter-feeding bivalve found from very shallow subtidal waters down to about -40m deep. An extremely variable species especially in spine development, the specimen shown has rather long and dense spines. The colouration also varies a little but typically the right valve is reddish brown to purple while the left valve is white. Although a comm.on species most specimens are worn or with poorly developed spines; spectacular specimens are uncomm.on. It has been used in Europe for ornament making since more than 5000 years ago, as is evident from excavated specimens in burial sites such as Varna Necropolis, Bulgaria. Typical shell length including spines around 80mm., very large specimens may exceed 120mm.



Clinopegma magnum (Dall, 1895) f. *aequapaceum* Tiba, 1981
BUCCINIDAE

-400~600m, southeast Nemuro, Hokkaido, Japan, 97.5mm., 2013/vii

Known from Hokkaido, Japan to Sakhalin Island, *Clinopegma magnum* f. *aequapaceum* is a rather rare and perhaps the most attractive form of the « Magna Whelk ». *C. magnum* is itself very widely distributed from Hokkaido, Japan to Aleutian Islands and is extremely variable. It may be fusiform or stout, and the number of spiral cord vary in general from a single strong subshoulder keel to more than ten; many names have been given to its various forms. Form *aequapaceum* represents a tall-spined variety with very strong cords; similar to *C. magnum* f. *unicum* (Pilsbry, 1905) but with more numerous and stronger cords below the sub-shoulder keel. *C. m. f. unicum* is often regarded as a Hokkaido to Sea of Okhotsk subspecies of *C. magnum*. It is a carnivorous / scavenging gastropod inhabiting sandy to muddy bottoms of rather deep water around -200~600m in depth. Typical shell length around 80mm., very large specimens may exceed 110mm.



Angaria formosa (Reeve, 1843)
ANGARIIDAE

-10~25m, Olango Island, Central Visayas, Philippines, 31.0mm.

The « Taiwanese *Delphinula* » is a very attractive angariid ranging from Japan to Taiwan to Philippines to Vietnam to Malaysia. An extremely variable species in both form and colouration, especially with regards to spine formation. The most characteristic form has very wide and irregular downward-pointing spines like the depicted specimen resulting in dramatic shape as there may be as little as three spines covering the entire whorl. It is however also capable of producing regularly interspaced upward-pointing spines with variable lengths like most angariids, almost unbelievable that these are all forms of one single species. Regarding colouration, it often carry distinctive bands of red and white but may also be green and red or uniformly red; even golden specimens have been reported. It is often confused with *Angaria nodosa* (Reeve, 1843), another irregular and variable species, but may be distinguished by the sculpture. *A. formosa* has only very fine spiral cords while *A. nodosa* has generally stronger and wider cords; the cords of *A. nodosa* also almost always carry some dark pigments resulting in dark dotted lines running across the whole shell including umbilical region, this is not the case in vast majority of *A. formosa*. An algae-grazing gastropod inhabiting hard substrata of shallow water around -5~35m in depth, it is a rather uncomm.on species. Typical shell length around 40mm., very large specimens may exceed 60mm.



Homalocantha vicdani D'Attilio & Kosuge, 1989
MURICIDAE

-100m (-350ft), From 'snag nets', Bohol, Central Visayas, Philippines, 28.2mm.

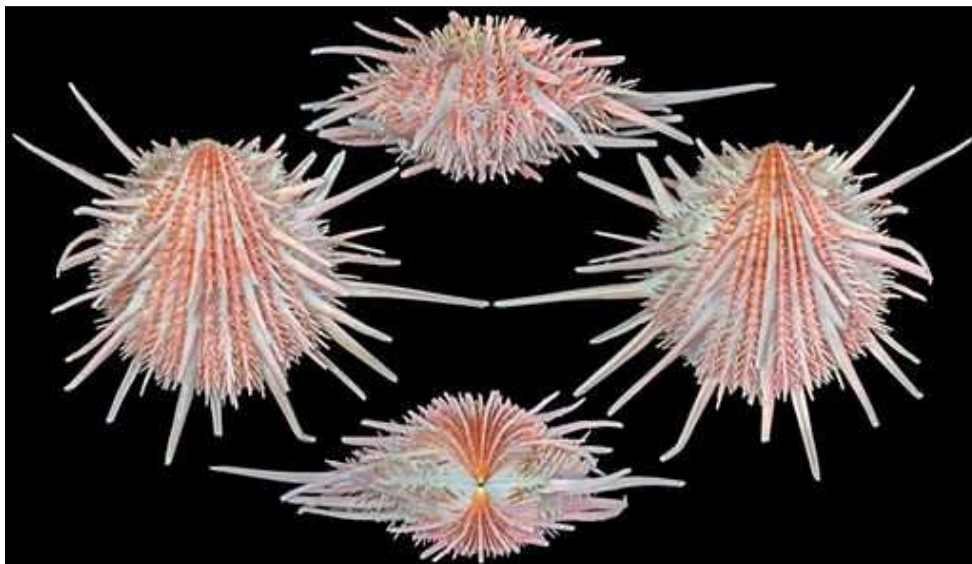
The « Victor Dan's Murex » is an intricately scabrous Homalocantha endemic to the Philippines. It is a member of the Homalocantha scorpio (Linnaeus, 1758) complex in the Philippines which comprises of several very closely related species, the others being H. pisori D'Attilio & Kosuge, 1989, H. dondani D'Attilio & Kosuge, 1989, as well as the recently described H. granpoderi Merle & Garrigues, 2011 and H. ninae Merle & Garrigues, 2011. A carnivorous and predatory gastropod inhabiting a rather wide bathymetric range from -20~150m, it is a rather rare species best known from Palawan to Visayas. Most specimens identified as H. vicdani are juveniles around 20mm. in shell length, heavily scabrous and yellowish to reddish brown in colouration; these are very similar to and difficult to separate from H. pisori and H. dondani. Specimens supposed to be adult H. vicdani are extremely similar to H. scorpio. In fact this is true with all species in the complex and given H. scorpio is an extremely variable species, many if not all other currently recognised species in the complex are likely to be forms of H. scorpio. Typical shell length is only around 25mm. as most are juveniles, adult specimens may exceed 55mm.



Spondylus imperialis Chenu, 1844
SPONDYLIDAE

Burias Island, Masbate, Philippines, 123.4mm.

The « Imperial Thorny Oyster » is a splendidly spinous spondylid widely distributed in the Indo-West Pacific, ranging from India to South China Sea to Taiwan to Philippines. Typically uniform white in colouration (umbo is often pink), spines very long spines especially in young specimens; larger specimens often have shorter spines in proportion to the shell. It is in fact a very variable species and in some specimens the pink colouration persists and the whole shell may be tinged in pink. The depicted specimen is an uncomm.on form with very well-developed fine spines and pink hue persisting to adult size. Generally a comm.on species, it is a filter-feeding bivalve normally found on shell debris and dead corals of shallow to moderate depths between - 10~100m. Typical shell length including spines around 90mm., very large specimens may exceed 150mm. Some large specimens, especially the depicted form, are very similar to *S. victoriae* Sowerby II, 1860 (better known as *S. wrightianus* Crosse, 1872) from Australia; but *S. victoriae* has five to seven minor interstice ribs each carrying one row of smaller spines between the principal ribs compared to three minor interstice ribs in *S. imperialis* each carrying three rows of smaller spines, one from the centre and weaker ones from either side. *S. victoriae* also usually has much thicker and stronger spines on the principal ribs in the early growth stage.



Astraliium tentorium (Thiele, 1930)
TURBINIDAE

Low tide, On rocks, Shark Bay, Western Australia, Australia, 35.8mm.

Astraliium tentorium is one of a few outstanding turbinids that produce vivid blue opercula. The colouration of its operculum is actually quite variable, ranging from blue to a dark purple and even blue ones often carry a tinge of purple near the nucleus. An algae-grazing gastropod inhabiting low tide zone of intertidal areas and shallow subtidal waters to about -5m, it is often found on or under rocks. Endemic to Western Australia and although a locally comm.on shell, it is uncomm.on in the international shell trade market. The dorsum is generally rough and eroded, but the base is brilliant yellow in colouration with delicate squamose sculpture. Typical shell length around 40mm., very large specimens may exceed 50mm.



Turbo lamniferus Reeve, 1848
TURBINIDAE

Low tide, Regnard Bay, Western Australia, Australia, 44.5mm.

The « Squamose Turban » is a medium-sized turbinid elaborately ornamented with dense wavy lamellae ranging from Western Australia to Queensland, Australia to New Guinea. It was for a long time widely known as *Turbo squamosus* Gray, 1847, hence the vernacular name. Although actually published a year prior to *T. lamniferus* Reeve, 1848, *T. squamosus* Gray, 1847 is unfortunately a junior homonym of the same name by Röding, 1798 (which is itself a synonym of *Turbo bruneus* (Röding, 1798)) and therefore not available. It is a locally comm.on algae grazing gastropod inhabiting intertidal zone to very shallow water down to about -5m, often found on rocks or other hard substrata. Individuals are quite variable in the strength of lamellae, but are otherwise little-varied. Typical shell length around 40mm., very large specimens may exceed 55mm.



Lithopoma tectum (Lightfoot, 1786) f. *olfersii* (Philippi, 1846)
TURBINIDAE

Intertidal, On reefs, Salvador, Bahia State, Brazil, 40.0mm., 1995/x

The « Olfer's Star » is a Brazil endemic form of the « Imbricate Star » which ranges widely from Florida, USA to Brazil with a distribution centre in the Caribbean Sea. Traditionally, *L. olfersii* has been the name applied to specimens from Brazil as a separate species to *L. tectum* or a subspecies of it (ie. *L. tectum olfersii*) but there is no real difference in the shell and operculum between the two except the Brazilian specimens tend to be less elaborate in sculpture and often have taller shells. These differences are not consistent across the population and as *L. tectum* is extremely variable *L. olfersii* is currently best treated as a regional form of *L. tectum*, as *L. tectum* f. *olfersii*. A comm.on algae-grazing gastropod, it inhabits rocky bottoms of intertidal to very shallow subtidal water less than -5m in depth. Typical shell length around 40mm., giant specimens may exceed 55mm.



Bolma modesta (Reeve, 1843)
TURBINIDAE

-50m, By lobster gillnet, Sakai, Minabe-Cho, Wakayama Prefecture, Japan, 58.3mm.

The « Modest Bolma » is an elaborately ornamented turbinid ranging from Honshu, Japan to Taiwan to East China Sea. The dorsum varies from pinkish to purple in colouration and carries two rows of strong spines as well as many rows of beaded cords; there is another row of moderate spines on the base. Spine development vary greatly among individuals, the depicted specimen has rather strong spines. The parietal callus is yellowish brown to golden and is rather widespead. A comm.on grazing and detritus-ingesting gastropod inhabiting rocky to gravelly bottoms, it lives in depths ranging from -20~150m which is shallow for a Bolma. Typical shell length around 45mm., giant specimens may exceed 60mm.



Astraliium stellare (Gmelin, 1791)
TURBINIDAE

Low tide, On outer reef, Shoal Point, Queensland, Australia, 38mm.

The « Blue-Mouthed Star » is a remarkable turbinid with a striking sky blue columellar and operculum. It is one of the most celebrated blue shells, as true blue is rare in the shells of marine gastropods. Although usually a vivid blue, the operculum may sometimes carry a purplish hue. A locally comm.on algae-grazing gastropod, it inhabits low tide zone of intertidal waters down to very shallow depths of around -5m. Geographically it is best known from Australia where it ranges from Queensland to Western Australia but is supposed to have a wider distribution in the Indo-West Pacific. Individuals vary greatly in development of varices, some specimens have very strong spine-like varices while others have modest nodule-like development. Often a very rough shell, it is not easy to find a quality specimen. Typical shell length around 35mm., very large specimens may exceed 50mm.



Astraliium rotularium (Lamarck, 1822)
TURBINIDAE

Low tide, Under rocks on reef, Cape Leveque, Kimberley, Western Australia, Australia, 36.3mm., 2014

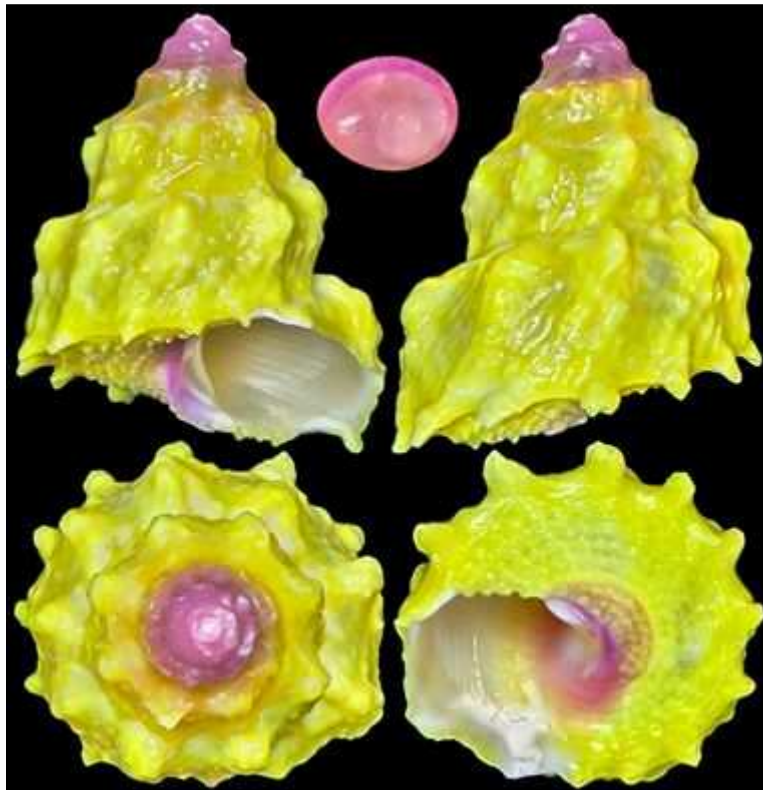
The « Rotary Star » is an intricately sculptured turbinid endemic to western and northwestern Australia. It is a comm.on algae grazing gastropod inhabiting very shallow water from low tide zone of intertidal waters down to about -5m, often found under rocks or other hard substrates when not foraging. Although specimens are often dull white throughout, many carry a reddish tinge especially between spines of the earlier whorls. The varices vary somewhat in frequency among individuals, and are sometimes webbed. Typical shell length around 30mm., extremely large specimens may exceed 45mm.



Astraliium provisorium (Schepman, 1903)
TURBINIDAE

-10~15m, On coral rubble, Olango Island, Central Visayas, Philippines, 19.7mm.

Astraliium provisorium is a moderate-sized and tall-spined turbinid endemic to the Philippines. Its range was originally considered to be restricted to the Sulu Archipelago, but a population was found around Olango Island and subsequently described as *Astraliium roseobasis* Kreipl & Dekker, 2003. *A. roseobasis* is now considered a synonym of *A. provisorium*, extending its range to the Visayas; specimens are also known from localities inbetween such as near Bohol Island. The synonymisation took some time to confirm, partly because the holotype of *A. roseobasis* is in very poor shape. Presumably a grazing herbivore feeding on algae, it is usually found in shallow water around -10~50m and is somewhat uncomm.on. The overall form is little-varied but it is extremely variable in colouration from brown to yellow to pink to red, often very brightly coloured like the superb specimen depicted. Typical shell length around 20mm., very large specimens may exceed 25mm.



Guildfordia superba Poppe, Tagaro & Dekker, 2005
TURBINIDAE

-100~200m, By tangle net, Tinina, Balut Island, Davao, Philippines, 89.4mm., 2014/viii

The « Superb Star Turban » is a very beautiful turbinid recently described from Philippines where it is endemic to, and is best known from Davao Region, Mindanao. It is most similar to *Guildfordia yoka* Jousseaume, 1888, especially the golden deep-water form, but differs significantly in lacking most sculpture on the dorsum except one or two weak rows of pustules adjacent to the suture. The dorsum is thus rather glossy and is often decorated with patterns in the form of brown lines. The shell itself is large for the genus and its spines are proportionally shorter than *G. yoka*. It is presumed to be a bottom grazing / detritus ingesting gastropod and inhabits sandy to gravelly to muddy bottoms of rather deep water around -100~300m. It was considered rare for a few years since its original description but now it is being brought up more often by deep-water tangle nets and perhaps best described as locally uncomm.on. Typical shell length including spines around 75mm., very large specimens may exceed 90mm.



Cochlespira pulchella (Schepman, 1913)
COCHLESPIRIDAE

Dredged by local fisherman, In coral rubble, Aliquay Island, Mindanao, Philippines, 26.7mm., early 2014.

The « Star Turrid » is an elegant cochlespirid 'turrid' with a strongly keeled scalariform spire and prolonged siphonal canal. A carnivorous and predatory gastropod inhabiting sandy to rubbly bottoms of rather deep water around -50~300m, it is primarily vermivorous and is somewhat uncomm.on. The overall geographic range is considered to be from Boso Peninsula, Japan to East China Sea to Philippines to Indonesia. Although the overall form is usually stable, the shoulder spines vary greatly in formation and some forms were described as distinct species but now considered to be synonyms; for example *C. fossata* Powell, 1969 and *C. semipolita* Powell, 1969. *C. p. pulcherrissima* (Kuroda, 1959) often has spines pointing sideways and is sometimes regarded as a northern subspecies ranging from Japan to East China Sea but its true status is not clear, may be a synonym but also sometimes considered a separate species. Typical shell length around 25mm., very large specimens may exceed 35mm.



Cylindrus gloriamaris (Chemnitz, 1777)
CONIDAE

-180~250m, By tangle net, Cebu Island, Philippines, 86.3mm., 2008/xi

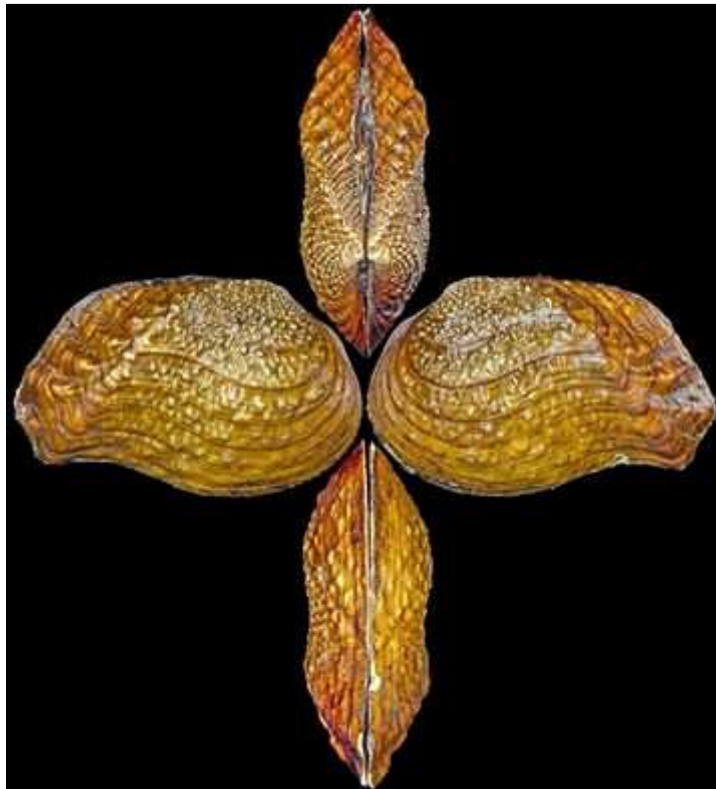
The « Glory-of-the-Sea » is certainly the greatest historical rarity of all molluscs throughout the history of shell collecting. This distinguished cone with beautiful tent patterns was the most desirable and an exceptionally rare shell of for about two hundred years since the first specimen arrived in the western world as early as 1757. S. Peter Dance, who selected it as one of four greatest rarities in « Shell Collecting: An Illustrated History » (1966) and one of his 50 « Rare Shells » (1969), wrote: « some rare shells are well known; a few are famous; one, and one only, has become legendary »; « to see one was a privilege, to hold one an honour, to own one a triumph ». The handful of early specimens were all unlocalised but its true provenance was revealed by Hugh Cuming when he discovered two in the Philippines in 1836, but none were found after his visit and many considered it extinct; until 1957 when a living population was re-discovered once again in the Philippines. By 1960s many more had turned up from western Pacific and today it is only somewhat uncomm.on, many being brought up by deep-water tangle nets in the Philippines. Its distribution range is now known to be rather wide, ranging from the Philippines to Indonesia to Fiji to Samoa. Although it is found across a wide bathymetric range, -10~300m, most specimens are obtained from depths greater than -100m which certainly contributed to its initial scarcity. A predatory gastropod capable of injecting toxin using a dart-like radula like other conids, it inhabits sandy to muddy bottoms and is molluscivorous. The pattern is very variable and the shell is rather prone to growth lines. Specimens showing strong blue hues are known as well as a golden form. Typical shell length around 100mm., extremely large specimens may exceed even 170mm. Although much of its illustrious rarity has faded through the re-discovery, its fame and glory shall not; and it will always remain a must in any serious collection for as long as the history of shell collecting continues.



Tritogonia verrucosa (Rafinesque, 1820)
UNIONIDAE

Marais des Cignes River, Ottawa, Franklin County, Kansas, USA, 102.1mm., Coll. 1994.

The « Pistolgrip » or « Buckhorn » is a large and thick unionid freshwater mussel endemic to USA and is wide-spread across the eastern half of the country. It is a filter-feeding burrower and inhabit sand, gravel, or mud bottoms of medium to large rivers down to depths of around -20m. It exhibits unionid's characteristic reproduction cycle of females brooding fertilised eggs until hatched and then release these larvae (the glochidia); which are obligate parasites attaching on fish gills or fins until dropping to become sedentary mussels. It spawns in spring and releases glochidia in summer (ie. tachytictic), the host fishes of its glochidia are usually catfishes such as the « yellow bullhead » *Ameiurus natalis* (Lesueur, 1819) and the « flathead catfish » *Pylodictis olivaris* (Rafinesque, 1818). Rather uncommon throughout its range, it is threatened in some states such as Virginia and Wisconsin from habitat degradation like many other worldwide unionids. The shell is sexually dimorphic with the posterior part of shell compressed and elongate in females (depicted) and much truncated in males. The periostracum is lighter brown in juveniles and becoming darker towards black as the mussel grows older. Typical shell length around 120mm., very large specimens may exceed 160mm.



Tiphobia horei Smith, 1880
PALUDOMIDAE

-20m, Trawled on sand, Lake Tanganyika, Tanzania, 38.7mm.

Ornamented with numerous pronounced elongate shoulder spines the « Hore's Tiphobia » is one of the most iconic and coveted freshwater gastropods world-wide, and exceptionally resembles some marine species such as muricids or genus *Thalassocyona* of Ficidae. It is a well-known endemic of the ancient Lake Tanganyika, the largest freshwater lake of Africa and second largest in the world, bordering Tanzania, Congo, Burundi, and Zambia. Lake Tanganyika is renowned for being a biodiversity hotspot and hosting many endemic species, most famously more than 250 species of cichlid fish but also more than 50 species of mollusc. An omnivorous epifaunal grazer feeding on deposits, it locally comm.on throughout the lake on sandy to muddy bottoms from very shallow waters down to -150m deep although generally found deeper than -50m and records exist for depth exceeding -300m. It is ovoviviparous meaning it gives birth to live young; eggs are retained within a uterine brood pouch until hatched. Live specimens are covered in a rather thick layer of brown periostracum. It is very variable in spine formation and somewhat in spire height. Typical shell length around 40mm., very large specimens may exceed 50mm. It was named in honour of the British Reverend Captain Edward Coode Hore who first discovered it among many other freshwater species during his visit to Tanzania during the late 1800s.



Thiara scabra (Müller, 1774)
THIARIDAE

On mangrove plant, Pelabuhan Ratu, Sukabumi Regency, West Java, Indonesia, 23.6mm., 1980s.

The « Spiky Trumpet Snail » is a freshwater gastropod widely ranging from Amami Islands, Japan to Indonesia to Yemen. A popular snail for aquarists, it is often seen kept and bred in freshwater aquariums around the world and has been artificially introduced to many countries in the southern Pacific such as New Caledonia and Solomon Islands. There is some uncertainty regarding whether the African populations are the same species as the Asian ones, and if they have been artificially introduced or not. Although most specimens carry numerous attractive long spines, it is in fact extremely variable in spine growth and strength of sculpture; some specimens lack spines entirely. It is also variable in shell height / width ratio, the depicted specimen is rather fusiform. The ostracum may be white to brown and may carry patterns consisting of dark straight or zigzag lines; overlaid with a thick layer of dark brown to black periostracum. As is the norm for freshwater snails, the apex is usually corroded away in adults. It is a comm.on algae-grazing herbivorous gastropod inhabiting freshwater streams as well as some brackish estuaries. Typical shell length around 25mm., very large specimens may exceed 35mm.



Bolinus cornutus (Linnaeus, 1758)
MURICIDAE

Dakar, Senegal, 132.0mm., F/F+.

The « African Horned Murex » is a large club-shaped muricid native to western Africa, ranging from Mauritania to Angola (including Cape Verde). Each whorl bears seven spinous varices, each usually bearing two strong spines near the shoulder and many weaker ones towards the siphonal canal. Individuals vary greatly in spine length and curvedness; irregularity in spine growth is not uncomm.on. The colouration is also very variable and can vary from off-white to almost black. The club-shaped shell and long varices make it closely resemble members of the genus *Tudivasum* in Turbinellidae, although the protoconch of *Tudivasum* is bulbous and very different. Like its only congener *B. brandaris* (Linnaeus, 1758) which was used to produce the ancient Tyrian purple dye, the mucus of *B. cornutus* also turns purple upon contact with air and may be used to produce purple dye. A carnivorous and predatory gastropod, it inhabits mostly sandy to muddy bottoms of moderately shallow waters around -5~80m deep and is not uncomm.on throughout its range. Typical shell length around 150mm., extremely large examples may exceed 200mm.



Scutellastra longicosta (Lamarck, 1819)
PATELLIDAE

Low-tide, On rocks, False Bay, Cape Peninsula, South Africa, 75.2mm.

The « Long-Ribbed Limpet » is a spectacular limpet characterised by long spine-like digits displayed in a « star-burst » pattern, native to South Africa and southern Mozambique. The digit development is extremely variable and so is sculpture strength; many specimens have short and subdivided digits as opposed to the long-digit form depicted here. A comm.on grazing gastropod inhabiting mid to low tide zones of intertidal rocky shores, it is known to exhibit territorial behaviour as part of the mutualistic relationship with the brown algae *Ralfsia verrucosa* Areschoug, 1845. *R. verrucosa* is the limpet's preferred food species and the limpet clears away new settlement space for *R. verrucosa* by grazing away existing vegetation. After *R. verrucosa* establishes in the new territory, the limpet facilitates its growth by fertilisation using mucus and faeces as well as prying intruding organisms from the territory. The algae therefore gains new habitat protected by the limpets and the limpets in return gets a constant supply of their favourite food by 'farming'. The limpet's long digits are considered to have evolved to increase efficiency in prying intruders as well as to increase surface area of attachment to the rock. Typical shell length around 60mm., very large specimens may exceed 90mm.



Paludomus loricatus Reeve, 1847
PALUDOMIDAE

Colombo, Sri Lanka, 26.4mm., 1970s

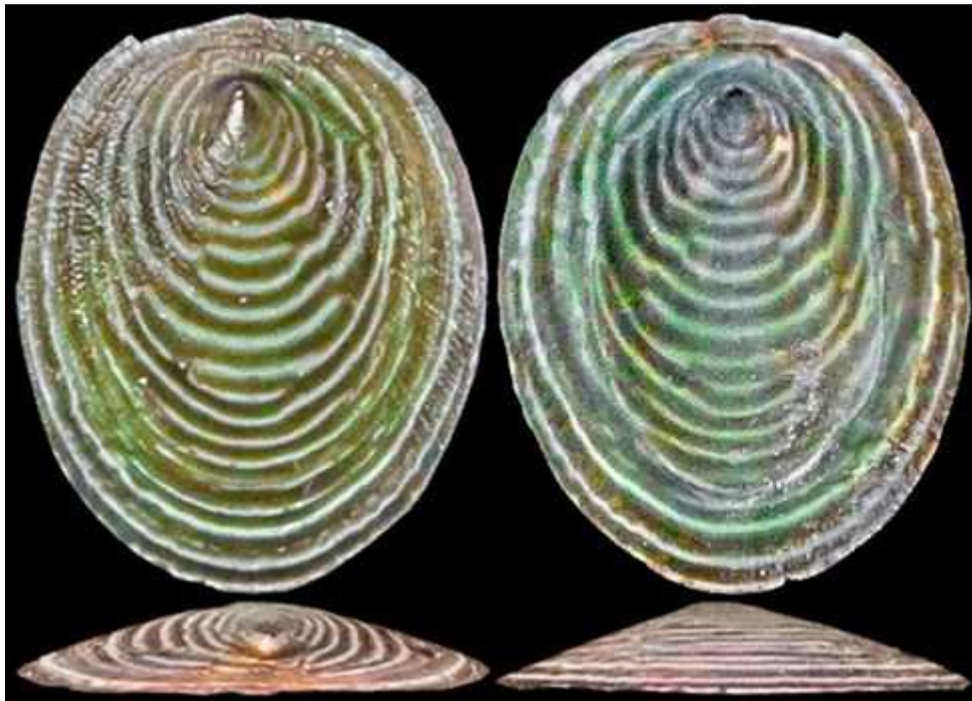
Paludomus loricatus is a prickly and attractive freshwater snail endemic to India and Sri Lanka. The fine-scale distribution is not well-understood especially outside Sri Lanka as it is recorded from a few disjunct localities in India (e.g., Assam and Arunachal Pradesh) but not between them. This is likely to be a result of either poor sampling efforts or mis-identification with other *Paludomus* species. Also, although more than fifty species of *Paludomus* have been described from the region, freshwater snails may vary considerably in morphology depending on environmental factors many are likely to be synonyms of *P. loricatus*. It is a herbivorous algae-grazing gastropod inhabiting slightly acidic and slow-flowing mountain streams, and is locally common (especially in Sri Lanka where it is one of the most common *Paludomus* species). Somewhat variable in spire height, many carry striking pattern of zig-zag lines but is usually concealed under the rather thick, brown periostracum. It is a popular algae-grazer species for freshwater aquarists and are kept and bred in aquaria around the globe outside its natural range. Typical shell length around 30mm., giant specimens may exceed 40mm.



Atalacmea fragilis (Sowerby I, 1823)
LOTTIIDAE

Slipper Island, Coromandel Peninsula, North Island, New Zealand, 10.4mm., 1952.

The « Blue-Ringed Limpet » must be one of the most striking of all lottids. The shell is characterised by a pattern consisting of radial green to brown lines with the interline spacing filled by a brilliant turquoise or blue. A algae-grazing gastropod, it inhabits rocky surfaces of intertidal to very shallow water less than -10m deep and is endemic to the North, South, and Stewart islands of New Zealand. Although locally not uncomm.on, it is somewhat rarely seen on the shell market probably due to its small size and difficulty in obtaining quality specimens as the shell is extremely fragile as the specific epithet suggests. Typical shell length around 15mm. and very large specimens may exceed 20mm. It can only be confused with its only congener *Atalacmea multilinea* Powell, 1934 endemic to the South Island of New Zealand, which has a similar pattern but with interline spaces filled by off-white to light brown instead of turquoise; the greenish lines are also generally thinner. *A. multilinea* is also much smaller than *A. fragilis*, averaging at about 7mm. and maxes out around 12mm.



Dicathais orbita (Gmelin, 1791)
MURICIDAE

Cornwallis Beach, Manukau Harbour, Auckland, New Zealand, 70.2mm., 2000/xii.

The « Comm.on Cartrut » or « Cartwheel Purple » is a large rock shell ranging from Australia (Queensland to Western Australia, including Lord Howe Island and Tasmania) to New Zealand. It is a comm.on to abundant carnivorous gastropod across the range and inhabits rock surfaces of intertidal to very shallow water less than -10m deep. Mainly a predator preying on other molluscs such as *Lunella torquata* (Gmelin, 1791) and *Septifer bilocularis* (Linnaeus, 1758) but may also scavenge; it forages up the shore during high tide and retreats to rock crevices during low tide. It is currently the only species in genus *Dicathais* but is extremely variable in sculpture / shape and different forms were once considered to be separate species. For example specimens from southern Australia is generally reduced in sculpture and has been named *Dicathais textilosa* (Lamarck, 1822); nodulous specimens from western Australia lacking strong radial ribs were given the name *D. aegrota* (Reeve 1846). The variation is known to be attributable to a mixed effect of temperature, diet, substrate, and exposure to wave action; a moderately strongly sculptured specimen is depicted here. The thick, heavy shell is usually white to grey but juveniles are often brown with thinner shells. Typical shell length around 60mm., extremely large specimens are known to reach even 120mm.



Perisserosa guttata (Gmelin, 1791)
CYPRAEIDAE

Deep water by tangle net, Balut Island, Philippines, 65.73mm., Col. ii/2004.

The « Great Spotted Cowrie » is a lovely classic rarity among cypraeids characterised by circular bright spots on the dorsum and long tooth on the base extending to the dorsum as marginal lines. One of S. Peter Dance's fifty « Rare Shells » (1969), only sixteen were known by 1963 according to a list of known specimens published then by Woodward and it was exceedingly rare until the late 1900s. Today it is known to be a widely distributed species ranging from Maldives to Japan to Philippines to Queensland, Australia; it is very variable and several forms / subspecies names are currently being used. The nominal subspecies occurs from Philippines to Queensland and is uncomm.on, best known from moderate depths around -25~100m in the Philippines where specimens with clear large spots are taken by diving or tangle netting. The form *azumai* (Schilder, 1960) is a northern form of *guttata* with smaller indistinct spotting and often lacking the labral blotch known from Japan and East China Sea; in recent years the Chinese trawlers are producing a huge quantity of this form from the East China Sea making it very comm.on and inexpensive, but most specimens are quite poor. The form *bicallosa* (Raybaudi, 1985) refers to an angular form with well-developed white callous on both sides best known from Philippines. It is extremely rare in Queensland, its southern limit, and the specimens from here (usually deeper water around -150~300m) may represent a real subspecies; although not formally named these are often referred to as « *queenslandica* » on the market. The only widely accepted subspecies except the nominal *guttata* is the uncomm.on Indian Ocean subspecies *guttata surinensis* (Raybaudi, 1978) from deeper waters (-100~300m) of Maldives to Thailand; characterised by an depressed oval shape, fine spots, darker and larger basal blotches, and much longer marginal lines. It is an omnivorous gastropod often inhabiting crevices of rocky walls. Extremely variable in size, the typical shell length is around 55mm. but specimens smaller than 35mm. and larger than 85mm. are known to exist; specimens less than 45mm. or over 70mm. are rather rare. It is still one of the most sought-after cowries today, giant dark specimens with large well-defined spots are perhaps the most coveted although an ideal specimen is still very difficult to obtain.



Pterynotus elongatus (Lightfoot, 1786)
MURICIDAE

In tangle net by local fisherman, Mactan Island, Cebu, Philippines, 72.8mm., early 2014.

The « Club Murex » is an elegantly and curiously shaped muricid distributed very widely across the entire Indo-West Pacific region ranging from eastern Africa to Hawaii, USA including the Red Sea and best known from the Philippines. Although a comm.on species today, it was historically a famous rarity and is one of S. Peter Dance's 50 « Rare Shells » (1969). Since around 1767 when it first appeared in the western world it has been very rare; until mid to late 1900s when divers from the Philippines and other countries began to recover it in good quantities. A carnivorous gastropod inhabiting rocky to sandy bottoms of around -5~150m deep, it was rare despite the relatively shallow depths of -10~40m where it is most often found partly because live specimens are well concealed by marine overgrowth. Often found on hard corals with complex structures, making it even more difficult to locate. Both scientific and vernacular name refers to its spire which is usually slender-looking due to the fragile varices are damaged on the earlier whorls. Uncomm.only specimens with intact varices on earlier whorls are found and these are truly wonderous. Majority of specimens are pure white in colouration but the colouration is actually variable from white to yellow to orange to brown and even violet. Typical shell length around 70mm., extremely large specimens are known to exceed 100mm.



Leporicypraea valentia (Perry, 1811)
CYPRAEIDAE

-30~50m, Dived, Camotes Islands, Camotes Sea, Philippines, 88.2mm.

The « Prince Cowrie » is a very famous classic rarity among cypraeids with a distribution from the Philippines to Melanesia to the northernmost Australia, although by far best known from the Philippines. It is one of S. Peter Dance's 50 « Rare Shells » (1969) and only half a dozen specimens were known when the book was published. The first specimen known in the western world was obtained by Lord Valentia (ie. George Annesley) from George Humphrey and eventually became the holotype when George Perry described the species in 1811 using the same specimen and dedicated the specific epithet to its owner. This specimen is currently housed in the Natural History Museum, London. There have been some controversy over its provenance in the early years, many thought it was an Indian Ocean shell and it was not until after the mid-1900s that its Pacific origin was widely accepted. This was because it was 'long-lost': no specimens were found for many decades, until Phillip Clover finally obtained a reliably localised specimen in 1967 (collected in the year before) from New Britain. This re-discovery was reported by S. Peter Dance in the Hawaiian Shell News (June 1968). It remained exceptionally rare until around and after 1980s when specimens began to turn up from the Philippines with the widespread of SCUBA diving and the advent of tangle nets targeting molluscs. Although it is only moderately rare and much readily obtainable nowadays it remains one of the most desirable cowries of all. It is a omnivorous gastropod inhabiting caves and crevices of rocky walls in moderate depths around -15~80m, the typical shell length is around 80mm. while extremely large specimens may exceed 100mm. It is a relatively little-varied species and is easily distinguished from other cowries. It is worth noting that the Philippine Fisheries administrative order 208 (effective 2001) forbids collecting and exporting of *L. valentia*; although the order appears to be poorly enforced and many specimens continue to be traded every year.



Pedum spondyloideum (Gmelin, 1791)
PECTINIDAE

By local hookah diver, Cordova, Cebu, Philippines, 83.3mm., early 2014.

The « Coral Scallop » is a strange and unique pectenid that strongly resemble spondylids (hence the binomial name), and is the only species in genus *Pedum*. It is a common obligate scleractinian stony coral associate widely distributed throughout the entire Indo-Pacific region and lives embedded in live coral skeleton to which it is attached using byssus threads. It uses a variety of coral hosts such as genera *Montipora*, *Porites*, and *Pavona* in shallow water ranging between -2~20m; massive *Porites* appear to be the favourite. The shell is mostly surrounded by coral skeleton in adults as the coral would have grown and expanded since it settled. It has been suggested that this scallop-coral relationship may be mutualistic with the scallop providing coral enhanced water circulation for feeding and generating water jets to repel coral predator while the coral provides structural support and protection to the scallop. Both valves are usually white, sometimes carrying brown blotches or streaks; black specimens are also known but rarer. The shape is very variable. Typical shell length around 60mm., gigantic specimens may exceed 100mm.



Spirula spirula (Linnaeus, 1758)
SPIRULIDAE

On beach, Solomon Islands, 24.5mm.

The « Ram's Horn Squid » is a very unique cephalopod with a loosely coiled chambered shell. It is not a true squid (order Teuthida) but the only surviving species of the order Spirulida; its shell is a true shell and is actually internalised like a true squid but is visible from the outside even in a live animal. It is considered to be the closest extant relative of the extinct belemnites (order Belemnitida), and is also closely related to extant cuttlefishes and squids. Like its distant cousin the nautilus, it uses the chambered shell (around 25-37 chambers) as a buoyancy organ for vertical movement by controlling the gas / liquid ratio in the chambers using osmosis. A deep-sea carnivorous cephalopod distributed throughout the world's tropical oceans, it lives in water column around continental shelf down to great depths of -1000m and is most often seen around -200~700m although very occasionally also ventures into shallow water less than -20m deep. It exhibits diurnal vertical migration, rising to shallower depths for feeding at night and spends the day in the deep. Like many deep-sea cephalopods it is capable of bioluminescence from a photophore at the very posterior end between the fins, which emits a green light. Its radula is extremely reduced. The animal is very rarely seen but the shell is common and often washes up to beaches and shores, because after the animal dies the gas-filled shell floats to the sea surface and becomes pelagic. Typical shell length around 25mm., very large specimens may exceed 35mm. The animal is typically around 35mm. in mantle length and 70mm. in entire length.



Japelion pericochlion (Schrenk, 1863)
BUCCINIDAE

-200~250m, Trawled, Sōma, Fukushima Prefecture, Japan, 120.1mm., 2009/vi

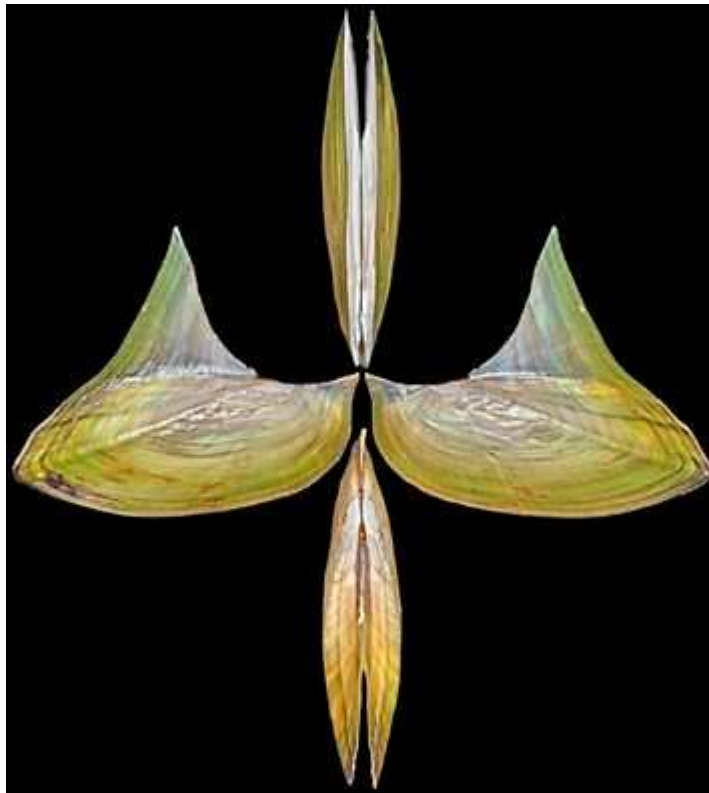
The « Peri Japelion » is a large cold-water buccinid endemic to Japan, ranging from Chiba Prefecture to Hokkaido and is best known from Fukushima Prefecture. It is a somewhat uncomm.on carnivorous / scavenging gastropod inhabiting muddy bottoms of rather deep water around -100~400m. A number of similar Japelion species are also found in Japan, most notably and comm.only seen are *J. hirasei* (Pilsbry, 1901) and *J. adelphicus* (Dall, 1907). *J. hirasei* differs by having usually a broader substral platform and a much shorter anterior siphonal canal, and *J. adelphicus* differs by having no substral platform and only a raised keel. All three species are sometimes seen (*J. pericochlion* usually mixed-in with *J. hirasei*) in Japanese fish markets and are sold for food like many large cold-water buccinids in Japan. They are most comm.only eaten raw as sashimi / sushi or steamed using Japanese sake. Typical shell length around 110mm., extremely large specimens may reach 150mm.



Hyriopsis bialata Simpson, 1900
UNIONIDAE

Yom River, Saerabhumi, Roi Et Province, Thailand, 85.6mm., 2013/iii/07

Hyriopsis bialata is a freshwater mussel with an extraordinary shape from a raised keel in the posterior half of the shell, which varies in extent greatly between individuals with some completely lacking it. It is native to southeast Asia from Thailand to Cambodia; and is a filter-feeding bivalve inhabiting sandy bottoms of river streams. It is an economically important species locally especially in Thailand, with the nacreous shell and pearl produced being used in various kinds of jewelry and ornament making and the meat being used for food or livestock feed. Although a common species, human-induced environmental degradation is causing population in Thailand to decline rapidly in the recent years. It is one of the most fecund (fast generation time, spawning throughout the year) unionids native to the area and aquaculture of this species exist in Thailand. Typical shell length around 80mm., extremely large specimens may approach even 130mm.



Nacella polaris (Hombron & Jacquinot, 1841)
NACELLIDAE

On rocks, King George Island, South Shetland Islands, Antarctica, 53.4mm., F, Coll. S. Maytía, 1992/iv/03

The « South Polar Limpet » is a sub-Antarctic to Antarctic nacellid mainly distributed in the Scotia Sea but extends further to reach Bouvet Island. The name of this species has been intricately confusing. First described as *Patella polaris* Hombron & Jacquinot, 1841; it was known by this name for a long time until Powell in 1973 recognised that the name is a junior homonym of *Patella polaris* Röding, 1798. Powell replaced the name with *Nacella concinna* (Strebel, 1908), which was originally described as a deep water form; until Engl decided the name *N. polaris* is available after all in his 2012 book 'Shells of Antarctica'. It is an algae-grazing herbivorous gastropod living attached on rocky surfaces from intertidal zone down to about -200m deep. The shallow water nominal form (shown here) has a rather elevated shell with weak to no ribbing as adults, whereas the deep water *N. polaris* f. *concinna* is much more flattened and usually carry strong radial ribs numbering 28-30. The nominal form is also generally larger with typical shell length around 40mm. and up to 65mm., f. *concinna* averages at around 25mm. but giants may exceed 50mm. Although it is locally a very common species it is uncommon on the shell market due to its remote distribution.



Eurochatella tankervillei (Gray, 1824)
HELICINIDAE

Cockpit Country, Trelawny Parish, Jamaica, 23.6mm.

The « Tankerville's Trochatella » is a lovely helicid landsnail endemic to Jamaica. It is a herbivorous / detritivorous gastropod grazing algae and other organic matters on rock surfaces where it lives. Highly sculptured for a *Eurochatella* and usually with an attractive pattern which is variable among individuals. Rather large for the genus, its typical shell diameter is around 15mm. with very large specimens growing to approach 25mm. An uncomm.on species, it is not frequently seen on the shell trade market due to its limited range. Helicids are remarkable among landsnails as they evolved to live on land independently (and likely earlier) from better-known landsnail groups such as the pulmonates. They belong to the clade Neritimorpha and are in fact closely related to freshwater and marine nerites; they still carry a calcareous operculum.



Clithon coronatum Leach, 1815
NERITIDAE

Mauritius, 28.5mm., Very old collection.

The « Coronate Nerite » is a superb neritid with perhaps the longest spines of all species in the family. The spines number about four to six on each whorl and are mostly made of thick periostracum folded in a tube-like manner, and thus it is rather flexible in life and although the animal burrows under rocks or detritus the spines do not easily break. This species is confined to the Indian Ocean and supposedly endemic to the Mascarene Basin, best known from Mauritius and Réunion. Often seen placed in genus *Theodoxus* as *T. coronatus* (Leach, 1815) which refer to the same name. Although many records exist across the Indo-Pacific region extending to the Philippines and Polynesia, these are likely to be misidentifications with similar spined brackish congeners such as *Clithon corona* (Linnaeus, 1758) or *C. recluzianus* (Le Guillou, 1841). It is perhaps most confused with *C. corona*, a western Pacific species with a similar specific epithet but *C. corona* has shorter spines and is often highly patterned, with a lighter coloured operculum. *C. coronatum* generally lacks any colouration and is uniformly very dark reddish brown to black (although may have light/dark radial stripes), with a more pigmented operculum. The spines vary somewhat in length, very long spined ones such as the specimen shown here are often referred to as *f. longispina* (Récluz, 1841). An algae-grazing herbivorous gastropod inhabiting shallow brackish streams and waters, it is locally common but increasingly uncommon on the shell market due to its restricted distribution. Typical shell length around 25mm. including spines, very large specimens may reach 40mm.



Perotrochus anseeuwi Kanazawa & Goto, 1991
PLEUROTOMARIIDAE

-100~250m, Tangle nets, Balut Island, Davao, Mindanao, Philippines, 59.8mm., 2011.

The « Anseeuw's Slit Shell » is a beautiful pleurotomariid endemic to southern Mindanao, Philippines; virtually all specimens known to date have originated from south of Balut Island. The pattern varies between different hues of orange and consists of flame-like bands above the slit/selenizone and chequer-like blotches below it; although the two often mix. It is a carnivorous grazer inhabiting hard bottoms around -100~300m deep, mainly spongevorous although may also feed on coral polyps. Curiously majority of specimens caught are young and below 50mm. in shell height with a sharply keeled body whorl, these are only uncomm.on. Larger specimens have much more inflated whorls and are rare; extremely large specimens are known to exceed 90mm. The depicted specimen is medium-sized and has begun to show inflation of body whorl.



Guildfordia aculeata Kosuge, 1979 f. *tagaroe* Alf & Kreipl, 2006
TURBINIDAE

-150m (-80fms), In nets, Panglao Island, Bohol, Philippines, 43.4mm.

The « Tagaro's Star Turban » is the name given to a very unusual spineless form of « Aculeate Star Turban » which normally develop 7-9 short spines around the body whorl. It can only be a form as many intergrades lacking some spines are known, and it is otherwise no different from a typical *Guildfordia aculeata*. It is an algae-grazing herbivorous gastropod inhabiting rocky to rubbly surfaces of moderately deep water ranging between -50~150m. *G. aculeata* itself is endemic to the central Philippines and somewhat uncomm.on; f. *tagaroe* is more uncomm.on than the nominal form and appears to be most comm.on around Aliguay Island. Typical shell diameter around 40mm., very large specimens may approach 50mm. The specific epithet 'tagaroe' was given to honour Sheila P. Tagaro, a marine biologist working in Conchology, Inc., Philippines who has described over 80 new species mainly from the Philippines.



Japelion adelphicus (Dall, 1907)
BUCCINIDAE

-300m, Trawled on mud bottom, East China Sea, 104.3mm., 2011/v.

The « Adelpic Japelion » is a moderately large cold-water buccinid ranging from central Honshu, Japan to Korea to East China Sea with some records from Taiwan and South China Sea. A carnivorous / scavenging gastropod inhabiting sandy to muddy bottoms of moderate depths around -50~400m, it appears to be comm.on in East China Sea but uncomm.on to rare in other areas. Although somewhat variable in stoutness its shell is generally fairly slender and spindle-shaped. Similar to other slender *Japelion* species from the same area such as *J. hirasei* (Pilsbry, 1901) and *J. pericochlion* (Schrenk, 1863) but may be distinguished by having no subsutural platform but only a deep channel. Typical shell length around 80mm., very large specimens may exceed 110mm.



Trophon nucelliformis Oliver & Picken, 1984
MURICIDAE

Low tide, On rocks, Seymour Island, Antarctic Peninsula, Antarctica, 12.6mm., Coll. José Ignacio Garate Zubillaga, 1985.

Trophon nucelliformis is an Antarctic muricid ranging from the South Orkney Islands to the tip of the Antarctic Peninsula. It is a carnivorous gastropod that lives on rocky surfaces from intertidal waters down to shallow depths of about -20m. Although locally a quite comm.on species, it is uncomm.on on the shell market due to its restricted and difficult to access distribution range. Adult shells are always very worn and eroded, juveniles carry irregular weak axial ribbing. It is a direct developing species like many muricids with juveniles directly emerging from egg capsule with no larval phase. Typical shell length around 17mm., giant specimens are known to exceed 30mm. The holotype was collected in 1977 by Gordon B. Pickens of British Antarctic Survey on Signy Island, South Orkney Islands; currently housed in the National Museum Wales.



Turbo canaliculatus Hermann, 1781
TURBINIDAE

-5m, SCUBA dived, Salvador, Bahia, Brazil, 74.3mm., 1995/x.

The « Channeled Turban » is a very handsome turbinid with a distribution centre in the Caribbeans, ranging from southern Florida, USA to Brazil. It gains its name from the conspicuously depressed channel-like subsutural zone, which is also its hallmark as although it is very variable in both colouration and strength of spiral ribs (some specimens almost completely lack ribs) the channel is always present. It is an algae-grazing herbivorous gastropod inhabiting rocky surfaces of shallow to moderately deep water ranging around -2~100m. Once ago rather uncomm.on but today it is known to be comm.on and may be obtained quite reasonably. Typical shell length around 70mm., very large specimens may grow to approach 100mm.



Thiara cancellata Röding, 1798
THIARIDAE

In river, Collected by local person, North of Cebu City, Cebu, Philippines, 32.3mm., early 2014.

The « Hairy Trumpet Snail » is an attractive thiarid with remarkable robust hairs which are mostly part of the periostracum, extending from short shoulder spines. Juveniles are lighter in colouration due to the periostracum being translucent and has finer hairs, as the animal matures the periostracum thickens to be opaque black with more robust hairs. Endemic to freshwater streams of the Philippines, it is a locally comm.on herbivorous gastropod that grazes on algae. A popular algae grazer snail for freshwater aquariums, it is bred by aquarists around the world and has settled as alien species in the wild in some countries such as Solomon Islands and Papua New Guinea. Like most freshwater gastropods the apex is usually corroded. Typical shell length around 25mm., very large specimens may exceed 35mm.



Nautilus cf. stenomphalus Sowerby II, 1849
NAUTILIDAE

-15~20m, Taken by native divers, Sindangan Bay, Zamboanga del Norte, Mindanao, Philippines, 125.5mm., F

The « White-Patch Nautilus » is perhaps the most elusive of the five currently recognised recent nautilid species, characterised chiefly by the narrowly open umbilicus not covered by callus. Whether it actually is a true species or merely a form of *N. pompilius* has the subject of much debate. *Nautilus* with narrowly open umbilicus referred to as *N. stenomphalus* has been found widely throughout the Western Pacific, but the only truly reliable distinguishing character is in the soft parts: the hood of *N. stenomphalus* is covered in irregular papillae and highly textured. Such specimens are restricted to the Great Barrier Reef, Australia and *N. stenomphalus sensu stricto* is considered an endemic of this region although drift shells may be collected in other parts of the Western Pacific. The vernacular name originates from the fact that *N. stenomphalus s.s.* usually (not always) has a white band lacking flame pattern around the umbilicus region although this is seen in other nautilids as well. To add to the confusion, *N. pompilius* juveniles have narrowly open umbilicus and these are covered as the second whorl forms (approx. 75mm. in size for Philippines specimens); causing many such juveniles to be mis-identified as *N. stenomphalus*. Very rarely this feature is retained to adulthood, and it is difficult to conclude whether the specimen shown is a drift shell of *N. stenomphalus* or a freak *N. pompilius*. Furthermore, a recent biogeography study (Bonacum et al., 2011) concluded that *N. pompilius* is not a true phylogenetic species but a cryptic assemblage of at least three paraphyletic populations; the only specimen identified as *N. stenomphalus* in the study fell within the *N. pompilius* clade from the same area. Although inconclusive, this suggests *N. stenomphalus* may only be a form of *N. pompilius* and agrees with many other recent studies which concluded that *N. stenomphalus* is a form or at most subspecies of *N. pompilius*; although *N. pompilius* itself seems to need a phylogenetic revision. Like all *Nautilus* *N. stenomphalus* is a carnivorous / scavenging cephalopod capable of adjusting its buoyancy by changing the liquid / gas composition within its chambered shell to move vertically in water column through its depth range of around -5~800m. Typical shell length around 150mm., very large specimens may exceed 180mm.



Acanthopleura echinata (Barnes, 1824)
CHITONIDAE

On rocks, Los Vilos, IV Coquimbo Region, Chile, 93.2mm., 2006/v.

The « Spiny Chiton » is a large polyplacophoran with numerous thick and strong calcareous spicules on its girdle. Its distribution is from Peru to Valparaiso, Chile but may extend to the Galapagos Islands where old records supposedly exist but it has not been collected for over 50 years. It is a locally comm.on species living attached on intertidal rocks, mainly in the low tide level. As is the norm with chitons it grazes rocky surfaces using its radula, the most important major lateral teeth is reinforced by biomineralisation of iron oxides in three distinct layers each involving magnetite, lepidocrocite, and apatite. Although it is mainly a herbivore feeding on encrusting coralline algae, approximately 35% of its diet composes of various invertebrates such as barnacles and sponges which is also grazes; thus it may be considered an omnivore in a wide sense. Somewhat variable in spine strength and frequency, its valves are often covered in algal growth. Rather variable in size, the typical shell length is around 80mm. but giant specimens may exceed even 130mm.



Phyllocoma convoluta (Broderip, 1833)
MURICIDAE

By local fisherman using tangle net, Punta Engaño, Lapu-Lapu City, Mactan Island, Philippines, 21.2mm., early 2014.

The « Convoluted False Triton » is a delicate muricid widely distributed throughout the Indo-Pacific, ranging from South Africa to Red Sea and widely across the western Pacific. Typical of genus *Phyllocoma*, it greatly resembles a miniature version of trumpet tritons and Broderip originally assigned it wrongly to Ranellidae, under genus *Triton*; hence the comm.on name « False Triton ». Currently genus *Phyllocoma* contains strictly three species, the other two being *P. scalariformis* (Broderip, 1833) and *P. platyca* Houart, 2001; all clearly differ in sculpture and pose no difficulty in identification. It is an uncomm.on carnivorous gastropod found mostly on rocky bottoms or under rocks, and appears to inhabit a wide bathymetric range from about-10m down to more than -500m. The shell may vary somewhat in stoutness, it is very brittle and many specimens have the apex naturally damaged during the animal's life. Typical shell length around 20mm., very large specimens may exceed 30mm.



Parancistrolepis kinoshitai (Kuroda, 1931)
BUCCINIDAE

-200~250m, Trawled on sand and mud, Daiousaki, Shima, Mie Prefecture, Japan, 82.2mm., 2007/x.

The « Kinoshita's Whelk » is a medium sized cold-water buccinid considered endemic to the Pacific coast of Japan; ranging from Sagami Bay to Shikoku Island. It is one of only two known species of genus *Parancistrolepis*, characterised by tiny tear-drop shaped operculum. It may be distinguished from its only congener *P. fujitai* (Kuroda, 1931) by its smooth and glossy periostracum (as opposed to a fuzzy one with many folds in *P. fujitai*), longer anterior siphonal canal, and thicker shell. The shell is also generally more fusiform, although the proportions may vary considerably as well as strength of spiral ribs. Specimens have recently been surfacing from East China Sea and its distribution may extend there; although it is still questionable as no absolutely reliable record exist from this area. Specimens claimed to originate from East China Sea are often more bulbous compared to the average Japanese specimen. An uncommon carnivorous / scavenging gastropod, it inhabits sandy to muddy bottoms of moderate depths around -200~400m. Typical shell length around 80mm., very large specimens may approach 100mm. It was named in honour of late Mr Seiichiro Kinoshita, a Japanese collector who once maintained the Shirahama Shell Museum in Shirahama-cho, Wakayama Prefecture, Japan.



Penion mandarinus (Duclos, 1831) f. *grandis* (Gray, 1839)
BUCCINIDAE

Tasmania, Australia, 127.7mm.

The « Mandarin Penion » is a large siphon whelk endemic to southeastern Australia, including Tasmania. A carnivorous / scavenging gastropod, it inhabits sandy bottoms across a great bathymetric range from around -20m down to -600m, most comm.on around -100~300m. It is an extremely variable species according to locality and depth and many names have been given to different forms. The shallow water form shown here is known as *P. mandarinus* f. *grandis* (Grey, 1839) and has broader, more robust shell than the nominal form with a bent siphonal canal; deep water specimens known as f. *waitei* (Hedley, 1903) are generally more fusiform, with longer and straight siphonal canals as well as lighter colour. There is also an intermediate form called *P. mandarinus* f. *levifida* (Iredale 1925). Another extreme shallow water variation is *P. mandarinus* f. *oligostira* (Tate, 1891) which is similar to f. *grandis* but has rounded shoulders completely lacking in knobs. It is a comm.on species throughout its range, and the depth forms are found in different frequencies according to localities, for example f. *grandis* is more comm.on in southern Tasmania but uncomm.on in New South Wales. Typical shell length around 130mm., very large specimens may reach 190mm.



Pachymelania aurita (Müller, 1774)
THIARIDAE

Intertidal on mud, Mangrove swamp, Exit of Wouri River, Douala, Cameroon, 41.3mm.

Pachymelania aurita is an attractively sculptured thairid native to coastal west Africa, ranging from Senegal to Angola. An abundant species, it inhabits sandy to muddy flats of mangrove swamps and brackish lagoons and prefers localities with relatively high salinity and sand contents; although it is an euryhaline species and the salinity where it is found may vary from about 0.01 to 20mg/l. It is an omnivorous deposit feeder feeding on blue-green algae, diatoms, and organic debris by ingesting sediments in its surroundings. Very variable in strength of shoulder nodules, the depicted specimen is an example with elaborate nodules. It is covered in a layer of semi-transparent greenish brown periostracum when alive which obscures the banded pattern of the ostracum. Typical shell length around 35mm., very large specimens may exceed 55mm. Its range overlaps with a brackish potamidid *Tympanotonos fuscatus* (Linnaeus, 1758) which is remarkably similar but has more radial ribs and a very different aperture shape. The two species are often confused, and are both important food species for local people.



Opeatostoma pseudodon (Burrow, 1815)
FASCIOLARIIDAE

Intertidal, Gobernadora Island, Gulf of Montijo, Panama, 47.8mm.

The « Thorn Tooth Latirus » is a remarkable fasciolariid characterised by a long protruding 'tooth' in the anterior part of the outer lip. Such 'tooth' are more comm. only seen in muricids such as *Acanthina monodon* (Pallas, 1774) to pry open shells of armoured prey, but is unusual among fasciolariiids. *O. pseudodon* is also an predatory gastropod considered to feed on shelled animals including barnacles, bivalves, and vermetid worm snails; its muricid-like 'tooth' is thus thought to be a result of convergent evolution. It ranges from Mexico to Peru including Galápagos Islands, and lives among rocks of intertidal waters down to very shallow littoral waters of around -5m. It has a rather thick, dark brown periostracum when alive and much of the attractive dark/light banding pattern is concealed under it. The length of 'tooth' may vary considerably between individuals of a similar size. A comm.on species, its typical shell length is around 50mm., while very large specimens may reach 75mm.



Taranteconus chiangi Azuma, 1972
CONIDAE

From deep water, Trawled by native fisherman, Aliquay Island, Mindanao, Philippines, 15.5mm., early 2014.

The « Chiang's Cone » is a bizarre species unique among cones to produce a row of sharply raised hollow spines on the shoulder. Although some other cones such as *Rolaniconus polongimarumai* (Kosuge, 1980) also have shoulder nodules they are not hollow spines like in *T. chiangi*; it is so unusual that it is currently the only species in genus *Taranteconus* and once a new family *Taranteconidae* Tucker & Tenorio, 2009 was proposed to house it. In the most recent molecular phylogeny of Conidae (Puillandre et al., 2014) it is actually placed with very good confidence in *Stephanoconus* with the sister group being *zonatus* and *imperialis* (currently placed in genus *Rhombiconus*). It is therefore likely that the unusual spines are homologous to shoulder nodules seen in *zonatus* and *imperialis*, and these species may be moved to genus *Stephanoconus* in the near future should the phylogeny become relatively well accepted. It is a locally comm.on carnivorous and predatory gastropod feeding mainly on polychaete worms and inhabiting rather deep water around -200~400m often among coral rubbles. Its distribution is apparently disjunct, with the main range from southern Japan to the Philippines but also found in New Caledonia. Typical shell length around 20mm., very large specimens may exceed 25mm. A well-known synonym is *Conus lamellatus* Suzuki, 1972.



Volutopsius norvegicus (Gmelin, 1791)
BUCCINIDAE

-150~200m, Trawled, North Atlantic Ocean, southern Iceland, 104.2mm.

The « Norwegian Volute Whelk » is an elegant cold-water buccinid native to the whole breadth of North Atlantic Ocean from eastern Canada to Iceland to United Kingdom, extending to North Sea and Norwegian Sea. It is an uncomm.on species and majority of specimens on the shell market originate from northeast Atlantic and North Sea, mostly from old collections. A carnivorous gastropod mainly preying on polychaete worms, it inhabits soft bottoms across a wide bathymetric range of -20~600m; although it is most comm.on around -100~300m deep. The shell surface is very smooth apart from insignificant axial growth lines; very little periostracum usually remain on adult specimens. Typical shell length around 90mm., very large specimens may exceed 120mm. A widespread misspelling of its binomial name is *Volutopsius norvegicus*, with a 'v' in the place of 'w'.



Anostoma octodentata Fischer von Waldheim, 1807 f. *depressum* Lamarck, 1822
ODONTOSTOMIDAE

On the ground, Under dead tree trunk, Sobral, Ceará, Brazil, 38.6mm.

The « Brazilian Up-Mouth Snail » is a most peculiar landsnail characterised by the upturned final half whorl making the aperture point upwards, hence the genus name. Due to this unusual twist the adult animal carries the shell upside-down with apex pointing downwards. In juveniles the shell is carried vertically with the keel pointing upwards, and as the 'up-mouth' forms the shell tilts to the right and finally falls to a horizontal position. It is an uncomm.on herbivorous gastropod feeding on foliages of vegetation and moss and is endemic to Brazil, mainly states of Ceará and Amapá. The form *A. o. f. depressum* shown here may be distinguished from the nominal form by having fewer teeth in the aperture, more angular shell, and the lighter colouration on the underside; the two are sometimes treated as separate species. Typical shell width around 35mm., very large specimens sometimes exceed 45mm.



Tympanotonos fuscatus (Linnaeus, 1758)
POTAMIDIDAE

Senegal, 43.6mm.

The « Mud-Flat Periwinkle » is an extremely variable potamidid endemic to the Atlantic coast of Africa ranging from Senegal to southern Angola. It inhabits quiet, muddy flats of intertidal brackish ecosystems especially those of mangrove swamps to about -2m deep; and is a deposit feeder that ingests mud and digests the rich organic matter contained within. It is one of the most abundant mangrove gastropods throughout its distribution and is economically important in west Africa as it is used for food, the market demand is rather high. It is a euryhaline species capable of adapting to a wide range of salinity from 0.1 to 25mg/l. Most variable in the strength of nodules on the second spiral cord from the suture; the nominal form generally has weak nodules and the shell appear granular, whereas the form with strong nodules is known as *T. f. f. radula* (Linnaeus, 1758) but intermediates are also comm.on. The specimen depicted is an exceptionally knobby specimen of *T. f. f. radula*, such extremes are rare. Typical shell length around 50mm., very large specimens may exceed 70mm.



Leptoconus milneedwardsi (Jousseume, 1894)
CONIDAE

-200~250m, Trawled, Kollam, Kerala, India, 170.1mm., 2014/vi.

The « Glory of India » is one of the most famous cones of all and a historical classic rarity of great beauty. Known in the western world since mid 1700s, it was once known as 'Drap d'Or Pyramidal' (The Pyramidal Cloth-of-Gold Shell) before the days of binomial names and was formally described by Félix Pierre Jousseume in 1894 using a specimen from Aden. Five years later J. C. Melvill and R. Standen, not knowing about Jousseume's description, described two specimens found by F. W. Townsend 200km Bombay, India from a submarine cable under the best known synonym today: *Leptoconus clytospira*. Melvill wrote that its discovery was « sufficient to mark an epoch », and with less than a dozen specimens known at the time it was included in S. Perer Dance's 50 « Rare Shells » (1969). It remained a great rarity until late 20th Century, and although best described as uncomm.on nowadays it is still one of the most sought-after cones. It is a predatory and molluscivorous gastropod inhabiting sandy to rocky bottoms of moderately deep water around -50~250m. Four regional subspecies are currently recognised, the nominal *L. m. milneedwardsi* from South Africa to Aden; Melvill & Standen's name survives as *L. m. clytospira* ranging from Pakistan to India to Sri Lanka; *L. m. lemuriensis* (Wils & Delsaerd, 1989) from Reunion and Mauritius; and *L. m. eduardi* (Delsaerd, 1997) from Red Sea. *Leptoconus kawamurai* (Habe, 1962) from Okinawa, Japan was once considered as a subspecies but now generally accepted as a full species. Typical shell length around 120mm., giant specimens such as the depicted specimens may occasionally exceed 170mm. Such large sizes are only attained by *L. m. milneedwardsi* and *L. m. clytospira*. It is very variable in spire height and the 'tent' pattern. The specific name honours Alphonse Milne-Edwards, then the director of National Museum of Natural History, Paris.



Laternula truncata (Lamarck, 1818)
LATERNULIDAE

In 'deep water', From local fisherman, Balicasag Island, Bohol, Philippines, 43.3mm., early 2014.

The « Truncate Lantern Clam » is a fragile laternuld very widely distributed across the Indo-West Pacific region ranging from eastern Indian Ocean to southern Japan to northwestern Australia. It is a filter-feeding bivalve inhabiting sandy to muddy bottoms (often of mangrove ecosystems) of intertidal and littoral zone down to shallow water of around -30m and lives permanently buried. The animal is well camouflaged as the protruding siphonal canal is covered in sand grains and other attachments. The foot is mobile and muscular in juveniles and used for burrowing, but it is very reduced in adults; and adult clams are thus incapable of re-burrowing once dug out. The shells are inequivalve and inequilateral, possessing a layer of brown periostracum which is only obvious in marginal areas. The valves are fragile yet rather flexible, a crack naturally exist near the hinge allowing the animal to use this flexibility to aid animal motion and water flow instead of the ligament like in many other bivalves. It is a comm.on species across its range, and is extensively used as food in some countries such as the Philippines. Typical shell length around 50mm., very large specimens may reach 90mm.



Dermomurex elizabethae (McGinty, 1940)
MURICIDAE

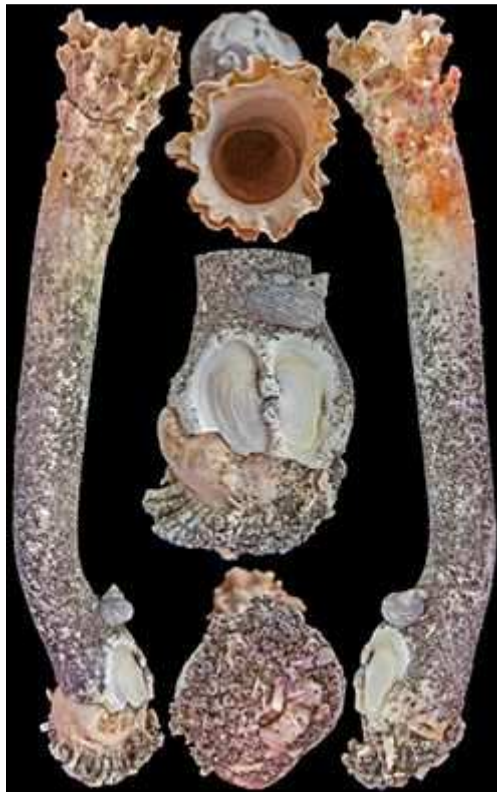
-4.5~6m (-15~20ft), Under rocks, Pompano Beach, Broward County, Florida, USA, 19.3mm. The « Elizabeth's Murex » is a small but delightful muricid ranging from Virgin Islands to Florida, USA to Bermuda. It is a carnivorous and predatory gastropod which inhabits rocky to rubbly bottoms of shallow water up to about -30m deep. An uncomm.on species, it is usually quite rough and quality specimens are not easy to find. Pure white to yellowish white in colouration, it is somewhat variable in varication and strength of radial sculpture. Typical shell length around 15mm., large specimens occasionally exceed 20mm. Original description placed it in genus *Aspella*, and it is thus sometimes referred to as « Elizabeth's *Aspella* ».



Nipponoclava gigantea (Sowerby, 1888)
PENICILLIDAE

-30~50m, Sakai, Minabe-cho, Wakayama Prefecture, Japan, 285.1mm., 1980/iii.

The « Giant Watering Pot » is a spectacular penicillid endemic to western Pacific waters of southern Japan. Like other penicillids it also after a certain early growth stops growing the true shell and instead develops a calcareous adventitious tube, although it is unusual in switching over to growing tube exceptionally late. In most watering pot clams the true shell is only 2~5mm. in length but in this species it regularly exceeds 20mm. and is splayed open to a lesser extent. This is similar to some fossil members of the superfamily and is evidence that it is a primitive member of this extraordinary group of bivalves, hence its current placement in the monotypic genus *Nipponoclava*. It is a filter-feeding species living buried in soft sandy to muddy bottoms of shallow to moderate depths around -5~70m. One of the largest members of the family, it is locally uncomm.on but due to its restricted range it is quite rare on the international shell trade market. Typical shell length around 250mm., very large specimens may exceed even 300mm.



Maxwellia santarosana (Dall, 1905)
MURICIDAE

-23m (-75ft), On reef, Bird Rock, La Jolla, San Diego, California, USA, 22.1mm.

The « Santa Rosa Murex » is a muricid with lovely fronds ranging from central California, USA to central Baja California, Mexico. An uncommon carnivorous gastropod, it occurs on rocky to gravelly bottoms of sublittoral zone down to about -50m deep. It is known to be a predator of bivalves like many muricids and spends many days drilling through clams. It then feeds through the hole which tapers towards the interior of victim's shell. Typical shell length around 30mm., very large specimens may approach 45mm. It co-occurs with its very common congener « Gem Murex » *Maxwellia gemma* (Sowerby II, 1879) characterised by numerous dark spiral bands and rounded varices that are not fimbriated like that of *M. santarosana*.



Gemophos sanguinolentus (Duclos, 1833)
BUCCINIDAE

-2~3m, Under rock slabs, By snorkel, Melaque, Jalisco, Mexico, 23.1mm., 2014/iii.

The aptly named « Measle-Mouth Cantharus » is an attractive buccinid with a reddish-brown columellar distinctively decorated with numerous white pustules. Distributed from Baja California, Mexico to Ecuador including Galápagos Islands, it is a carnivorous / scavenging gastropod inhabiting rocky surfaces of intertidal waters down to depths of about -20m. A comm.on species, it is very variable in development and pustulation of the columellar as well as height / width proportions. The apex is almost always eroded. Typical shell length around 25mm., very large specimens may reach 35mm. Previously placed under genus *Cantharus* and still often seen listed as a member of that genus.



Leucosyrinx lancea Lee, 2001
PSEUDOMELATOMIDAE

-400~600m, Trawled by fishing boat, Pratas Island, Taiwan, 53.5mm. (operculum dried with animal inside), 2014/iii/29.

Leucosyrinx lancea is a very uniquely shaped 'turrid', with a rapidly tapering anterior siphonal canal from a strongly angulated shoulder. It appears to be endemic to waters around Pratas Island in the western Pacific Ocean quite some distance southwest of main island of Taiwan; and was first reported from bycatches from this area by Taiwanese deep trawlers unloading in Yilan, northeast Taiwan. It is a carnivorous / predatory gastropod inhabiting sandy to muddy bottoms of deep water from about -300m down to bathyal depths of around -1000m. It is a rare species in the shell trade due to its remote range and great depths it inhabit. The development of the shoulder keel is rather variable, and so is the spire height. Typical shell length around 45mm., very large specimens may exceed 60mm.



Clavatula muricata (Lamarck, 1822)
CLAVATULIDAE

-12~13m, Under rocks, Dived at night, northern side of Banana Islands, Sierra Leone, 25.4mm., 2014/iii.

The « Muricate Turrid » is a clavatulid with fascinating sculpture endemic to western Africa ranging from Senegal to Angola. A fairly variable species, individuals vary greatly in development of the spine and although the radial and axial ribs usually finely cross to form beaded sculpture some specimens almost completely lack this. The colouration is also variable, usually from yellowish brown to white but some may display beautiful lavender colouration like the specimen shown here. It is a comm.on carnivorous predatory gastropod inhabiting sandy to rocky bottoms of shallow water around -10~50m in depth. Typical shell length around 30mm., very large specimens may reach 45mm.



Fulgoraria clara (Sowerby III, 1914)
VOLUTIDAE

-200~300m, Dredged, southern Honshu, Japan, 69.7mm.

The « Clara Volute » is a lovely glossy volute endemic to the Pacific coast of Japan, ranging from Suruga Bay, Shizuoka Prefecture to Tosa Bay, Kochi Prefecture. A small Fulgoraria species, it is superficially very similar to Fulgoraria noguchii Hayashi, 1960 from the same area but with a narrower distribution; but F. noguchii has much stronger radial lyrations and axial ribs on the earlier whorls and the two are easily told apart with close observation. F. noguchii is generally also less glossy in comparison. A moderately uncommon carnivorous gastropod, it inhabits sandy bottoms of rather deep water around -100~400m in depth. Typical shell length around 80mm., very large specimens are known to exceed 120mm. In large specimens the outer lip tends to flare out slightly.



Afrivoluta pringlei Tomlin, 1947
MARGINELLIDAE

-150m, Trawled, Mossel Bay, South Africa, 113.4mm., 2001/i.

The « Pringle's Marginella » is a majestic marginellid endemic to South Africa and is the second largest extant marginellid known to science, only *Marginellona gigas* (Martens, 1904) of the Indo-Pacific region exceeds it. Despite its strong plate-like columellar plications obviously typical of Marginellidae, John Read le Brockton Tomlin originally described it as avolute partly because its extremely large size for a marginellid. It quickly became much coveted by collectors, being classified as a volute probably contributed to its popularity. In 1963 Keppel H. Barnard studied specimens including soft parts and finally rectified its family placement. At the time it was considered the largest marginellid because although *M. gigas* was already described it too was considered a volute and its family position was yet to be corrected. It was included by S. Peter Dance in his 50 « Rare Shells » (1969), and remained a great rarity until late 1990s. Currently deep-water trawlers obtain decent quantities as by-catch making it only rather uncomm.on; although large specimens in good conditions are not the easiest to obtain. A carnivorous / scavenging gastropod inhabiting sandy to muddy bottoms of rather deep water around - 150~350m, the typical shell length is around 100mm. while gigantic specimens may exceed 130mm. It was named after Dr John Adams Pringle, the director of the Port Elizabeth Museum and Snake Park at the time of its description; for it was his encouragement of local fishermen to send unusual specimens to the museum that led to its discovery.



Nipponotrophon gorgon (Dall, 1913)
MURICIDAE

-200m, Tokyo Bay, Kanaya, Futtsu, Chiba Prefecture, Japan, 38.2mm., 1997/iv.

The « Gorgon Trophon » is a delicate muricid ranging from Chiba Prefecture, Japan to Taiwan. The more spinous specimens with shorter inter-varice distance as shown has long been referred to as the « Prickly Trophon », *Nipponotrophon echinus* (Dall, 1918), but Hasegawa & Okutani concluded in 2011 that it is merely a form of *N. gorgon*. Although TC Lan included it as one of the « Rare Shells of Taiwan » (1979), today it is only somewhat uncomm.on. A carnivorous predatory gastropod, it inhabits sand to gravel bottoms of rather deep water around -100~600m. It is a rather variable species in terms of number of varices per whorl (usually 5-7), length of spines, and spine recurvedness. Typical shell length around 40mm., very large specimens may exceed 50mm.



Comitas kaderlyi (Lischke, 1872)
PSEUDOMELATOMIDAE

-250~300m, From bottom trawler, Owase, Mie Prefecture, Japan, 94.8mm., 2013/x.

The « Kaderly's Turrid » is a large and beautifully striped 'turrid' with a distribution from Sagami Bay, Japan to Philippines. A carnivorous gastropod inhabiting fine sandy bottoms, it is usually found in moderately deep water ranging between -150~450m but records exist from as deep as -1600m. It is best known from southern half of Honshu, Japan; and although a locally comm.on species live-taken specimens are somewhat uncomm.on. A rather invariable species, knobs are prominent in the earlier whorls but weakens towards the final whorl. Very fresh specimens often carry a lovely purple hue which generally fades quickly. Typical shell length around 75mm., very large specimens may exceed 100mm.



Mirabilistrombus listeri (Gray, 1852)
STROMBIDAE

-80~120m, Trawled, Between Koh Racha Islands, Phuket, Thailand and Mergui Archipelago, Myanmar, 133.4mm., 1980s-1990s.

The « Lister's Conch » is a magnificent and famous strombid with a noteworthy history. The first known specimen belonged to John Tradescant of London in the early 17th Century and was illustrated by Martin Lister (its namesake), which Thomas Gray used in his description making it the holotype. It remained unique for a short while but Mrs de Burgh, one of two famous female British collectors of the time, acquired another specimen and not knowing about Gray's description had Sowerby II describe it as *Strombus mirabilis* (1870). Until more specimens turned up in the second half of 20th Century it remained elusive and one of the most sought-after shells of all, and was thus listed as one of S. Peter Dance's 50 « Rare Shells » (1969). As it is quite distinctive from all other strombids its taxonomic placement has been controversial, and in 1998 Gijs Kronenberg erected a new monotypic genus for it: *Mirabilistrombus*; the name of which is sublimed from that well-known synonym by Sowerby II. The holotype is supposed to be deposited in the Hunterian Museum, Glasgow, Scotland; but how John Tradescant acquired it in the first place is enigmatic till this day. With deep trawling and dredging it has become comm.on today, although specimens with original operculum is quite scarce. A herbivorous gastropod inhabiting sandy bottoms of moderately deep water around -40~150m, its distribution range is from northwest Indian Ocean to Bay of Bengal and recently extended to Arafura Sea; most specimens originate from either Myanmar or Thailand. It is a little-varied species and the typical shell length is around 130mm., very large specimens may exceed 160mm.



Tibia melanocheilus (A. Adams, 1855)
ROSTELLARIIDAE

-80~120m, Trawled by Thai trawlers, Pulau Raja, northeast of Sumatra, Indonesia, 127.2mm.

The « Dark-Mouthed *Tibia* » is a peculiar rostellariid strongly resembling its sister species *Tibia fusus* (L., 1758) but has a dark brown aperture and yellowish brown parietal callus as opposed to white in *T. fusus*. The shell is also usually more compressed and squat, and the siphonal canal is also shorter than *T. fusus*. For some time it was treated as a subspecies of *T. fusus*, but now usually accepted as a separate full species based on these differences. It lives burrowed in sand of shallow to moderate depths around -20~150m, and is quite uncomm.on especially live-taken specimens in good condition. The distribution range is supposed to be from Sabah, Malaysia to as far as Bangladesh, but vast majority of specimens originate from around northwest Sumatra, Indonesia. Although the exact feeding habits of *Tibia* species is unclear, they are presumed to be herbivorous to omnivorous gastropods which swallow quantities of sand and digest algae and detritus within, as well as grazing on algae. Typical shell length around 130mm., very large specimens may exceed 165mm.



Festilyria duponti Weaver, 1968
VOLUTIDAE

-65~85m, By traps, Zavala (aka. Quissico), Zavala District, Mozambique, 107.7mm., 2000/xii.

The « Dupont's Volute » is a beautiful flame-patterned *Festilyria*, a small genus of four handsome African volutes. A famous rarity especially in live-taken condition as vast majority are trawled dead or ex pisces (ie. taken from fish stomach), it is generally considered endemic to Mozambique (its type locality) although records from as far as South Africa exist. A carnivorous and predatory gastropod, it inhabits soft bottoms of moderately deep water around -40~150m. It is slightly variable in elongateness and also patterning but cannot be confused with any other species except perhaps *F. ponsonbyi* (Smith, 1901) which has a much larger protoconch and lacks dark parietal blotches. Typical shell length around 110mm., very large specimens may exceed 140mm.



Textilia dusaveli (H. Adams, 1872)
CONIDAE

-60~80m, By tangle net, Sarangani Island, Davao Occidental, Philippines, 73.3mm., 2014/iv.

The « Du Savel's Cone » is an extremely illustrious classic rarity among the conids, with an intriguing history. The holotype specimen was owned by a Mr Du Savel, its namesake, when it was described in 1872 and supposedly came ex pisces (ie. from stomach of a fish) Mauritius. It remained elusive and one of the greatest rarity among cones as no other specimen was found, and the holotype exchanged hands several times for high prices. Unsurprisingly it made into S. Peter Dance's 50 « Rare Shells » (1969), but shortly after that in 1972 two cone shells dredged Okinawa, Japan in the National Museum of Tokyo was revealed to be *Textilia dusaveli*. Then the first dive collected specimens were collected also in Okinawa in the late 1970s, and by end of the 1980s specimens began turning up from the deep-water tangle nets of Philippines. Today it is only uncomm.on, and its distribution centre is from Philippines to Okinawa, Japan; although records also exist from as far as New Caledonia. The holotype which was unique for exactly 100 years after description currently resides in the Melvill-Tomlin Collection in the National Museum of Wales, but the type locality is likely erroneous. It is a carnivorous gastropod that hunts fish by injecting poison with its toxoglossate radula, and inhabits sandy bottoms of moderate depths around -50~250m deep. Very variable in colouration and pattern and less so in form; typical shell length around 75mm. but very large specimens may exceed 90mm.



Buccinum osagawai Habe & Ito, 1968
BUCCINIDAE

-600~650m, Trawled, Rausu, Hokkaido, Japan, 148.3mm.

The « Osagawa's Whelk » is a large cold-water buccinid endemic to the Sea of Okhotsk, best known from around Rausu, Hokkaido, Japan. A carnivorous / scavenging gastropod inhabiting muddy bottoms of rather deep water around -200~700m, it is locally somewhat uncommon but rather rare in the international shell trade. The very fragile shell is very slightly variable in inflatedness of whorls, but otherwise little-varied. It was named in honour of Mr. Goro Osagawa who kindly donated many specimens to Japanese malacologists which became the basis for describing a number of new species including this one, during his presidency of the Rausu Fisheries Union. Typical shell length 120mm., giant specimens occasionally exceed even 150mm. It is sometimes seen in Japanese fish market especially in Hokkaido, and is considered a delicacy like other *Buccinum* species.



Athleta abyssicola (Adams & Reeve, 1848)
VOLUTIDAE

-200m, Trawled, West Coast, South Africa, 75.1mm.

The « Abyssal Volute » is a moderately comm.on volute endemic to South Africa. As the name suggests it inhabits rather deep water around -100~350m, albeit not in abyssal depths. A carnivorous predatory gastropod, it is mostly trawled muddy botoms. Quite variable in elongatedness which accounts for its wide size range from shell length of 40mm. to exceeding 110mm., although most specimens are around 75mm. The genus *Athleta* is a small group of deep water volutes containing about 15 species, mostly from southeastern Africa and best represented in South Africa. The genus contains many rarities, although many species are similar and difficult to separate.



Margarya mansuyi (Dautzenberg & Fischer, 1905)
VIVIPARIDAE

Yilong Lake, Shiping County, Yunnan Province, China, 61.6mm., 1985.

The « Mansuy's *Margarya* » is a fascinating freshwater snail with a peculiar shift in coiling in the earlier whorls and an attractive keeled form. A member of genus *Margarya* which contains perhaps the most striking viviparids of all. All are endemic to lakes in Yunnan Province, China; and this species has been recorded in history from Dianchi Lake, Xinyun Lake, Qilu Lake, Datunhai Lake, and Yilong Lake. It is classified as Endangered under the IUCN Red List and Vulnerable under the Chinese Red List due to threats from water extraction, industrial pollution, and tendency of smaller lakes to dry out. It is certainly already extinct in Yilong Lake and probably also in Dianchi Lake and Datunhai Lake, leaving only two surviving known populations. It is thus a rare species, especially in the international shell trade. The same threat is posed to all *Margarya* species, some of which are already considered to be completely extinct. A wide-range of feeding methods including grazing, detritus feeding, and filter feeding are used by *Margarya* species. A little-varied species except slight variability in elongateness and strength of keels, its average shell length is around 60mm. while giants occasionally exceed 80mm.



Tegula regina (Stearns, 1892)
TEGULIDAE

-18~24m (-60~80 ft), Dived on rocks, Point Loma, San Diego, California, USA, 54.1mm.

The « Queen Tegula » is a famous collector's item among the top shells and much sought-after for its beautiful golden aperture and attractively ribbed base. It is an uncomm.on herbivorous grazing gastropod inhabiting mostly rocky bottoms of shallow subtidal waters around -5~30m deep, ranging from California, USA to west Mexico. Originally placed by Robert E. C. Stearns in the turbinid genus *Uvanilla* based on the remarkably similar shell; the operculum was not examined in the description, however, and its corneous (as opposed to calcareous) operculum became the basis to correct this taxonomic error. Specimens are quite uniform in form and shape, although the colouration is somewhat variable from light to very dark brown and many form bands of two shades, like the depicted specimen. A rather rough species, picturesque specimens are not the easiest to come by. Typical shell length around 45mm., very large specimens may exceed 65mm.



Strategoconus thomae (Gmelin, 1791)
CONIDAE

-80~120m, By tangle net, Davao Gulf, Mindanao, Philippines, 72.7mm.

The « St. Thomas Cone » is a very handsome classic rarity among the cones ranging from southern Philippines to Indonesia, famed for being selected as one of S. Peter Dance's 50 « Rare Shells » (1969). It was known in the western world since around the beginning of 18th Century, most specimens seemed to come from Moluccas, Indonesia. However as it is a rather deep-water shell it is not surprising that it remained very rare until late 20th Century; today it is only uncommon as deep-water tangle nets in the Philippines frequently bring fine specimens to surface. A carnivorous and predatory gastropod mainly feeding on polychaete worms, it inhabits a bathymetric range of around -100~250m. The sharp edged and refined form is little-varied; the pattern is quite variable although the three brown spiral bands are present regularly. Typical shell length around 70mm., extremely large specimens may exceed 95mm.



Siratus alabaster (Reeve, 1845)
MURICIDAE

-200~300m, By tangle net, Panglao Island, Bohol, Philippines, 163.4mm.

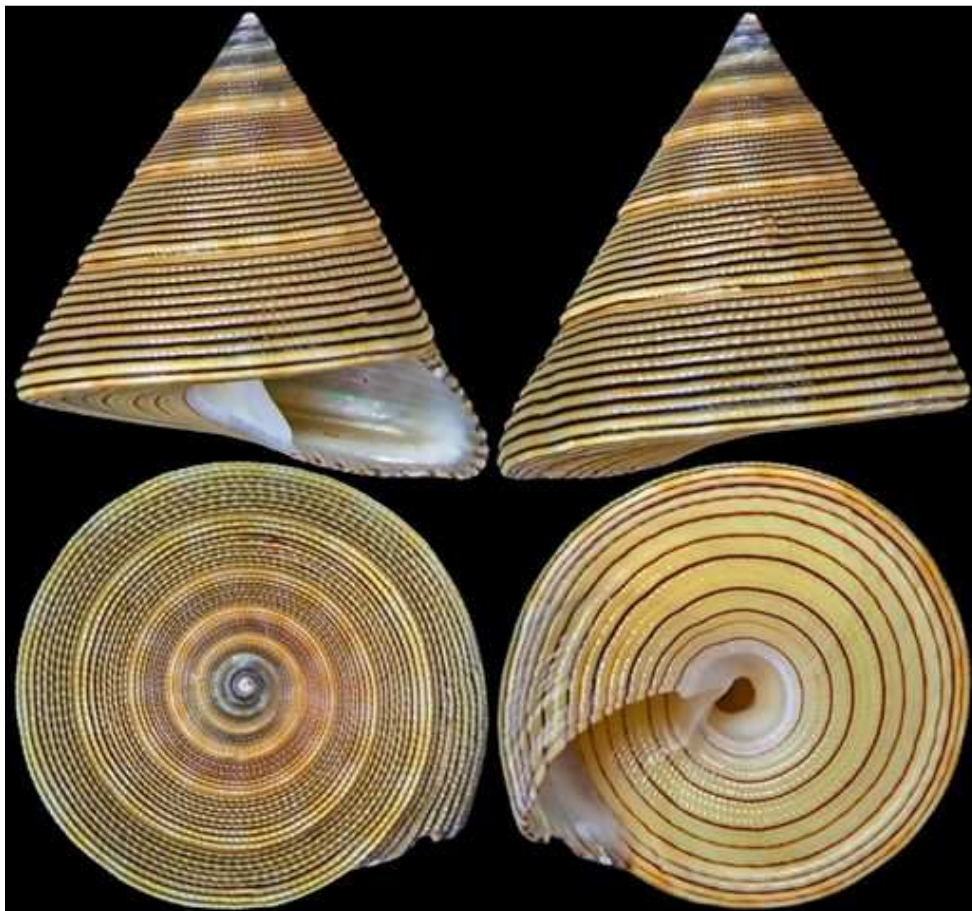
The « Alabaster Murex » is a large and elegantly frilled muricid ranging from southern Japan to Philippines. It was first discovered by Hugh Cuming during his famous trip to the Philippines from 1836~1839, but even Cuming could only obtain a single beach-washed specimen which remained unique until 1961. Its rarity then justified it to be selected as one of S. Peter Dance's 50 « Rare Shells » (1969), and no fine quality specimens were known then. This is largely because it is a carnivorous gastropod inhabiting deep water around -100~500m, an inaccessible depth. Nowadays however it has become a comm.on shell in the market, even high quality specimens. The availability of this remarkable species among many others in the shell trade today must be attributed to the deep-water tangle nets in the Philippines; without these nets it may be still as scarce as it was in the old days, and quality specimens impossible to obtain. It is a little-varied and easily recognised species, with colouration ranging from pure white to yellowish white. Typical shell length around 140mm., extremely large specimens are known to exceed 200mm.



Calliostoma javanicum (Lamarck, 1822)
CALLIOSTOMATIDAE

-30~50m, By traps, Martinique Island, 26.6mm.

The « Chocolate-lined Top » is an extremely lovely and attractive calliostomatid ranging from Florida, USA to Brazil. A comm.on herbivorous gastropod and algae grazer, it is usually found in shallow water around -1~40m deep; although it has also been recorded at nearly -100m deep. It is quite a variable species, the shell height to width ratio vary from specimen to specimen so some are conical while others are quite broad; the strength of protuberance around the suture line also vary. Intensity of the characteristic chocolate-coloured lines also vary greatly and some specimens almost lack it; beautiful specimens are uncomm.on. It is quite prone to growth lines. Typical shell length around 25mm., very large specimens may exceed 35mm.



Vokesimurex tricornis (Berry, 1960)
MURICIDAE

-45m (-25 fms), Trawled, Guaymas, Sonora, Mexico, 58.4mm.

The « Tricorn Murex » is a somewhat uncomm.on muricid ranging from west Mexico to Ecuador. A predatory gastropod, it inhabits shallow to moderate depths of around -10~100m. It is rather variable in form and colouration, extent of spines especially so. There a few very similar and difficult to separate Vokesimurex in this region including this one, which may be forms of the « Bent-Beak Murex » Vokesimurex recurvirostris (Broderip, 1833). Typical shell length around 55mm., very large specimens may reach 80mm.



Bolma tayloriana (Smith, 1880)
TURBINIDAE

-45m, SCUBA dived, Cape Point, South Africa, 75.2mm., 1998/x.

The « Taylor's Star » is a famous collector's item among turbinids known for its attractive columellar shield. Once thought to be distributed from Japan to Taiwan, this is believed to be a mistake and it is now considered an endemic species of South Africa. Used to be a rare species, today it is best described as uncomm.on on the shell market. It is a algae grazing gastropod inhabiting rocky to muddy bottoms around -30~300m deep. It is somewhat variable in colouration, some specimens have alternating brown and light bands; the colour of columellar also varies from golden to dark brown. Although little varied in form, in geronic specimens the outer lip flares significantly. Live or fresh specimens have a peculiar dark periostracum which carries numerous short spikes. Typical shell length around 70mm., exceptionally large specimens may reach 90mm.



Vasum rhinoceros (Gmelin, 1791)
TURBINELLIDAE

Mombasa, Mombasa County, Kenya, 76.4mm.

The « Rhinoceros Vase » is a very thick and heavy vase shell endemic to a small part central east Africa, ranging from Kenya and Tanzania including Zanzibar. Although a locally comm.on species, it is uncomm.on on the market due to its restricted range. It is a carnivorous and predatory gastropod primarily feeding on polychaetes and sipunculans. A shallow water dweller, it may be found from intertidal waters down to approximately -20m deep and inhabits sandy to rocky to weedy bottoms just within fringing coral reefs. It is generally a rough shell and is very variable in pattern and form, especially knobyness. A rare yellow to golden coloured form is known only from Zanzibar which has uniform yellow shell with no brown patterns and a golden columella. In some geronic specimens the posterior part of the outer lip strongly flares. Typical shell length around 70mm., very large specimens are known to exceed 100mm.



Neobuccinum eatoni (Smith, 1875)
BUCCINIDAE

-3000~4000m, Trawled on mud, Crozet Island, French Southern and Antarctic Lands, southern Indian Ocean, 71.0mm., F/Dead, 1974, Ex-Coll. Paul Johnson (2013), Ex-Coll. George Rainer (2003) .

The « Antarctic Whelk » is a moderate sized buccinid endemic to and widespread in Antarctic and sub-Antarctic waters. Although locally it is a comm.on species, its remote distribution near Antarctica makes it a rather rare species on the shell trade. A carnivorous / scavenging gastropod inhabiting sandy, rubbly, and muddy bottoms of a very wide bathymetric range from -10m down to about -800m; most comm.on around -100~300m. Usually found in rough condition, it is not easy to find a live collected specimen in good condition. Typical shell length around 50mm., very large specimens may approach 80mm. It is the type species of the monotypic genus *Neobuccinum* (Smith, 1879).



Ophioglossolambis digitata (Perry, 1811)
STROMBIDAE

-5~10m, Dived, Sanculo (Lumbo), Mozambique, 128.5mm., 2006/vi.

The « Elongate Spider Conch » is a very attractive spider conch with alternating dark/light bands in the aperture, endemic to western Indian Ocean ranging from Kenya to Mozambique to Réunion. Although there are some historical distribution records from Philippines and Samoa in the Pacific Ocean, the credibility of these is negligible. The nominal form dominant in mainland/Madagascar is comm.on but there is a form *O. digitata* f. *crocea* (Reeve, 1854) which is rather rare on the market. *O. digitata* f. *crocea* is the dominant form in Mauritius/Mascarene Basin and very uncomm.on outside that region; quite different from the nominal form in having a flattened and much wider whorls and a much shorter, compressed spire as well as longer digits. This species is generally variable in digitation, but can usually be easily identified by the most posterior digit being forked, in combination with its aperture pattern. It is a herbivorous gastropod inhabiting sandy and rubble bottoms of shallow water around -5~30m in depth. Typical shell length around 120mm. but gigantic specimens are known to exceed 180mm. Previously placed in genus *Lambis*, it is now the type species of the recently erected genus *Ophioglossolambis*, its only congener being the famous rarity *O. violacea* (Swainson, 1821).



Melanopsis magnifica (Bourguignat, 1884)
MELANOPSIDAE

-0.5m, On sand, Ras Kebdana (aka. Ras el Ma), Nador Province, Oriental, Morocco, 31.33mm.

Melanopsis magnifica is a very attractively ribbed melanopsid endemic to Morocco (approximately from Berkane to Fez to Ouadi Korifla); there have been Algerian records in the past but most likely extinct there nowadays. Its distribution is very patchy with small areas of distribution scattered around its range which totals up to less than 500km². It is extremely variable with many subspecies / forms named, shown here is the subspecies *M. m. expansa* Pallary, 1920; it is not clear whether these merely reflect variations due to environment differences or distinct evolutionary lineages. A freshwater herbivorous / detritivorous grazer, it is found in medium-sized river streams with low water level and inhabit sandy to stony bottoms. Fresh specimens are covered by a layer of rather thick and very dark periostracum. Typical shell length around 25mm., very large specimens occasionally approach 40mm. It is listed as Endangered on the IUCN Red List, primarily due to habitat degradation as many of its patchy habitats are found close to areas of urbanisation.



Timbellus phyllopterus (Lamarck, 1822)
MURICIDAE

-15m, Diver collected, Guadeloupe, 70.5mm., 2012.

The « Leafy Winged Murex » is a splendid muricid with outstanding wavy varices and colouration which makes it an extremely desirable collector's item. Native to the Lesser Antilles, it is an uncommon carnivorous and predatory gastropod inhabiting shallow water around -5~30m deep. Although little-varied in form it is extremely variable in colouration such as red, brown, yellow, purple, or white; and saturation of the colouration also differ between specimens. Its beautiful varices are very delicate and often broken in specimens taken from the wild but attempts at artificially raising specimens in controlled environment have been quite successful, producing and supplying specimens with perfect or near-perfect varices to the shell trade market. Typical shell length around 65mm., giant specimens are known to exceed 100mm.



Textilia cervus (Lamarck, 1822)
CONIDAE

By tangle net, Cebu, Philippines, 106.7mm.

The « Pallisade Cone » or « Deer Cone » is a large and magnificent cone ranging from Philippines to Moluccas to New Caledonia. It is and has always been among the most celebrated rarities in the family, and is one of S. Peter Dance's 50 « Rare Shells » (1969). Once extremely scarce, some considered it to be merely a form of *Textilia bullatus* (Linnaeus, 1758) but as more specimens became available for comparison it proved to be a distinct species. The actual provenance of it was unclear until after mid-1900s because majority of the specimens known in collections before then were from very old collections with unreliable locality data. It is a venomous fish-hunting gastropod and inhabit sandy to rubbly bottoms of rather deep water around -150~400m deep. It is the largest member of the genus *Textilia* with typical shell length at around 100mm., very large specimens are known to exceed 125mm. As is typical for the genus, mature specimens have a thickened lip; the pattern is quite variable.



Sinustrombus taurus (Reeve, 1857)
STROMBIDAE

-25~30m, Dived, 'Roco Island', Marshall Islands, 93.53mm., 1995/iv.

The « Bull Conch » is a striking classic rarity among the strombids characterised by two posterior spines; it is one of the most coveted conchs of the Pacific Ocean and also one of S. Peter Dance's 50 « Rare Shells » (1969). Originally described from the collection of Sir David Barclay who kept the then unique specimen in personal collection until his death, and it remained unique for more than a century until its re-discovery in the Marshall Islands by R. C. « Dick » Willis. Locating its home ground was difficult because when Lovell Augustus Reeve described it he misinterpreted the locality as 'Amirante Islands', part of Seychelles in the Indian Ocean; the actual locality appears to be Admiralty Islands in the Pacific Ocean which is much more likely. It is still rare today, mainly known from the Marshall Islands and Mariana Islands. A herbivorous gastropod, it is usually found on sandy to rubble bottoms of moderately shallow water around - 5~50m in depth. Often found in pairs or threes, rarely one may encounter a large 'herd' (known from many strombid species); and 'herds' may contain 50 or more individuals. Usually a rough species with much of the shell encrusted or corroded or damaged by cap shells and worm shells; specimen grade shells are difficult to find. A very heavy shell for its size, its typical shell length is around 90mm. but giants are known to exceed 130mm.



Godfreyena torri (Verco, 1909)
BUCCINIDAE

-35m, Night dived, Cape Le Grande, Esperance, Australia, 46.0mm.

Adorned with a band of orange and ornamented with speckles of brown, the « Torr's Whelk » is certainly one of the most stunning and exquisite buccinids of all. A very rare species endemic to southwestern Australia, specimens are usually dead taken and most of the live taken specimens available on the market were collected around Esperance during night dives by the late Mr Peter Clarkson, a famed Australian diver. A carnivorous / scavenging gastropod, it is a nocturnal species inhabiting sandy to rubble bottoms of moderate depths around -20~50m. It is generally a little varied shell, although the pattern of brown speckles and the general colouration varies a little. Typical shell length around 50mm., giant specimens occasionally exceed 70mm. It was originally described under genus *Cominella* and is often still seen listed under that genus but as it is quite distinctive from other *Cominella* species, a new monotypic genus *Godfreyena* was erected for it.



Cymbiola aulica (Sowerby I, 1825)
VOLUTIDAE

-10~20m, Taken by local fisherman, Zamboanga Peninsula, Philippines, 120.2mm.

The « Princely Volute » is a very handsome volute and a famous collector's item coveted once ago for rarity and today for its endless variability and beauty. One of S. Peter Dance's 50 « Rare Shells » (1969), it was known from a single specimen of unknown origin until Hugh Cuming, the 'Prince of Shell Collectors', discovered its home ground in southern Philippines where it is endemic to and brought specimens back to the Western world in 1840. It remained scarce, however, until mid-20th Century; and today it is only uncomm.on. A predatory gastropod inhabiting sandy bottoms of relatively shallow water around -5~50m, it is extremely variable in pattern, form, and colouration. Usually recognised for irregular patterns of diffused red, but specimens with well-defined pattern or even completely solid red are known. Typically not so angulate with sloping shoulders, but many develop very strong shoulder spines. Several subspecies and forms have been named; some recently recognised as full species. Also very variable in size, the typical shell length is around 110mm. but giants occasionally exceed 170mm.



Buccinum aniwanum Dall, 1907
BUCCINIDAE

-200m, Abashiri, Hokkaido, Japan, 154.8mm., 2010/vi.

The « Aniwa Whelk » is a large cold-water buccinid endemic to the Sea of Okhotsk. The specific epithet is taken from name of the species' type locality: Aniva Bay, Sakhalin Island; an alternative spelling of which is Aniwa Bay. It is a carnivorous / scavenging gastropod found in deep water ranging around -100~1000m, usually on muddy bottoms. The form is somewhat variable but typically quite tall and fusiform for genus *Buccinum* (as shown). Typical shell length around 110mm., very large specimens may exceed 150mm. It is similar to *Buccinum bayani* Zenkevitch, 1963 and is sometimes confused with it; the most obvious difference is in sculpture, the spiral sculpture in *B. bayani* is much finer and does not become very strong near the siphonal canal like in *B. aniwanum*. *B. bayani* usually also has much more inflated whorls than *B. aniwanum*.



Volutoconus bednalli (Brazier, 1878)
VOLUTIDAE

-100m, Trawled in the Arafura Sea, Northern Territory, Australia, 130.13mm.

The « Bednall's Volute » is a classic rarity among the volutes and one of the most beautiful species characterised by the unique and extremely attractive chocolate-laced pattern. One of S. Peter Dance's 50 « Rare Shells » (1969); it was described from a shell that belonged to the Australian collector Mr William T. Bednall, its namesake. This shell remained the sole known specimen until 1893, and by early 1900s more specimens had appeared on the market; an anecdote tells that divers used to exchange each specimen caught with a bottle of brandy. Today it is known to be a moderately rare species ranging from northern Australia (in the Arafura Sea and the Timor Sea) to eastern Indonesia. It is a predatory gastropod inhabiting shallow to moderately deep water around -10~150m deep, and usually lives on sandy bottoms. Typical shell length around 110mm., although extreme giants may exceed 165mm. The spire height varies greatly and accounts for much of the size variation. The extent of surface sculpture may also vary from rather smooth to strong and wrinkle-like; and the base colouration ranges between pure white and yellowish white.



Crucibulum spinosum (Sowerby I, 1824)
CALYPTRAEIDAE

On rock exposed at lowtide, Southeast coast of Gobernadora Island, Gulf of Montijo, Panama, 35.9mm.

The « Spiny Cup-and-Saucer » is an elaborately ornamented calyptraeid native to eastern Pacific ranging from California, USA to Tomé, Chile. It has also been introduced by human activity to Hawaii, USA unintentionally, attached to ships' hulls during the World War II; and is now an exotic species found throughout the main islands there. A common to abundant species living attached to hard substrates from intertidal zone down to about -8m depth, it primarily filter-feeds with its extensive gill filaments like other calyptraeids but also grazes on algae. It is a very fecund protandrous hermaphrodite, each individual is male when young and grows to become a large female. Extremely variable in colouration and ornamentation; its typical shell length is around 50mm. with giants occasionally exceeding 75mm.



Astraliium pileolum (Reeve, 1842)
TURBINIDAE

At extreme low tide, Under rock slab on exposed muddy reef, Roebuck Bay, near Broome, Kimberley, Australia, 48.4mm.

The « Frilled Star » is a turbinid endemic to northwestern Australia with a remarkable pleated lappet formed by wide spines merging together. A comm.on grazing gastropod, it is found on reef flats among rocks in intertidal zone to very shallow water. The frilly spines are exceptionally variable in form and extent, in some specimens they are completely merged with no gaps or breaks. Usually a rather rough shell, with early whorls eroded exposing the nacre layer. Typical shell diameter around 40mm., giant specimens may exceed 65mm.



Craspedochiton producta (Carpenter in Pilsbry, 1892)
ACANTHOCHITONIDAE

-10m, Dived, East London, South Africa, 41.03mm.

Craspedochiton producta is an amazing chiton with extremely well developed girdles that partially cover the shell plates. It is endemic to South Africa, and live attached to hard substrates in rather shallow water ranging from about -5~30m. Very interestingly, members of genus *Craspedochiton* are known to use their wide, fleshy girdle to catch small prey; and are carnivorous unlike most chitons which are herbivorous grazers. Similar behaviour is known from genera *Placiphorella* (Mopaliidae) and *Loricella* (Schizochitonidae), and are considered to be result of convergent evolution. An uncomm.on species, it is extremely variable in colouration and can even be bright pink or orange. Typical length including the girdle around 35mm. (without girdle 20mm.), very large specimens may approach 50mm. (without girdle 30mm.).



Nerita textilis Gmelin, 1791
NERITIDAE

Intertidal in rock crevice, Toliara, Madagascar, 44.0mm.

The « Textile Nerite » is a comm.on neritid with striking pattern; it has a rather wide distribution in the western Indian Ocean ranging from eastern South Africa to the Red Sea. It is a grazing herbivore living attached on hard substrates of rocky shores, in the littoral zone; often quite high on the shore. It is very variable in size and also in pattern; although average size is about 30mm. giant specimens may exceed 50mm. The specimen depicted here is rather large, but unfortunately without the granulose operculum.



Amalda vernedei herlaari Van Pel, 1989
OLIVIDAE

-350~400m, Trawled, Darwin, Northern Territory, Australia, 91.03mm., 2005.

The « Herlaar's Amalda » is a very handsome ancillariin endemic to northern and western Australia. *A. vernedei* (Sowerby, 1859) represents a very widely distributed and very variable species in the Western Pacific and forms a complex of many subspecies such as *A. v. herlaari*, *A. v. hilgendorfi* (Martens, 1897) from Japan, and *A. v. richeri* Kilburn & Bouchet, 1988 from New Caledonia. It is one of S. Peter Dance's 50 « Rare Shells » (1969), which more specifically referred to the most elusive nominate subspecies *A. vernedei vernedei*; of which only a few specimens are known and appears to be endemic to deep water of the Solomon Islands. The conchologically similar but more accessible *A. v. herlaari* is often used as a substitute or placeholder when one attempts to collect all 50 and finds the nominate *A. v. vernedei* impossible to obtain. Although another subspecies of *A. vernedei* from the Philippines and South China Sea with similar spire callous but much more slender in form is also usually referred to as *A. v. herlaari*, it is clearly different from the Australian specimens and is from shallower depths of - 50~200m (although a few Philippines records are similar in form to true *A. v. herlaari*). A further subspecies similar to *A. v. hilgendorfi* is known from around Taiwan, and several more have been collected during expeditions of the MNHN (P. Recourt, pers. comm.). This complex contains the largest known members of the subfamily Ancillariinae, *A. v. herlaari* is one of the largest with a typical shell length of 80mm. and giants exceeding 100mm. A carnivorous / scavenging gastropod, it is a sand-burrower inhabiting deep water around -200~800m.



Turbinella pyrum (Linnaeus, 1767)
TURBINELLIDAE

-30~50m, Trawled, Kayalpatnam, Tamil Nadu, India, 244.2mm.

The « Sacred Chank » is a massive and extremely heavy turbinellid famous for being one of the eight auspicious symbols ('Ashtamangala') carrying religious and cultural significance in Hinduism and Buddhism. In both religions it is used as a ceremonial trumpet and libation vessel, often ornamented with gold or silver. It is called 'shankha' in Indian, meaning 'sacred conch', and the English name 'chank' was derived from this word. Sinistral specimens occurs but very rarely; in Hinduism a sinistral chank serves as the symbol of goddess Maa Lakshmi and is an extremely highly valued ceremonial item said to bring success, wealth, and purification. It is a shallow water dweller found around the depths of -5~50m, and is a predatory gastropod feeding mainly on polychaete worms. It has a very localised distribution in the Indian Ocean ranging only from southeastern India to Sri Lanka, and prefers a special type of sandy bottom with mud and organic material mixed in; which has very high abundance of polychaete worms. Typical shell length around 150mm. but extremely large specimens may approach 300mm. It is very variable in form and many names have been given to the different forms. Young specimens often carry brown spots on the dorsum. Fresh specimens are covered in a layer of very thick, brown, fur-like periostracum.



Pyrulofusus dexius japonicus Habe, Ito & Tanji, 1980
BUCCINIDAE

-150~200m, Kushiro, Hokkaido, Japan, 139.7mm., 1985/vii.

The « Japanese Right-Handed Whelk » is an uncomm.on buccinid endemic to area ranging from Japan (north of Fukushima Prefecture) to Kuril Islands to Kamchatka Peninsula, Russia. This subspecies lacks the strongly raised radial ribs which is present in the nominate subspecies *Pyrulofusus dexius dexius* (Dall, 1907) mainly distributed in the Aleutian Islands, Bering Sea; and can thus be easily differentiated from it. A carnivorous / scavenging gastropod inhabiting sandy to muddy bottoms in moderately deep water around -50~200m. Typical shell length around 130mm., giant specimens may reach 160mm.



Swiftopecten swiftii (Bernardi, 1858)
PECTINIDAE

-50m, Trawled on mud and seaweed bottom, Japan Sea, Japan, 95.6mm., 2012/xii.

The « Swift's Scallop » is a colourful and attractive medium-large pectinid distributed from Japan Sea to northeast Japan to Sakhalin, Russia. Although quite distinctively shaped, it is very variable in knobiness depending on number of growth pauses the specimen has had, each pause forming a row of knobs. It is very variable in colouration from bright yellow to purple to red to dark brown, and it is very popular among collectors for this reason. A comm.on filter-feeding bivalve, it inhabits mostly rock and gravel bottoms of shallow water from lowtide depths down to about -50m. Typical shell length around 80mm., very large specimens may exceed 100mm.



Eclogavena coxeni (Cox, 1873)
CYPRAEIDAE

Honiara, Solomon Islands, 23.63mm.

The « Coxen's Cowrie » is a pretty and pyriform cowrie endemic to Melanesia ranging from Papua New Guinea to Solomon Islands to Vanuatu, although vast majority of specimens appear to originate from Solomon Islands. Often mistakenly called « Cox's Cowrie » but it is in fact named after Mr. Charles Coxen, a conchologist and ornithologist from Queensland, Australia and should be « Coxen's Cowrie ». An omnivorous gastropod, it is a comm.on species inhabiting shallow water down to approximately -15m deep. It is nocturnal and is often found hiding under rocks or coral debris during the day. Typical shell length around 20mm., very large specimens sometimes attain 30mm. Generally a little-varied species but the thickness of callus do vary from specimen to specimen.



Pterochelus triformis (Reeve, 1845)
MURICIDAE

-3m, On oysters, Albany Harbour, western Australia, 61.1mm.

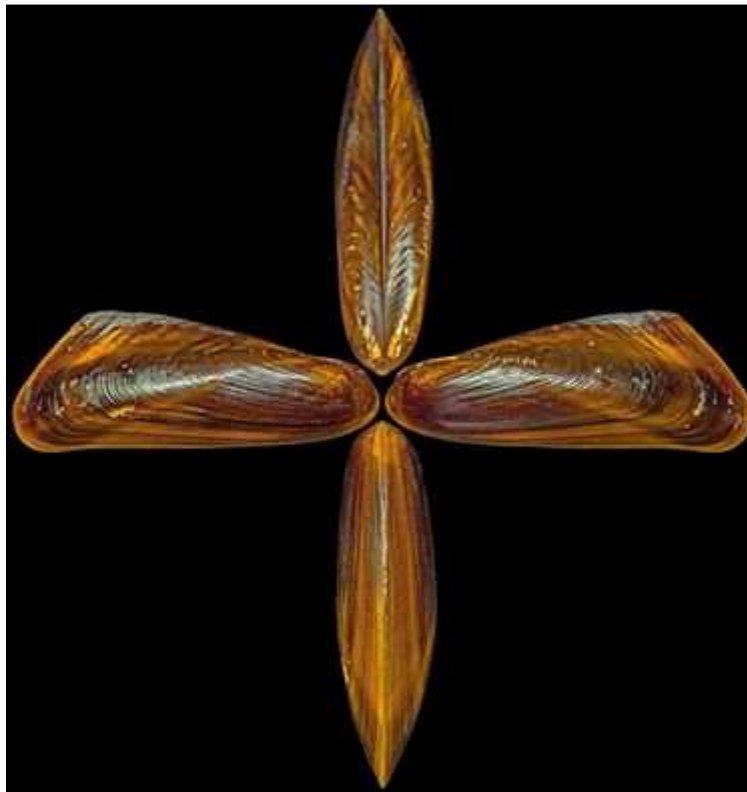
The « Three-Shaped Murex » is a winged muricid endemic to southern Australia ranging from Albany in the west to New South Wales in the east, including Tasmania. It is a common carnivorous gastropod inhabiting shallow water from lowtide depths down to about -30m, often found among rocks and seaweeds. Typical shell length around 60mm., although very large specimens may attain 85mm. The colouration ranges from off-white to dark brown. It is often confused with *Pterochelus acanthopterus* (Lamarck, 1816) which is larger with deeper suture and usually much more undulated wing-like varices. The varices of *P. acanthopterus* is also much more scabrous on the aperture side compared to that of *P. triformis*.



Jolya elongata (Swainson, 1821)
MYTILIDAE

-20m, Surigao, Philippines, 110.5mm., 2011.

Jolya elongata is a very elegant mussel with attractive shiny periostracum; rather widely distributed in the Western Pacific ranging from Hokkaido, Japan to southern China to Queensland, Australia. It is a filter-feeding species which lives buried in shallow sandy to muddy soft bottoms around -10~120m deep, inside a 'cocoon' built from surrounding material and its byssus threads. A locally uncomm.on species but somewhat rare on the market; its periostracum colour varies from light to dark brown, sometimes with a bluish hue. Typical shell length around 90mm., very large specimens such as the one shown sometimes exceed 110mm. Juvenile specimens are much less elongate and looks almost like a different species. This trend of increased elongation with age is comm.on among mytilids.



Scutus antipodes Montfort, 1810
FISSURELLIDAE

-6~10m, Under narrow limestone ledges in seagrass bed, Jurien Bay, western Australia, 127.9mm.

The « Elephant Snail » is a very large duck's bill limpet endemic to the southern half of Australia, including Tasmania. The largest fissurellid of Oceania and like many fissurellids the animal is much larger than the shell; the mantle is jet-black in this species. It is a common to abundant algae grazer inhabiting very shallow water in lowtide depths down to about -20m. A nocturnal species, it hides under rocks or in crevices during the day and emerges at night to feed. Typical shell length around 80mm., specimens above 120mm. may be considered large but in extreme cases it may exceed even 150mm.



Vexillum stainforthii (Reeve, 1842)
COSTELLARIIDAE

-25~30m, In sand and rubble, Bolo Point, Okinawa, Japan, 41.8mm., 1988.

The « Stainforth's Mitre » is a strikingly spotted costellariid with a rather wide distribution in the Western Pacific ranging from Okinawa, Japan to Queensland, Australia. One of S. Peter Dance's 50 « Rare Shells » (1969), its description was based on a shell then in the famed Mrs de Burgh collection; which later passed to the hands of Reverend Francis John Stainforth after whom it is named after. In the 19th Century it was considered to be the rarest of all mitre shells, and it remained rare until late 20th Century. Today it is known to be a moderately comm.on carnivorous species inhabiting sandy to muddy bottoms around -10~80m deep, although it still remains as a popular collector's item. Typical shell length around 35mm., very large specimens may approach 60mm. It is somewhat variable in form, but varies little in general pattern and colouration and thus is an easily recognisable species.



Platiscala morchi (Angas, 1871)
EPITONIIDAE

-146m (-80 ftms), In nets, Panglao, Bohol, Philippines, 24.7mm., 2011, Ex-Coll. David DeLucia.

Platiscala morchi is a very unusual wentletrap best known from southeastern Australia but with some records extending as far as Philippines and Okinawa, Japan. Like many epitoniids it feeds exclusively on sea anemone and lives in sand among sea anemone colonies around -20~300m deep. In early whorls the sculpture is cancellate but in large specimens (as shown) the axial ribs weakens and almost disappears in later whorls leaving only spiral cords. Typical shell length around 10mm., very large specimens may approach 25mm. A rare species, specimens from southeast Australia (type locality) is smaller and differs in form from specimens found in other localities, which may prove to be a separate species in future studies. The giant specimen shown here is virtually identical to the one illustrated by Guido T. Poppe in « *Philippine Marine Mollusks: Volume I* » (2008, p. 706-707).



Vexillum dennisoni (Reeve, 1844)
COSTELLARIIDAE

Dived, west of Sorsogon, Luzon Island, Philippines, 56.0mm.

The « Dennison's Mitre » is a flamboyant costellarid famous for being listed as one of S. Peter Dance's 50 « Rare Shells » (1969). It was described from the collection of Hugh Cuming, the 'Prince of Shell Collectors', and named after John Dennison, one of the greatest British shell collectors of the 19th Century who owned two specimens. It was a rare species even into the late 20th Century, but today it is only moderately comm.on. A carnivorous gastropod, it inhabits moderately shallow water around -10~50m deep and has a Indo-West Pacific range centering around Philippines, Malaysia, and Indonesia. Vast majority of specimens come from the Philippines, especially south of Luzon Island. It is rather variable in form and very variable in colouration, the orange hued form depicted here is somewhat uncomm.on. Typical shell length around 50mm., very large specimens may approach 70mm.



Cymbium pepo (Lightfoot, 1786)
VOLUTIDAE

-10~20m, Trawled by local fisherman, Sanyang, southern Gambia, 244.8mm., 2012/iii.

The « Neptune Volute » is a very large volute endemic to west Africa with a distribution from Western Sahara to Nigeria. It is the most globular and one of the largest Cymbium species, Cymbium being a genus of large to very large volutes known from west Africa to Mediterranean Sea. A comm.on species, it has a gigantic foot which like many other Cymbium species is used by locals as food and sometimes exported in frozen state. It is a carnivorous gastropod usually found on sandy bottoms of shallow water around -10~50m deep. Typical shell length around 200mm., very large specimens may exceed 300mm. Large specimens are uncomm.on on the shell market, partly due to difficulty in transporting its large and fragile shell. Sinistral specimens appears to be more frequent than usual in this species, as well as other species in genus Cymbium.



Bathytoma atractoides (Watson, 1881)
BORSONIIDAE

-400~600m, Pratas Island, Taiwan, 69.5mm., 2013/viii.

Bathytoma atractoides is a large borsoniid widely distributed from eastern Indian Ocean to Philippines to Taiwan to western Australia. It is a rather comm.on deep-water carnivore inhabiting sandy to muddy bottoms around -250~900m, most comm.on around -400~500m. Typical shell length around 50mm. but very variable in size and gigantic specimens in excess of 85mm. are known. Usually a rough shell quite frequently disturbed by growth scars and lines, young shells tend to be prettier, brighter coloured, and often with a more pronounced cord near the suture line.



Haliotis squamosa Gray, 1826
HALIOTIDAE

Collected on rock by local person, Fort Dauphin, Madagascar, 83.1mm., 2001/viii.

The « Squamose Abalone » is a strongly corded abalone endemic to southern Madagascar. It is a locally comm.on species and gains its name from numerous fine scales on its strong ribs. A algae-grazing herbivore like all abalones, it lives attached on rocks of shallow water from intertidal zone down to about -20m. Typical shell length around 65mm., very large specimens may attain 90mm.



Buccinum kinukatsugi Habe & Ito, 1968
BUCCINIDAE

-180m, By bottom trawler, southeast of Cape Terpeniya (48 deg 30'N, 145 deg 20'E), Sakhalin, Russia, 96.2mm., Gd/F, 1975/x/7.

Buccinum kinukatsugi is a cold-water buccinid with a very characteristic hirsute periostracum, endemic to the Sea of Okhotsk. A locally uncomm.on species, it is rarely seen in the shell market outside Japan, especially specimens retaining full periostracum complete with the fine hairs. It is a carnivorous / scavenging gastropod inhabiting muddy bottoms of rather deep water around - 70~500m. Typical shell length around 70mm., very large specimens are known to exceed 100mm. It is said to be very tasty and may be seen in Japanese fish markets, albeit rarely.



Toxiclionella elstoni (Barnard, 1962)
CLAVATULIDAE

-100m, Dredged, Mbotyi, Transkei, South Africa, 36.6mm.

Toxiclionella elstoni is an uncomm.on clavatulid with a very unusual shape, endemic to South Africa. The strongly undulating sculpture is quite unique among gastropods and is one of the most easily recognisable species among Clavatulidae. A carnivorous gastropod, it inhabits rather deep water around depth of -70~120m on the continental shelf along Transkei and Natal. Typical shell length around 30mm., very large specimens may approach 40mm. A broadly lanceolate operculum is present and occupies approximately 1/3 of the aperture length. A shell not often offered on the market, probably due to its restricted range.



Naria lamarckii (Gray, 1825) f. *phuketensis* (unknown author)
CYPRAEIDAE

-20~30m, By scuba diver near Ko Racha Yai and Ko Racha Noi islands, south Phuket Province, Thailand, 27.43mm., 2013.

The « Lamarck's Cowrie » is a pleasingly spotted comm.on cowrie widely distributed throughout the Indian Ocean and named in honour of the famous French naturalist Jean-Baptiste Lamarck. It is a very variable species in terms of both pattern and form. The uncomm.on form shown here is characteristic of population endemic to a small area around Phuket Island, Thailand usually referred to as *N. lamarckii* f. *phuketensis*, although the author of the name is unclear and it carries no taxonomic authority. This form can be regarded as an extremely callous and depressed variation of *N. lamarckii* f. *redimita* (Melvill, 1888) which is itself a short and callous form of *N. lamarckii* best known from Zanzibar, Natal, and Thailand. The two are sometimes treated as synonymous on the market, treating f. *phuketensis* as simply a variation of f. *redimita*. *N. lamarckii* f. *redimita* was often treated as a subspecies, but no sufficient genetic evidence was found to support this from the Cowrie Genetic Database Project and now best considered simply as a form. It is a nocturnal omnivore often found to inhabit muddy bottoms, and is usually found from very shallow intertidal zone down to about -50m deep. Typical shell length of *N. lamarckii* is around 35mm. with giants sometimes exceeding 50mm.; *N. lamarckii* f. *phuketensis* is smaller with a typical shell length around 30mm. and rarely exceeding 40mm.



Circomphalus foliaceolamellosus (Dillwyn, 1817)
VENERIDAE

-10~20m, Trawled, Attached to fishing nets, Gunjur, Gambia, 66.3mm., 2012/iii, Coll. Carl Ruscoe & Craig Ruscoe.

Magnificently ornamented with frequent frilly ribs, the « Scaly-ridged Venus » is a large venus clam and the most extensively ribbed species of genus *Circomphalus*. It is a comm.on burrowing filter-feeder endemic to western Africa ranging approximately from Morocco to Angola and inhabits intertidal to subtidal waters down to about -80m deep. Typical shell length around 60mm., very large specimens are known to exceed 80mm. The radial ribs vary somewhat in frequency from specimen to specimen, and they are quite prone to damage especially in large specimens; examples with all ribs intact are not easy to find.



Cymbiola chrysostoma (Swainson, 1824)
VOLUTIDAE

Sulawesi, Indonesia, 72.1mm., Ex-Coll. Paul Johnson.

The « Golden-Mouth Volute » is a classic collector's item among the volutes endemic to Indonesia, characterised by the brilliant golden hue in its aperture for which it was named. It was selected by S. Peter Dance as one of his fifty « Rare Shells » (1969) and was very rare even into the late 1900s. Today it is only uncomm.on and much easier to obtain, although giant specimens still fetch high prices. The spire height is somewhat variable as well as the prominence of the two dark bands, the shell is quite prone to growth scars. The number of spines per whorl is also variable. It is a carnivorous gastropod inhabiting shallow sandy bottoms of about -2~50m deep. Typical shell length around 55mm., giant specimens may occasionally exceed 70mm.



Angaria sphaerula (Kiener, 1839)
ANGARIIDAE

In deep water, by local fisherman using tangle net, Panglao Island, Bohol, Philippines, 62.9mm., early 2014.

With its long, recurved spines the « Kiener's Delphinula » is perhaps the most beautiful angariid, and certainly one of the most variable. S. Peter Dance chose this species as one of his 50 « Rare Shells » (1969) as it was for a long time considered very rare. Today it is known to be a rather common species native to the tropical Indo-West Pacific, and an algae grazer inhabiting rocky surfaces of intertidal zone up to moderate depths of around -100m. It is very variable in colouration and ornamentation, the spines can vary from a simple tube to being extensively webbed. A large specimen of the frilly form is shown here, with wide spines like petals of a flower. It is quite rare to find a specimen of this form with intact spines and good size combined. Typical shell length around 60mm. including spines, although very large specimens may approach 100mm.



Volutoconus coniformis (Cox, 1871)
VOLUTIDAE

-14m, On sand of pearl farm, Roebuck Bay, Broome, Australia, 70.0mm., Ex-Coll. Paul Johnson.

The « Cone-shaped Volute » is a rare and appealing volute endemic to the portion of northwest Australia between Dampier and Broome. It is a nocturnal carnivorous gastropod inhabiting sandy to rubbly bottoms of shallow water ranging from intertidal zone down to about -20m deep. Although a shallow water shell it is a seldomly seen species, live-taken specimens such as the one shown especially so. Characteristically of the genus *Volutoconus*, it has a sharp needle-like tip in its protoconch. Typical shell length is around 60mm., giant specimens may grow to approach 80mm.



Trophonella echinolamellata (Powell, 1951)
MURICIDAE

-200~220m, Trawled, King George Island, South Shetlands, Antarctica, 63.2mm., 1996/xii.

Trophonella echinolamellata is a beautifully ornamented Antarctic trophon endemic to the Southern Ocean, with a range from South Georgia and the South Sandwich Islands to the Antarctic Peninsula although the actual range might be wider. It appears to be extremely rare in the shell market due to its inaccessible habitat and distribution. Originally placed in genus *Trophon*, it was placed in the newly erected genus *Trophonella* in 2010 by Harasewych & Pastoino along with four other species due to significant differences from the type species of *Trophon*, ie. *Trophon geversianus* (Pallas, 1769). It is a carnivorous gastropod with a bathymetric range of around -50~500m, but live specimens are usually found between -100~200m deep. Typical shell length approximately 50mm., very large specimens are known to attain nearly 70mm.



Tenorioconus cedonulli (Linnaeus, 1767)

CONIDAE

-12~14m, Scuba dived at night, Young Island, Saint Vincent and the Grenadines, 44.03mm.

With its specific epithet meaning 'second-to-none', the « Matchless Cone » is a gorgeous Caribbean cone greatly celebrated for its beauty and rarity. One of the 'Four Famous Rarities' in S. Peter Dance's book « Shell Collecting: An Illustrated History », it was originally described by Linnaeus as a subspecies of *Leptoconus amm.iralis* (L., 1758) with reference to the famous figure by Albertus Seba (1758) drawn from the then unique specimen owned by Johan de la Faille, a famous Dutch collector. Johan de la Faille ultimately had two specimens, one was sold to the King of Portugal and the other (not the one figured by Seba) later passed to the naturalist Pierre Lyonet (who refused to sell the specimen for £100, equivalent to about US\$15000 today, believing it was worth triple of that), then to Jean-Baptiste Lamarck, and the same shell supposedly now rests in the Natural History Museum of Geneva. It is now considered a full species with three subspecies: *T. c. cedonulli* from St Vincent, *T. c. dominicanus* (Hwass in Bruguiere, 1792) from Grenadines and Grenada, and *T. c. insularis* (Gmelin, 1791) from St Lucia and Barbados. It is extremely variable in pattern and colouration (the specimen depicted here is typical of *T. c. cedonulli*) and somewhat variable in form; and is likely to have been confused with other species especially in the 18th and 19th Century. A predatory gastropod inhabiting sandy to rubbly bottoms around -2~80m deep, its typical shell length is around 45mm. but very large specimens may reach 60mm.



Lyria lyraeformis (Swainson, 1821)
VOLUTIDAE

-40m, Dived, Lamu Island, Kenya, 112.1mm.

The « Lyre-formed Lyria » is a beautiful classic rarity among the volutes endemic to east Africa ranging from Somalia to Mozambique, with majority of specimens coming from Kenya or Somalia. One of S. Peter Dance's fifty « Rare Shells » (1969), it was truly scarce until the mid-20th Century. Today it is still a rare and coveted shell especially in live-taken condition; although a good amount were brought into the market from Somalian and Kenyan fishermen decades ago this seems to have stopped today and most specimens available on the market are from old collection. A carnivorous gastropod inhabiting sandy to muddy bottoms, its bathymetric range is around -10~200m from subtidal to moderately deep water. Typical shell length around 100mm., giant specimens are known to exceed 140mm. Typical of genus *Lyria*, this species also has a horny operculum but specimens complete with operculum is very rarely seen. Its form is quite variable from the slender and fusiform shown here to a much wider and robust form; the colour is also somewhat variable, for example some specimens only carry various hues of orange.



Angaria sphaerula (Kiener, 1839)
ANGARIIDAE

In deep water, by local fisherman using tangle net, Panglao Island, Bohol, Philippines, 62.9mm., early 2014.



Chicomurex superbus (Sowerby III, 1889)
MURICIDAE

-100~200m, By tangle nets, Balut Island, Philippines, 68.1mm.

Chicomurex superbus is a rather widely distributed muricid ranging from Honshu, Japan to northeast Australia and Coral Sea. For a long time this common species was incorrectly referred to as *Chicomurex problematicus* since T.C. Lan's description in 1981 of it as a subspecies of *C. superbus*. This is because Sowerby III's original figures in *C. superbus*' description was misinterpreted and considered to be a different species (now described as *C. lani* Houart, Moe & Chen, 2014) which was what Lan compared his specimens to. When the holotype of *C. superbus* was seen however, it turned out to be exactly the same species as *C. problematicus*. Therefore *C. problematicus* is in fact a junior synonym of *C. superbus* which takes precedence. A carnivorous gastropod inhabiting moderately deep water around -40~300m, the typical shell length is around 65mm. although exceptionally large specimens may exceed 80mm.



Aforia circinata (Dall, 1873)
COCHLESPIRIDAE

-205m, Trawled in mud, Monbetsu, Hokkaido, Japan, 68.7mm., 1986/v/13.

The « Keeled *Aforia* » is a rather rare conoidean with a distribution ranging from Honshu, Japan to Bering Sea to Gulf of Alaska, USA. With its distinctive keel, it is a representative species of genus *Aforia* which was placed in Turridae until its recent revision, and is now in Cochlespiridae. This genus contains some of the most rare and desirable 'turrids' characterised by strong keels. It is known for exhibiting very clear sexual dimorphism in aperture shape, females have a strong notch in the lower part of the outer lip whereas males (shown here) lacks it. This feature is unusual in gastropods, and is also known for some species of the true turrid genus *Gemm.ula*. The shell is usually quite rough and worn. A carnivorous gastropod inhabiting muddy bottoms around -60-600m deep, its typical shell length is around 65mm. but giants may exceed 80mm.



Margarya yangtsunghaiensis Tchang & Tsi, 1949
VIVIPARIDAE

Yangtsunghai Lake, Yunnan Province, China, 50.0mm., 2013.

Margarya yangtsunghaiensis is a very attractive freshwater snail endemic to a single small lake with surface area of 32km² -- the Yangtsunghai Lake in Yunnan Province, China. It is listed on both IUCN Red List and Chinese Red List as Critically Endangered; some claim it may already be extinct. This is because the last official records of live specimens were back in 1949, and supposedly no live specimens were found in recent surveys of the lake. Given this background it is unsurprisingly a rare shell on the market, although it is puzzling that apparently live taken specimens claiming to be taken in recent years are sometimes seen for sale. Viviparids are known for having a wide-range of feeding methods, including grazing, detritus feeding, and filter feeding; genus *Margarya* is no exception. It lives across all depths of Yangtsunghai Lake, the maximum depth of which is about -30m. Typical shell length around 45mm., very large specimens may approach 60mm. The genus *Margarya* includes some of the most amazingly sculptured freshwater gastropods of all, and once comm.on enough to be used for food by local people. Nowadays however, unfortunately most species of this small (11 species) genus endemic to Yunnan Province are in sharp decline or already extinct due to anthropogenic pollution of the lakes they inhabit since the 1980s. This continues today and Yangtsunghai Lake, for example, was affected by a large-scale Arsenic pollution from a local fertilizer factory in 2008.



Pomaulax japonicus (Dunker, 1845)
TURBINIDAE

-50~60m, Owase, Mie Prefecture, Japan, 132.1mm., 2013/x.

The « Japanese Star » is an intriguing turbinid endemic to Japan where it is locally comm.on and Korea where it is rarer. It is a grazing herbivore inhabiting rocky substrates in shallow water up to -50m deep. The shell height is quite variable in relation to shell diameter, meaning the shell form can vary from very flat to rather tall. The thick nacre layer of the shell was used in Japan to make buttons. Typical shell diameter around 120mm., very large specimens may reach 170mm.; in general the larger the specimen the shorter the spine becomes. Specimens with long and well-preserved spines are not easy to acquire.



Beringius polynematicus Pilsbry, 1907
BUCCINIDAE

-300~400m, Trawled on mud, Chōshi, Chiba Prefecture, Japan, 131.0mm.

Beringius polynematicus is a cold-water buccinid ranging from northern Japan to Bering Sea. It is similar to *Beringius frielei* (Dall, 1895) and sometimes confused with it, but *B. frielei* have numerous deep spiral ridges in regular intervals on the upper half of the body whorl which is lacking in *B. polynematicus*. A common carnivorous / scavenging species found on muddy bottoms around -150~500m deep, it is edible and sometimes seen in Japanese fish markets. Typical shell length around 140mm., very large specimens may exceed 170mm. It is quite variable in form and may be much wider than the fusiform specimen shown.



Cancellaria cooperii Gabb, 1865
CANCELLARIIDAE

-20m, Dived, Santa Barbara, California, USA, 50.0mm.

The « Cooper's Nutmeg » is a particularly lovely nutmeg shell native to California, USA and Baja California, Mexico. It has a very special feeding mechanism -- it is a blood sucking parasite of larger animals and feeds by making wounds with its radula and then inserting the proboscis, as well as using existing wounds. First reported in 1987 as a specialised parasite of the Pacific electric ray, *Torpedo californica* (first reported gastropod parasite of fish), but now known to parasitise a large variety of animals such as echinoderms and other molluscs. An uncomm.on gastropod living buried in sand most of the time, it appears to be most comm.on in shallow water around -20~30m deep. It is quite variable in form ranging from the stout form shown here to much more elongate and fusiform, usually the more elongate the less shouldered and 'spiny' looking. Distinctness and contrast of the pattern is very variable too, the specimen shown here shows rather clear pattern. Typical shell length around 60mm., very large specimens may approach 90mm.



Neptunea beringiana (Middendorff, 1848)
BUCCINIDAE

In deep water by Russian fisherman, Central Sea of Okhotsk, Russia, 83.1mm.

The « Fat Neptune » is a peculiarly shaped cold-water buccinid distributed from the Sea of Okhotsk to Bering Sea. It is a very variable species and can range from completely lacking in significant sculpture (as shown) to having several rather strong radial cords; although usually the wide and squat shape is conserved. The name *N. beringiana* is in fact junior to *Fusus bulbosus* Valenciennes, 1846 which referred to the same species; but *N. beringiana* was conserved according to the ICZN Article 23.9.1-2 as a nomen protectum by Kantor & Sysoev (2002) because it was already in prevailing usage. A carnivorous / scavenging species inhabiting rather deep water around -100~500m; it is supposedly comm.on in its habitat but somewhat rare in the shell market. Typical shell length around 90mm., very large specimens may reach 120mm.



Caribachlamys pellucens (Linnaeus, 1758)
PECTINIDAE

-18m (-10 fathoms), Scuba dived under dead coral on hard reef top, Pompano Beach, Florida, USA, 39.8mm., 2010/iv.

The « Knobby Scallop » is a colourful pecten with delicate sculpture endemic to the Caribbean region from south Florida, USA to Brazil. Often both valves carry well-developed nodules, but the knobbyness vary greatly and in some specimens they are reduced to scales or even almost completely lacking. A very well-known synonym is *C. imbricata* (Gmelin, 1791) which it was known under until the synonymy with Linnaeus' name became apparent. A moderately comm.on filter-feeding species, it is usually found in shallow water ranging from -5~50m deep. Typical shell length around 40mm., very rarely giants may exceed 65mm.



Charonia tritonis (Linnaeus, 1758)
RANELLIDAE

-20~30m, Dived, Siargao Island, Philippines, 388.2mm.

The « Triton's Trumpet » is a giant ranellid comm. only found throughout the Indo-West Pacific region including Red Sea and Hawaii, and is perhaps one of the best known mollusc species of all. It is a predatory gastropod well-known for feeding on the crown-of-thorns starfish *Acanthaster planci*, but it actually feeds on a wide variety of echinoderms. A shallow water dweller usually found in depths less than -80m, it inhabits rocky to sandy bottoms, often of coral reefs. The shell is often used as a decorative object, and the meat is edible. In many cultures it was traditionally made into a horn, for example in Japan it was once used as war horn in the Sengoku period and in Hawaii it is the most comm. on type of 'pu' (conch horns), blowing of which has cultural and spiritual significance and often done in ceremonial occasions. Many consider it to be overfished and it is listed as a protected species in some countries such as Philippines and Australia. In 1994 Australia proposed to include it on CITES Appendix II, but the proposal was withdrawn later due to lack of sufficient support data. Typical shell length is around 380mm., giants may sometimes exceed even 500mm.; the protoconch is always missing in adult specimens. The specimen shown has clearly defined pairs of dentitions inside the the outer lip, such specimens seem to be less comm. on.



Bathyancistrolepis trochoideus (Dall, 1907) f. *ovoideus* (Habe & Ito, 1965)
BUCCINIDAE

-300~400m, Choshi City, Chiba Prefecture, Japan, 30.3mm., 1976/x.

Bathyancistrolepis trochoideus is a very peculiar buccinid endemic to the Pacific side of Honshu, Japan. Recent specimens are very rare, especially so in collections outside Japan; and it is better known from Pleistocene fossils frequently found in Iioka Formation of Chiba Prefecture for example, around 0.7~2 million years old and currently considered to be the same species. It is a carnivorous / scavenging gastropod usually inhabiting muddy bottoms of deep water ranging from -100~1000m. Shown here is a specimen of form *ovoideus*, which is more bulbous with a shorter spire and fewer cords near the siphonal canal. Typical shell length around 30mm., very large specimens may exceed 40mm.



Lussivolutopsius emphaticus (Dall, 1907)
BUCCINIDAE

-400m, By bottom trawler on muddy bottom, west of Rebun Bank, west of Rebun Island, Hokkaido, Japan, 103.7mm., 1986/x/12.

Lussivolutopsius emphaticus is a rare deep-water buccinid ranging from Japan to Korea to Kamchatka Peninsula, Russia. Colour vary from white to reddish or yellowish, and it tends to be a very rough species difficult to find in decent condition especially with mature flaring lip and operculum. It is a carnivorous / scavenging gastropod inhabiting muddy bottoms around -200~500m deep. Typical shell length around 90mm., very large specimens may reach 120mm.



Cymbiola chrysostoma (Swainson, 1824)
VOLUTIDAE

-10~15m, Banggai Island, East Sulawesi, Indonesia, 55.7mm.

The « Golden-Mouth Volute » is a classic collector's item among the volutes endemic to Indonesia, characterised by the brilliant golden hue in its aperture for which it was named. It was selected by S. Peter Dance as one of his fifty « Rare Shells » (1969) and was very rare even into the late 1900s. Today it is only uncomm.on and much easier to obtain, although giant specimens still fetch high prices. The spire height is somewhat variable as well as the prominence of the two dark bands, the shell is quite prone to growth scars. It is a carnivorous gastropod inhabiting shallow sandy bottoms of about -2~50m deep. Typical shell length around 55mm., giant specimens occasionally exceed 75mm.



Buccinum sagamianum Okutani, 1977
BUCCINIDAE

-300~400m, By lobster pots, Sagami Bay, Kanagawa Prefecture, Japan, 48.7mm.

The « Sagami Whelk » is a strikingly corded buccinid endemic to Sagami Bay, Tokyo Bay, and Suruga Bay in central Japan. It is a representative species of its type locality Sagami Bay, which is well known for housing a high molluscan diversity especially Japanese endemics. It is a locally uncomm.on carnivorous / scavenging gastropod found in sandy to muddy bottoms of deep water around -250~700m. Typical shell length around 35~40mm., the shown specimen is already large but giants may approach 55mm.



Astraliium asteriscum (Reeve, 1843)
TURBINIDAE

-10m, Dived, Poindimié, New Caledonia, 50.6mm.

The aptly named « Asterisk Star » is a very attractive turbinid which appears to be endemic to New Caledonia (may actually extend to northwestern Australia). Although generally accepted as a species in its own right, it is sometimes considered as a subspecies of *Astraliium stellare* (Gmelin, 1791). On average the shell of *A. asteriscum* is more depressed and the spines are more prominent compared to *A. stellare*. The number of spines per whorl vary from about 10 to 13. It is locally not uncommon and is a grazing herbivore found in shallow water down to about -40m deep. Typical shell length about 45mm. including spines, very large specimens may approach 65mm.



Buccinum rausicum Shikama, 1952
BUCCINIDAE

-250~300m, Abashiri, Hokkaido, Japan, 133.1mm., 1974/viii.

The « Rausu Whelk » is a large cold-water buccinid endemic to northeastern Hokkaido, Japan. It is unusual among genus *Buccinum* in having swollen, thin shell with strong radial ribs very much resembling genus *Ancistrolepis* or *Clinopegma*; large specimens are especially similar to *Clinopegma chikaoi* Tiba, 1968. The telltale concentric operculum, however, easily distinguishes it from those two genera which has claw-like opercula. It was first discovered by Mr Goro Osagawa, a famous Japanese collector, in Rausu-cho, Hokkaido (well known for housing a high diversity of cold-water buccinids); hence the name. Although locally only uncommon, it is very rare in the shell market outside Japan. It is a carnivorous / scavenging species inhabiting sandy to muddy bottoms of rather deep water around -250~800m. Typical shell length around 100mm., very large specimens may exceed 130mm. It is edible and in Autumn it is sometimes found in Japanese fish markets mixed with *Buccinum kinukatsugi* Habe & Ito, 1968.



Demoulia abbreviata (Gmelin, 1791)
NASSARIIDAE

-82m (-45fms), Trawled, Mossel Bay, South Africa, 35.23mm.

This is an interesting nassa snail endemic to South Africa. It is highly variable in pattern and colouration, live specimens are covered by a thick brown periostracum. It is a comm.on scavenging gastropod found on sandy to muddy bottoms of shallow water around -10~100m deep. Typical shell length around 25-30mm., very large specimens may exceed 35mm. The protoconch is often lacking in adults, the large specimen shown is superb in retaining it.



Pteropurpura festiva (Hinds, 1844)
MURICIDAE

-1.4m, Low tide on boulders inside the breakwater, Cabrillo breakwater, San Pedro, California, USA, 32.7mm., Coll. Phil Liff-Grieff, 2002/i/26.

The « Festive Murex » is a memorable muricid ranging from south California, USA to Baja California, Mexico; and is one of the representative muricids of the California region. Characterised by narrow, sharply recurved wing-like varices and chocolate spiral lines, it is a carnivorous gastropod living in intertidal zone down to shallow water of about -20m. It serves as a symbol of the San Diego Shell Club, which also publishes a malacology journal named « The Festivus ». Typical shell length around 40mm., very large specimens can approach 70mm.



Coralliophila radula (A. Adams, 1855)
MURICIDAE

Kusui, Nada-Cho, Gobou City, Wakayama Prefecture, Japan, 43.2mm., 2000/iv.

The « Radula Coral Shell » is a beautifully coloured coral shell ranging from Honshu, Japan to Philippines to New Zealand. It is an ectoparasite of scleractinian stony corals and feeds nocturnally on coral flesh, usually found attached to host corals around water depth of -10~50m. A common species, the dorsum colour ranges from white to light violet and the shell surface is very scabrous with numerous scale-like spines. Typical shell length around 40mm., very large specimens may exceed 70mm.



Japelion hirasei (Pilsbry, 1901)
BUCCINIDAE

-300m, Iburi Subprefecture, Hokkaido, Japan, 108.3mm., 2009/viii.

The « Hirase's Japelion » is a very appealing buccinid with a stepped spire. A deep-water carnivore / scavenger inhabiting muddy bottoms with a bathymetric range around -150~400m; its range extends from Chiba Prefecture, Japan to Bering Sea but vast majority of specimens come from Hokkaido, Japan. Although locally it is only uncomm.on, it rarely appears on the market outside Japan. It is very similar to its congener *Japelion pericochlion* (Schrenk, 1863) and often confused with it, the most clear difference is that *J. hirasei* lacks a well-defined siphonal canal. Both species are edible and sometimes seen mixed together in Japanese fish markets. Typical shell length around 100mm., very large specimens may approach 130mm.



Pagodula lata Marshall & Houart, 2011
MURICIDAE

-1200m, Hokianga, Northwest Auckland, New Zealand, 42.9mm., 2013/viii.

The « Broad Trophon » is a large Pagodula species recently described with a distribution from Eastern Australia to New Zealand. Prior to the description it has been confused with *Pagodula carduelis* (Watson, 1882), but *P. lata* is much larger, broader, and lacks spiral cords completely. Like many congeners, it is also very variable in the length of shoulder spines. It is an uncommon carnivorous gastropod inhabiting deep water ranging around -400~1400m. Typical shell length around 45mm., very large specimens may approach 55mm.



Parancistrolepis fujitai (Kuroda, 1931)
BUCCINIDAE

-500m, Shинchi-machi, Fukushima Prefecture, Japan, 82.6mm., 2013/vi.

The « Fujita's Whelk » is a rather rare cold-water buccinid with beautifully sculptured periostracum, endemic to Japan ranging from Aichi Prefecture to Hokkaido. The operculum is very small for the aperture and is characteristic of Parancistrolepis, a genus otherwise very similar to Ancistrolepis which this species was originally placed in. It is a carnivorous / scavenging gastropod living in sandy to muddy bottoms in quite deep water around -100~700m. It is named after late Mr. Tadashi Fujita, a Japanese malacologist. Typical shell length around 80mm., very large specimens may approach 110mm.



Chicomurex lani Houart, Moe & Chen, 2014
MURICIDAE

-150~200m, Trawled, South East Taiwan, 72.4mm., PARATYPE.

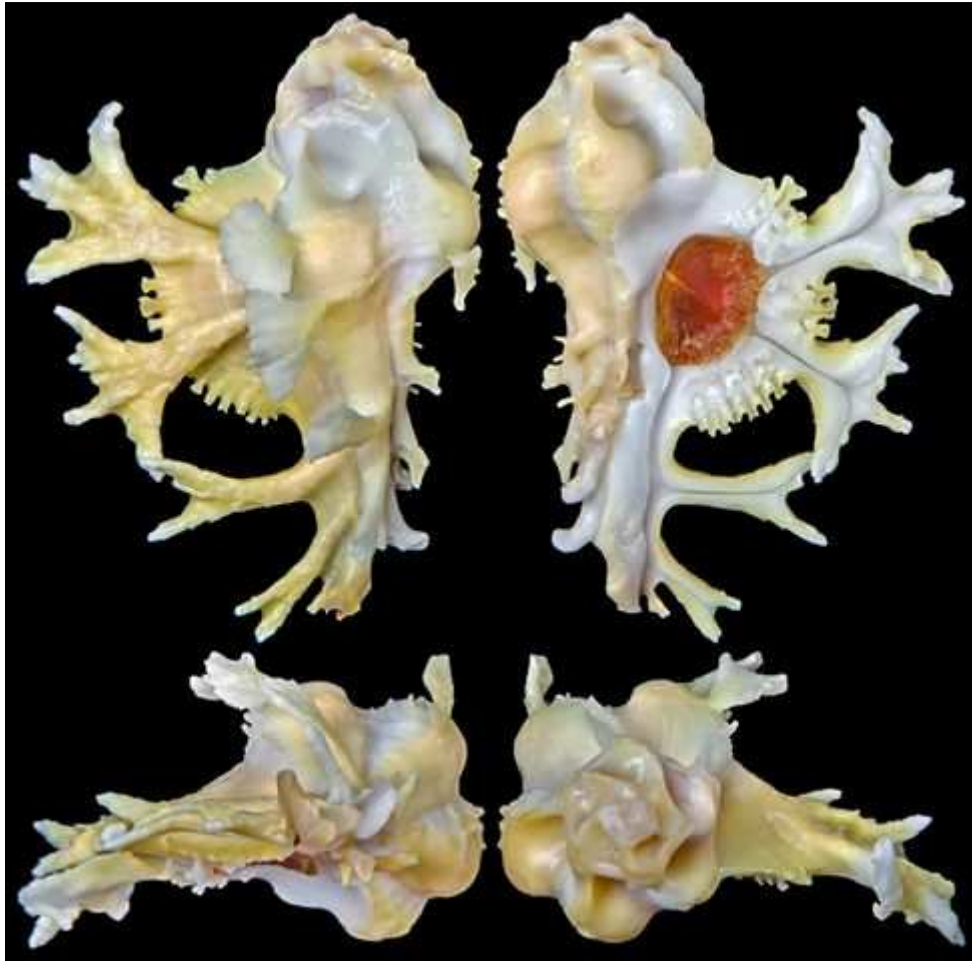
For a long time this lovely *Chicomurex* was thought to be the species Sowerby III described as *Chicomurex superbus* (Sowerby III, 1889), published with drawings of a single specimen from Hong Kong. However When photographs of the holotype was published by the National Museum of Wales, the specimen was clearly identical to species widely recognised as *C. problematicus* (Lan, 1981). This meant the name *C. problematicus* was rendered a junior synonym of *C. superbus*, and that the species referred to as *C. superbus* in the past was due to misinterpretation of Sowerby III's drawings -- it remains undescribed. It was formally described as *C. lani* in 2014, named in honour of the eminent Taiwanese collector and dealer T.C. Lan. Such intricate history of this species teaches important lessons -- species identification without knowing the actual holotype specimen (or at least photograph of it) is dangerous; and that the taxonomy of even 'well known' species may be very entangled. It is a rather comm.on carnivorous gastropod distributed from southern Japan to Taiwan to Northeast Australia to New Caledonia, with a depth range of around -40~300m. Typical shell length around 65mm., giant specimens may approach 90mm.



Homalocantha anatomica pele (Pilsbry, 1918)
MURICIDAE

-60ft, Dived on Porites coral reef, Waianae Oahu, Hawaii, USA, 45.13mm., Coll. Chris Moe.

The « Pele's Murex » is an endemic muricid of Hawaii well known for its vibrant colour variations and highly sought-after by collectors. The colour ranges from white to yellow, orange, pink, red, purple etc., and a colour set of quality specimens makes a wonderful display. It is usually treated as a Hawaiian subspecies of *Homalocantha anatomica* but is considered by some to be a separate full species. It is an uncomm.on carnivorous gastropod inhabiting a bathymetric range of around -10~50m. Typical shell length around 45mm., very large specimens may exceed 60mm.



Homalocantha anatomica pele (Pilsbry, 1918)
MURICIDAE

-60ft, Dived on Porites coral reef, Waianae Oahu, Hawaii, USA, 60.5mm., Coll. Chris Moe.

The « Pele's Murex » is an endemic muricid of Hawaii well known for its vibrant colour variations and highly sought-after by collectors. The colour ranges from white to yellow, orange, pink, red, purple etc., and a colour set of quality specimens makes a wonderful display. It is usually treated as a Hawaiian subspecies of *Homalocantha anatomica* but is considered by some to be a separate full species. It is an uncommon carnivorous gastropod inhabiting a bathymetric range of around -10-50m. Typical shell length around 45mm., very large specimens may exceed 60mm.



Hydrissa sodalis (Stimpson, 1859)
HYDRACTINIIDAE

-50m, Hokkaido, Japan, 54.3mm.

It may be difficult to believe but this « shell » is not made by a mollusc, but a species of shell-mimic hydrozoan. Hydrozoans are not molluscs but cnidarians, a phylum characterised by stinging cells called cnidocytes that includes animals such as corals and jellyfish. This colonial species forms commensal relationship with a hermit crab species, *Pagurus constans* (Stimpson, 1858); it protects the hermit crab with its sting and the hermit crab leads it to food. The hydroids first settle on small gastropod shells on young hermit crabs, and the polyps slowly grow and increase in number to cover the entire shell. The amazing thing is that the hydroid colony « shell » grows like a gastropod shell as the hermit crab grows larger, and thus the hermit crab does not need to change its shell throughout whole life. It is an omnivorous species ranging from Sea of Okhotsk to Kyushu, Japan (actual range may be wider in the north); living in rather deep water from about -30~400m. The average size is around 50mm., very large specimens may exceed 70mm.



Aulacofusus periscelidus (Dall, 1891)
BUCCINIDAE

-400m, Kunashir Island, Kuril Islands, 61.3mm., 2009/viii.

The « Garter Whelk » is an attractively sculptured buccinid ranging from Alaska to Russia to Hokkaido, Japan. An uncomm.on species but rarely seen on the market, it is a carnivorous snail living on rocky to sandy/muddy substrates from about -20~400m deep. The siphonal canal appears to vary in length and distinctiveness between individuals. Typical shell length around 60mm., large specimens can exceed 85mm. Live specimens are often covered by a layer of overgrowth made by other marine organisms, such as bryozoan and algae.



Lambis pilsbryi Abbott, 1961
STROMBIDAE

-10~15m, Dived, Nuku Hiva, Marquesas, 172.3mm.

The « Pilsbry's Spider Conch » is a large spider conch endemic to the French Polynesia and best known from the Marquesas Islands. For a long time it was regarded as a subspecies of *Lambis crocata* (Link, 1807) but now often recognised as a full species. It can be differentiated from *L. crocata* by lack of a large bulge in the columella and longer digits, as well as being much larger on average. Once considered rare due to its limited range but now it is only uncomm.on on the market. Presumably a herbivore / detritivore like other spider conchs, it inhabits shallow intertidal waters down to about -40m deep. Two forms exist, the slender form shown with long digits and a robust form with larger body and relatively shorter digits. The typical shell length is about 200mm. including digits, giants are known to exceed 250mm.



Entemnotrochus rumphii (Schepman, 1879)
PLEUROTOMARIIDAE

-180m, Trawled, East China Sea, 92.8mm., 2013/xii.

The « Rumphius' Slit Shell » is the largest of all known extant slit shells and a species of legendary fame among collectors. Only three specimens were known until 1969 when a fourth one turned up in Taiwan. Toba Aquarium in Japan purchased that specimen with 10,000USD, which is often cited as the most expensive shell in history. Nowadays it is still rare but is obtainable at a cost, although recently specimens from East China Sea are exchanging hands at relatively low price. It ranges from Honshu, Japan to Taiwan to Philippines inhabiting rather deep water around -50~400m deep. It is a grazer mostly feeding on sponges but also soft corals, and is mostly found on rocks where these grow. The average adult size is around 180mm., with very large specimens exceeding 250mm. The final whorl inflates and exhibit most clearly the « flame patterns » this species is known for. Young specimens such as the one shown tends to have yellow colouration, whereas mature specimens are dominated by red.



Fulgoraria hirasei (Sowerby III, 1912)
VOLUTIDAE

-250~300m, Kumano-Nada, Owase City, Mie Prefecture, Japan, 186.2mm., 2009/vi.

The « Hirase's Volute » is a large volute endemic to Pacific side of Japan. It is a representative species of *Fulgoraria*, a genus of slender deep-water volutes which Japan is famous for having many endemic species. A locally common species, it is a carnivore living on sandy/muddy bottoms in rather deep water about -100~400m in depth and mostly taken by bottom trawlers. The typical shell length is about 140mm. but very large specimens are known to reach 230mm., anything over 200mm. is rare.



Paziella pazi (Crosse, 1869)
MURICIDAE

-200~250m, Trawled, Caribbean Sea, Cuba, 36.6mm., 1984/vi.

The « Paz's Murex » is an uncomm.on muricid native to the Caribbean Sea and adjacent waters, ranging from Florida Keys to French Guiana. It is a predatory gastropod inhabiting rather deep water around -30~550m. A spiny species, the number of varices can range from six to eight per whorl. The typical shell length is around 40mm. but it is very variable in size and giants are said to reach even 90mm.



Calliostoma scotti Kilburn, 1973
CALLIOSTOMATIDAE

-40~45m, Trawled, Natal, South Africa, 38.5mm., 2002/vi.

The « Scott's Top Shell » is a very beautiful top shell with golden colouration and attractively keeled shell. It is distributed from Mozambique to South Africa, and is a herbivore / detritivore mostly found on sandy to muddy bottoms between -30~400m deep. It is locally moderately comm.on but it is rather variable in colouration, form, and sculpture and handsome specimens like the one shown are uncomm.on. Typical shell length around 35mm., giants may approach 45mm.



Cellana mazatlandica (Sowerby I, 1839)
NACELLIDAE

Intertidal on rocks, Chichi-jima, Bonin Islands, Japan, 82.4mm., 1980/viii.

Contrary to the specific epithet, the « Bonin Islands Limpet » is not distributed in Mazatlán, Mexico but is a famous endemic species of the Bonin Islands (aka. Ogasawara Islands), Japan. Sowerby I is said to have mistaken the locality when giving this species a name. Although for a long time it was known as *C. boninensis* (Pilsbry, 1891), a much better and descriptive name, due to the strict rules of zoological nomenclature it is now synonymised with *C. mazatlandica* and we are stuck with that senior name. This species is famous and significant because it is the only marine gastropod recognised as a natural monument in Japan and protected by law from collection (since 1970/xi/12). Thus although it is locally common in its habitat it is quite uncommon on the market. It is an intertidal grazer feeding on microalgae films, characterised by a tall shell and very strong radial ribs. It is a large cellanid, the typical shell length is about 70mm. but very large specimens may reach 100mm.



Turriconus excelsus (Sowerby III, 1908)
CONIDAE

-120~150m, Tangle net, Panglao, Bohol, Philippines, 67.2mm., 2004/iii.

The « Illustrious Cone » is one of the most coveted rare cones of all, and surely one of the most attractive. It is a very famous species included in S. Peter Dance's fifty « Rare Shells » (1969), only three specimens were known then and none of them fresh. A predatory gastropod living in rather deep water of about -100~400m, it has a wide distribution range in the Indo-Pacific ranging from Burma to Philippines to Japan to northern Australia to Solomon Islands. Most specimens seen on the market today comes from Balut and Aliguay islands of Philippines. Average shell length around 75mm., gigantic specimens may exceed 100mm. Its colour and pattern are both quite variable and the now synonymised name *T. nakayasui* (Shikama & Habe, 1968) was given to a form with less patterns than usual. It is the rarest of the three famed cones characterised by tall, stepped spires; the other two being *Cylinder gloriamaris* and *Leptoconus milneedwardsi*.



Annepona mariae (Schilder, 1927)
CYPRAEIDAE

New Caledonia, 14.23mm.

Described by Franz Schilder who dedicated the specific epithet to his wife, the « Maria's Cowrie » is one of the most lovely cowries of all with its unique eye-catching brown fringed yellow spots. An omnivore, it has a very wide range throughout the Indo-Pacific ranging from east Africa to northern Australia to Philippines to Hawaii to French Polynesia. The depth range of this nocturnal cowry is approximately -5~45m. The spotted pattern vary greatly between individuals, usually at least some parts are blurry; it is difficult to find a specimen with all spots having sharp and well-contrasted edges. The average shell length is around 15mm. for this rather uncommon species, although very large specimens may reach 20mm.



Odontocymbiola magellanica (Gmelin, 1791)
VOLUTIDAE

Rio Negro, Argentina, 141mm.

The « Magellanic Volute » is a large and comm.on volute found throughout the Magellanic province, ranging from Uruguay to Magellan Strait to southern Chile to Falkland Islands. It is a carnivorous gastropod and can be seen from very shallow intertidal waters down to about -800m deep. Average shell length is around 160mm., but very large specimens may exceed even 240mm. A highly variable species in both form and pattern, various forms have been given different names. Its form ranges from wide and stout to relatively slender with a tall spire; the pattern usually consists of dark zigzag lines. Many specimens lack patterns, however, especially those with rough and worn shells. The tall form is sometimes mistaken with *Adelomelon ancilla* (Lightfoot, 1786), another comm.on volute from the same area. *A. ancilla* is in general more fusiform with a smaller body mass than *O. magellanica*, the radula is also different. Both species are fished for meat and are of some economic importance for local fisheries.



Lioconcha castrensis (Linnaeus, 1758)
VENERIDAE

Cebu, Philippines, 59mm.

The « Camp / Zigzag Venus » is a strikingly patterned venus clam widely distributed across the Indo-west Pacific. It is a filter-feeding species which lives buried in sand from lowtide to about - 30m deep. The shell is white to light tan in colouration but the pattern varies greatly, generally with dark lines forming tent-like repetitive pattern. Although a comm.on species, it is quite sought-after by collectors for its beautiful pattern. Average shell length around 40-45mm., very large specimens sometimes exceed 55mm.; the depicted specimen is a real giant.



Trichotropis bicarinata (Sowerby I, 1825)
CAPULIDAE

Sawara-Cho (now Mori-Cho), Kayabe District, Hokkaido, Japan, 33.7mm., Coll. Shigeo Igarashi, 1978/vi/25.

The « Two-Keeled Hairy Snail » is a remarkable capulid with a vast range from northern Japan to British Columbia to New Foundland, Canada to Svalbard Archipelago, Norway. It is a cold water species with a depth range around -10~400m. Capulids are known to vary greatly in shape and sculpture, including some amazing ones like this species. Although it is not uncomm.on across its range, specimens retaining full periostracum are uncomm.on as it peels quite readily. Members of genus *Trichotropis* are generally suspension feeders but some have been reported to be kleptoparasites as well, stealing food from polychaete worms (e.g., *T. cancellata* and *T. conica*). It gains its comm.on name from the two strong keels on the shell (also the reason for its specific epithet) and a light brown periostracum with many hair-like protrusions. The actual shell is milky white with no hairs. Average shell length around 35mm., very large specimens can exceed 45mm.



Propeamussium sibogai (Dautzenberg & Bavay, 1904)
PROPEAMUSSIIDAE

-150~200m, Trawled Balicasag Island, Philippines, 37.3mm.

The « Siboga Glass Scallop » is not a true scallop (Pectinidae) but belongs to a closely related family Propeamussiidae, which includes mainly fragile deep-water species with the lower valve much smaller than the upper valve. It is named after Siboga, the Dutch ship during whose famous 1899-1900 expedition to Indonesia this species was discovered. A filter-feeding species, it has a very wide range including at least Japan to New Zealand to South Africa and lives in rather deep water around -50~400m. Although moderately comm.on, it is very difficult to find a quality specimen due to its extremely fragile shells. The average shell length of the upper valve is around 40mm. but in very large specimens this may approach 60mm.



Boreotrophon flos Okutani, 1964
MURICIDAE

-300~400m, Kunashir Island, Kuril Islands, 40.1mm., 2009/viii.

Boreotrophon flos is an elegant and fragile muricid species known from northern Japan to Kuril Islands. It appears that most specimens come from around the southernmost islands of Kuril Islands, a disputed area claimed by both Russia and Japan. A rare species, it is very difficult to find specimens with the characteristic upturned wings intact. A carnivorous gastropod, it lives in rather deep water ranging from about -300~800m. Average shell length around 35mm., very large specimens may approach 45mm.



Melapium elatum (Schubert & Wagner, 1829)
STREPSIDURIDAE

-100~150m, Trawled Inhambane, South Africa, 40.1mm., 1996/viii.

With a vivid violet columellar, *Melapium elatum* is a famous and attractive collector's item known from southern Africa. It is quite uncomm.on on the market, especially specimens with good colouration as the intensity of purple vary between specimens. It is a carnivorous / scavenging gastropod with a bathymetric range approximating -20~200m, usually taken by trawling. Average shell length around 45mm., although giants may exceed 65mm. The genus *Melapium* was traditionally considered as strange olive shells and placed in Olividae, but now separated and placed in Strepsiduridae containing only this genus and two species; the other being *M. lineatum* (Lamarck, 1822).



Haliotis laevigata Donovan, 1808 x *rubra conicopora* Péron, 1816
HALIOTIDAE

Farmed, Port Fairy, Victoria, Australia, 132.5mm.

This stunning blue abalone is supposedly a hybrid between the « Smooth Australian Abalone » *H. laevigata* and « Conical Pore Abalone » *H. r. conicopora*, and is a commercially developed hybrid for meat with increased growth rate. Many abalone species readily hybridize with each other, and hybrids between various species are known all around the world. The shell colouration of abalones reflect colouration of food they eat, and the vivid blue colouration in this specimens is caused by colour and chemicals in artificial feeds. Both parent species are algae grazers on hard substrates such as rocks occurring in shallow water down to -40m deep. They are large abalones with average shell length of around 150mm. and maximum length may exceed 200mm. It is rare for hybrids bred by aquaculture to reach large size because they are culled for meat after a certain period of growth. Abalones are considered a delicacy in many cuisines particularly Asian cuisines, and their meat fetch very high prices.



Marginella sebastiani Marche-Marchad & Rosso, 1979
MARGINELLIDAE

Trawled, Pointe des Almadies, Dakar, Senegal, 60.8mm., Collected by local fisherman, 2013/vi.

The « Sebastian's Marginella » is a beautifully spotted margin shell ranging from Mauritania to Guinea in west Africa. It is a carnivorous / scavenging gastropod living on sandy bottom with a bathymetric range of approximately -20~100m. It is very variable in size and although the average shell length is around 50mm, mature shells range from 35mm. to over 70mm. One of many spectacular large, spotted marginellids endemic to west Africa where this family is particularly diverse.



Murex spectabilis Ponder & Vokes, 1988
MURICIDAE

Bohol, Philippines, 121.7mm.

This is a quite uncomm.on murex species best known from shallow waters of Philippines, although its range supposedly extends to Thailand. A carnivorous species like all Murex, it is similar to *Murex pecten* but has only seven spines on the siphonal canal which are rather strongly recurved, notably the most anterior one. The opening of siphonal canal zigzags strongly along the length especially in the posterior part, which also helps in differentiating it from other congeners. Average shell length around 110mm., although very large specimens may approach 140mm.



Spondylus reesianus Sowerby III, 1903
SPONDYLIDAE

-25m, Dived on reef, Davao, Mindanao, Philippines, 95.2mm.

Originally known the Maluku Islands, Indonesia, *Spondylus reesianus* is a striking thorny oyster now known to have a distribution ranging from Japan to Philippines. It is a sessile filter feeder found in moderately deep water, most specimens are collected around -50~200m. It is unique among spondylids to have numerous strong and obvious radial ribs on the shell surface made out of a continuum of fine spines, and thus readily separated from other species. Like many spondylids, young specimens of this species often have spine tips with broad and leafy tips. Although a comm.on species, it is only uncomm. only seen on the market. Usually uniformly orange in colouration; average shell length around 90mm., very large specimens may exceed 120mm.



Galeodea rugosa (Linnaeus, 1771)
CASSIDAE

-400m, On mud bottoms, 5 miles Isla de Alborán, Spain, 96.8mm., 2013/v.

The « Rugose Bonnet » is a large bonnet shell native to northeast Atlantic Ocean ranging from the British Isles to West Africa, as well as West Mediterranean. It is a carnivorous gastropod most likely feeding on echinoderms and other molluscs, and is found between a depth range of about -50~700m. The shell is usually cream to orange in colour and covered by a translucent periostracum when alive. The fragile parietal shield varies in extent and is often badly broken. Average shell length around 80mm., large specimens often exceed 100mm.



Aporrhais serresianus (Michaud, 1828)
APORRHAIIDAE

-500m, Mud bottoms, Isla de Alborán, Spain, 51.5mm., 2013/vii.

The « Mediterranean Pelican's Foot » is an elegant aporrhaid ranging from Morocco to west Mediterranean to Iceland. A comm.on species, it can be found on fine mud between very shallow water up to -800m deep but is mostly seen around -100~300m. It is a specialised detritivore feeding on organic material and algae contained in mud. The digits are rather variable in length and curvedness, and the shown specimen has rather long and recurved ones. While the average shell length is around 40~45mm., giants may exceed 60mm.



Ocenebra inornata (Récluz, 1851)
MURICIDAE

-15m, Dived in oyster bed, Posyet Bay, Primorsky Krai, Russia, 51.2mm.

The « Japanese Oyster Drill » is a muricid famous as an invasive species. Although the native distribution range of this species is from Sakhalin, Russia to northern China, South Korea, and Japan; it has been introduced to North America and western Europe with exports of the Pacific Oyster *Crassostrea gigas* (Thunberg, 1793). It is a major predator of oysters and is widely recognised as a great threat to oyster aquaculture both in native and introduced regions, often causing devastating damage. Its vertical distribution is from intertidal waters down to about -20m deep, and it is comm. only found on rocks or bivalves. Very variable in sculpture and form like many members of genus *Ocenebra*, and the specimen shown has very well developed wing-like varices. Average shell length around 40mm., although large specimens may exceed 55mm.



Lotoria perryi (Emerson & Old, 1963)
RANELLIDAE

Tuticorin, Tamil Nadu, India, 127.1mm.

The « Perry's Triton » is an attractive triton native to Indian Ocean ranging from Sri Lanka to Mozambique. It is a comm.on carnivorous and predatory gastropod living in shallow water ranging from very shallow water up to about -80m deep. Average shell length around 110mm., large specimens often exceed 130mm. It is the type species of genus *Lotoria* and is similar to *L. lotoria* (L., 1758) and *L. grandimaculata* (Reeve, 1844) but can be distinguished from them by the lack of dark spots on the columellar shield, more knobby form, and more regularly spaced pattern on the varices.



Hydatina albocincta (van der Hoeven, 1839)
APLUSTRIDAE

Trawled, Kaohsiung, Taiwan, 56.4mm.

The « White Banded Bubble » is a rather large shelled opisthobranch widely distributed from Japan to New Zealand to South Africa. It is a comm.on species found across wide depth range from intertidal waters down to -100m, but most abundant around -10~20m. It lives on sandy bottoms and is a predatory species feeding mostly on polychaete worms. As is the norm with shelled opisthobranchs the soft part of the animal is much larger than the shell, and in this species it is beautiful with frilly white edges. Average shell length around 40~45mm., very large specimens like the one displayed can exceed 55mm. The most comm.on pattern is with three regular cream bands (shown), but many variations exist.



Takasagovolva honkakujiana (Kuroda, 1928)
OVULIDAE

-100~200m by tangle net, Balut Island, Philippines, 633mm., Nov 2013.

Takasagovolva honkakujiana is a large, rare ovulid and one of the most elegant of all. It was first described from the collection of Honkakuji temple in Wakayama Prefecture, Japan by Dr Tokubei Kuroda, hence the specific name. Honkakuji temple has a history of accumulating shells donated by fishermen for more than two centuries and currently houses a co..

Afficher la suite



Cirsotrema rugosum (Kuroda & Ito, 1961)
EPITONIIDAE

Deep water, Balut Island, Philippines, 56mm.

The « Rugose Wentletrap » is a rare wentletrap well-known for its delicate and beautiful sculpture. A carnivorous gastropod inhabiting sandy to muddy bottoms of rather deep water ranging from about -100 to -400m, it is distributed in the west Pacific and best known from Philippines and Japan. Very variable in size and can range from about 40mm. to over 90mm., although average size is around 60~70mm. Sometimes seem to be confused with *Cirsotrema edgari* (de Boury, 1912), which is similar and also has many blade-like varices but can be easily distinguished by their wavy varices.



Penion maximus (Tryon, 1881)
BUCCINIDAE

Trawled, Lakes Entrance, Victoria, Australia, 240mm.

The « Great Whelk » is a very large buccinid endemic to Eastern Australia including Tasmania. A rather light-weight shell for its size, it possesses strong nodules on shoulder which weakens on the body whorl of mature specimens. Has a thin, brown periostracum when alive; mature specimens often have slightly flared outer lip as in the specimen shown. A comm.on carnivorous gastropod living on sandy bottoms, it is found in quite a wide bathymetric range from about -20~550m but is mostly found around -50~150m. Average shell length around 200mm., although very large specimens may exceed 260mm.



Chicomurex elliscrossi (Fair, 1974)
MURICIDAE

-50m, Minabe, Wakayama Prefecture, Japan, Coll. 2010, 78.1mm.

The « Ellis Cross's Murex » is a member of genus *Chicomurex* native to West Pacific region, with Central Japan as its northernmost limit. A predatory gastropod living in moderate depths, it is most often found on rocky bottoms around -30~150m deep. It is best known from Kii Peninsula, Japan where it is well-known as a bycatch of lobster gillnets and rather common; specimens from other localities seem to be uncommon on the market. A quite scabrous shell, usually has extensive frills but only around the anterior half of the outer lip. Average shell length around 60~70mm., although very large specimens may exceed 85mm.



Monetaria caputdraconis (Melvill, 1888)
CYPRAEIDAE

-2m, Dived, Hanga Roa, Easter Island, Chile, 36.13mm.

The « Dragon's Head Cowry » is a comm.on cowry famous from its endemism to Easter Island and Isla Salas y Gómez, in the easternmost point of the Polynesian Triangle. A beautifully spotted species, it is distinct from the relative *Monetaria caputserpentis* by having black marks between teeth and having no callus in the margin. Although strictly speaking an omnivore like most cowries, it feeds mostly on algal material and is effectively an herbivorous gastropod. It is found mostly on rocky bottoms in intertidal reefs in crevices and under corals and rocks, in very shallow to shallow water less than -30m deep; being most comm.on less than -10m deep. Average shell length around 30~35mm. but it is very variable in size from dwarves as little as 15mm. to giants exceeding 40mm. The population in Isla Salas y Gómez differs from Easter Island population by being smaller in size and having a much paler shell, and is usually recognised as subspecies *M. caputdraconis poppei* (Martin, 1989).



Brechites australis (Chenu, 1843)
PENICILLIDAE

Low tide, Gales Bay, Western Australia, 170.2mm.

The « Australian Watering Pot » is a fascinating bivalve native to Australia. It is member of the peculiar watering pot family Penicillidae, members of which grow a normal shell with two valves like other clams in earlier stages of life but at one stage suddenly switches over to growing a calcareous tube made of highly organised aragonite crystals instead. This is secreted by a thin organic film covering the tube, and the animal is capable of repairing damaged tube. The early shell is not lost but still attached to the tube in opened position (see center image), proving its Bivalvia identity. It gains the comm.on name from the fact that the bottom end (pointing downwards in life) of the calcareous tube has many pores just like a gardener's watering pot, and it can actually function like one if you put water through the top end (where siphon exits, pointing upwards in life). Debris around the tube is often caught as it grows and fuses as part of the shell, like many empty mollusc shells in the specimen depicted. It is a rather comm.on filter feeding species living on soft bottoms of shallow water around -2~10m deep. Average tube length 170~180mm., large specimens may exceed 200mm.



Thatcheria mirabilis Angas, 1877
RAPHITOMIDAE

-200m, Hamamatsu, Shizuoka Prefecture, Japan, 92mm.

The aptly named « Japanese Wonder Shell » is one of the most exquisitely shaped gastropod known. It is said to have inspired many artists and architects, for example Frank Lloyd Wright based the design of Guggenheim Museum on this shell. First described from a Japanese shell brought to George Angas by Charles Thatcher, Angas had great difficulties working out its taxonomic affinities and placed it in a new genus honouring the finder. The holotype is apparently badly damaged and papier-maché was used to repair the outer lip. The particularly angular and scalariform shoulder combined with an elegant shape makes this species truly unique. So unique that until more were found around 1930s, many (e.g., George W. Tryon) thought it was an extreme freak form of something. For many years it was a classic rarity known only from Japan but now it is known to be fairly comm.on in the Pacific ranging from Japan to as far as Western Australia. Part of its early scarcity can be explained by the fact that it is a predatory gastropod inhabiting sandy to muddy bottoms of quite deep water around the depths of -50~400m. Shells of live specimens are even more lovely with a pink hue which fades rapidly after death. Although long considered a turrid, with the recent taxonomic revisions of Turridae it is now placed in Raphitomidae. Average shell length around 70~80mm., very large specimens may exceed 100mm.



Homalocantha anomaliae Kosuge, 1979
MURICIDAE

Philippines, 47.8mm.

The « Anomalous Murex » is a great deep-water rarity only known from Central Philippines. With very loosely coiled whorls and fragile wide-ending spines resembling ginkgo leaves, it is a very peculiar member of the genus Homalocantha. The first specimen was collected by tangle nets in Davao Gulf, and was such a strange shell that it was considered an extreme freak of *Homalocantha scorio* (Linnaeus, 1758) until more specimens were found. Adult specimens in good condition are very rare, and spines in earlier whorls may be retained in very top specimens. It is famous for the large number and wide variety of fakes and doctored specimens made in Philippines and extra care must be taken before purchasing a specimen. Very variable in spine length and development. Most specimens are caught with tangle nets around depths of - 100~500m. Average shell length around 42~47mm., giant specimens may exceed 60mm.



Homalocantha anatomica f. elatensis Heiman & Mienis, 2009
MURICIDAE

-8m, Eilat, Israel, 47mm.

This is a spectacularly spined muricid recently described as a subspecies of the « Anatomical Murex » *H. anatomica* (Perry, 1811) from the Sinai Peninsula. Although sometimes treated even as a full species, it is most likely synonymous with the « Faurot's Murex » *H. fauroti* Jousseume, 1888 from the same region ranging from Red Sea to Mascarene Basin, which is in turn regraded as a synonym of *H. anatomica* -- a very widely distributed murex found across the Indo-Pacific region. *H. anatomica* is an extremely variable murex, the spine formation varies greatly from specimen to specimen, although the colouration is mostly white or yellowish white based it is sometimes very colourful, particularly the form known as Pele's Murex *H. anatomica* f. *pele* (Pilsbry, 1918). It is a carnivorous murex feeding mostly on bivalves comm.on on coralline reefs in shallow water of about -2~40m deep. Average shell length around 40~50mm., although very large specimens exceed 60mm.



Scaphella dubia (Broderip, 1827) f. *kieneri* Clench, 1946
VOLUTIDAE

-100m, Louisiana, USA, 232.5mm.

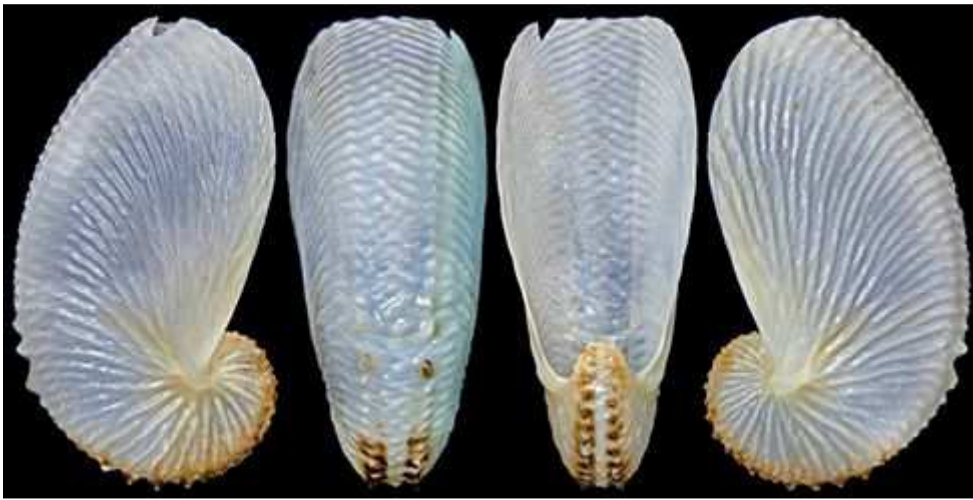
The « Kiener's Volute » is a particularly elegant form of the « Dubious Volute », ranging from west Florida to Mexico, most specimens appear to originate from Florida or Louisiana, USA. A classic rarity, this form was made famous by S. Peter Dance who recognised it as one of the fifty « Rare Shells » (1969), when it was still thought to be a valid full species. Although now known to be rather comm.on in its habitat, very little seem to be fresh caught nowadays with vast majority of specimens circulating the market coming from old collections. It is therefore still uncomm.on, and exceptionally large specimens over 200mm. like the one shown are rare. It is a carnivorous gastropod living in rather deep water around depths of -50~500m, mostly on mud bottoms. Average shell length around 120~140mm., although exceptionally large specimens may exceed 220mm.



Argonauta nouryi Lorois, 1852
ARGONAUTIDAE

By fishing net, San Carlos, Sonora, Mexico, Coll. 1990, 95.6mm.

The « Noury's Paper Nautilus » is probably the rarest of all extant argonautids. It is a pelagic octopus and the 'shell' shown here is in fact an eggcase made by a female. The eggcase of this elegant species is easily separated from others by its elongate shape, relatively smooth keel, and wide aperture. It is best known from a limited range from west coast of Mexico to Panama, although its actual range is much wider in the Pacific Ocean reaching the Coral Sea and the holotype actually comes from the Marquesas Islands. The females with eggcases have been reported to aggregate to form a chain, perhaps to reduce swimming efforts or to increase chance of encountering a male. Argonautid females are known to be able to control the buoyancy of eggcase much like nautilids although to much shallower depth (maximum about -10m). It is a medium-sized paper nautilus with average eggcase length approximating 60~70mm., although very large specimens like the one shown here may exceed 90mm.



Argonauta nodosus Lightfoot, 1786
ARGONAUTIDAE

Rio Grande, Southern Brazil, Coll. 1990, 170mm.

The « Nodose Paper Nautilus » is a pelagic octopus and the second largest of half-a-dozen or so species of extant argonautids. The 'shell' shown here is actually a calcareous eggcase produced by a specialised pair of dorsal tentacles in females before egg laying. The female resides in the shell for a while; the shell is often stranded on beach, sometimes with the female inside. It exhibits extreme sexual dimorphism and males are only a fraction of females' size and are much shorter lived. Males transfer sperm to females using a specialised arm, the hectocotylus, which detaches and launches to the female during mating. Unlike most octopuses the argonauts live close to sea surface in the open ocean and are predators with a salivary gland capable of injecting prey with poison. This species is very widely distributed around the globe in all warm, tropical waters but is most abundant in Southern Australia. A rather rare Brazilian specimen is shown here, specimens from South America often has protruding keels in the aperture near the umbilicus which the Australian specimens lack. Average length of eggcase around 150~170mm., although exceptionally large specimens may exceed 250mm.



Buccinum pemphigus Dall, 1907
BUCCINIDAE

-150~300m, In shell trap, 125km south of Magadan, Sea of Okhotsk, Russia, Coll. vii/2013, 125mm.

This is a large species of cold water whelk ranging quite widely from Alaska, USA to China. It has an attractively pustulated periostracum, which is light to dark brown and quite easy to peel off. A carnivorous / scavenging species mostly found in moderately deep water around -100~500m, it is rather variable in shell thickness like many of its congeners. Although a relatively comm.on species in its habitat, it is quite uncomm.on on the market and spectacular specimens like the one shown with large size and full periostracum are rare. Average shell length approximately 90~100mm., very large specimens may exceed 130mm.



Spondylus foliaceus Schreibers, 1793
SPONDYLIDAE

-50m, By tangle net, Zamboanga, Philippines, 51.7mm.

The « Leafy Thorny Oyster » is a widely distributed thorny oyster found throughout the Indo-Pacific from Japan to East Africa to Australia but best known from Philippines. Although characterised by spines which broaden at the tip, it is an extremely variable species like many spondylids. Colour varies from pale to orange to brown, and the formation of spine also differs from specimen to specimen. Adult specimens tend to be uniformly coloured, while juveniles like the one shown here often have attractive contrasting colouration between spines and shell. It is a comm.on sessile filter-feeding species found most comm.only in the depth range of -10~100m. Average size around 90-100mm. including spines, very lage specimens often exceeds 140mm.



Trigonostoma scala (Gmelin, 1791)
CANCELLARIIDAE

Trawled, Mbour, Petite-Côte, Sénégal, Coll. vi/2013, 23.6mm.

The « Withrow's Nutmeg » is an intricately sculptured nutmeg shell native to west Africa. The comm.on name originates from a quite well known synonym, *Trigonaphera withrowi* Petit, 1976. Best known from Senegal, it is a carnivorous species inhabiting shallow to moderate depths around -2~50m. A comm.on species, it is variable in colouration and pattern and may be pale and uniform or rather dark patterned like the specimen shown. Average shell length around 20~25mm., large specimens may approach 30mm.



Pterochelus acanthopterus (Lamarck, 1816)
MURICIDAE

In mud at extremely low tide, Back Beach, Dampier, Western Australia, 74.9mm.

The « Thorny Winged Murex » is a large and attractively winged muricid ranging from Western Australia to Torres Strait. It is locally fairly comm.on but uncomm.on on the market in good condition. A predatory gastropod living among rocks on sandy to muddy bottoms, it is found in quite a wide bathymetric range from very shallow to moderate depths around -5~200m. Very variable in colouration from white to bright orange to dark brown. Average shell length around 70~80mm., very large specimens may approach 100mm.



Bathybembix bairdii (Dall, 1889)
CALLIOTROPIDAE

-880m, Trawled on mud, Coos County, Oregon, USA, 47.4mm.

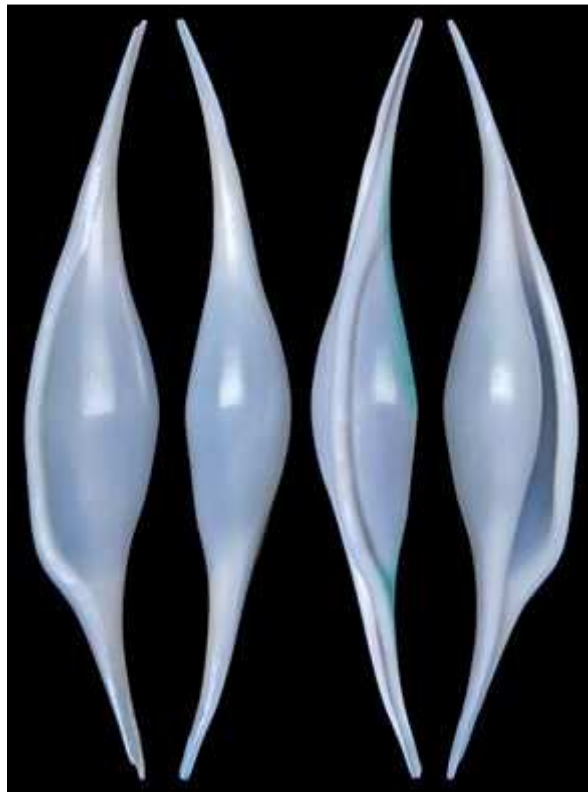
The « Baird's Spiny Margarite » is a top shell with attractive beaded sculpture much sought-after by collectors. It is a deposit-feeder found in deep water ranging from approximately -500~1500m depth, and although it is comm.on in its habitat due to the inaccessible depth it is uncomm.on on the market. Best known from Washington, USA to Mexico; but its range is vast and extends from the Bering Sea all the way to Chile. It has a thin, glossy, yellowish-green periostracum and a white, fragile ostracum. Although originally considered a trochid, it is currently placed in another family Calliotropidae. Average size about 40mm., very large specimens may exceed 50mm.



Calcarovula longirostrata (Sowerby I, 1828)
OVULIDAE

-100m, Aliguay Island, Philippines, 43.4mm.

The « Long-Snouted Volva » is an elegant ovulid with extremely elongated extremities. A very widely distributed species ranging from Japan to South Africa, it is a comm.on species and most specimens come from the Philippines. Although quite variable in length of posterior and anterior canals, it may be distinguished from other ovulids by its slender, recurved extremities and a distinct ridge running across the middle of body whorl. Although usually pure white and often semi-transparent, some specimens have orange pattern or tinge like the holotype and these are rather rare. Like most ovulids it is carnivorous and ectoparasite of octocorals, particularly *Euplexaura crassa* and *Calicogorgia granulosa*, and is found mostly in the depth range of - 20~150m. Average shell length around 40~50mm., very large specimens may exceed 70mm.



Mitra belcheri Hinds, 1843
MITRIDAE

-45m, Dredged, Mexico, 98.2mm.

The « Belcher's Mitre » is a famous mitre with strongly corded sculpture. It ranges from the Gulf of California, Mexico to Panama and is a sought-after collector's item best known from Mexico; it was once considered rare but is known to be comm.on nowadays, although large specimens in good condition are still uncomm.on. The shell is covered by a thick black periostracum, but the ostracum is cream in colouration; a pair of specimens with and without periostracum makes a very contrasting and visually attractive display. It is a carnivorous gastropod living in moderate depths, ranging from about -30m to -80m. A very large mitre, its average shell length is about 100mm. but giants often exceed 130mm.



Lyria delessertiana (Petit de la Saussaye, 1842)
VOLUTIDAE

-50m, Trawled on sand, Nosy Bé, Madagascar, Coll. 2003, 49.13mm.

The « Delessert's Lyria » is an attractive volute endemic to northwest Madagascar. A rarity back in the days, this colourful species is now fairly comm.on nowadays. It is a predatory gastropod living on sandy to muddy bottoms of sea grass beds, and are found in shallow water from just below the tide line to about -50m deep. Average shell length about 50mm., although very large specimens may approach 70mm.



Odontocymbiola pescalica Clench & Turner, 1964
VOLUTIDAE

-600~650m, Dredged, Falkland Islands, 78.2mm.

The « Pascal Volute » is a graceful rarity native to South Atlantic Ocean from Uruguay to Falkland Islands. It is a subantarctic volute found in deep water around -400~800m, and carnivorous like all volutes. The early whorls are often eroded, exposing the jade-like layer underneath. One of many deep water sub-Antarctic and Antarctic volutes from this region difficult to obtain due to the great depths they inhabit. Average shell length around 80mm., very large specimens may approach 115mm.



Harpovoluta charcoti (Lamy, 1910)
VOLUTIDAE

-200~300m, From Russian research vessel, South Shetland Islands, Antarctica, Coll. Late 1980s, 45mm.

The « Charcot's Volute » is an unusual volute native to the Southern Ocean, Antarctica and its adjacent waters. A carnivorous species, it exhibits an extremely interesting commensal relationship with two actiniid anemone species *Isosicyonis alba* (Studer, 1879) and *I. striata* Rodríguez & López-González, 2008. One single polyp of anemone completely covers the shell, and the volute effectively mobilises the anemone to food sources. A few anemone-volute relationships are known in sub-Antarctic to Antarctic waters but this is perhaps the most striking. However, not all specimens of this volute carry an anemone. This species has a circum-Antarctic distribution and is found in a wide bathymetric range between -30~1500m but is most common in depths less than -400m. Shell paper-thin and covered by a light brown periostracum; the animal is very much larger than the shell. Although locally common, it is rarely seen on the market due to its remote habitat. Average shell length about 40mm., very large specimens may exceed 50mm.



Guildfordia yoka Jousseaume, 1888
TURBINIDAE

-200~300m, By tangle net, Siquijor Island, Visayas, Philippines, 85.5mm.

The « Yoka Star Turban » is an astonishing turbinid resembling a star-burst pattern native to waters from the southern half of Japan to Philippines. A prized collector's item due to its attractive shape, it is comm.on especially from tangle nets in the Philippines but large specimens with spines intact are uncomm.on. It is an omnivorous gastropod which feeds ..

Afficher la suite



Lyria beauii (Fischer & Bernardi, 1857)
VOLUTIDAE

-130m, By traps, Port-Louis, Guadeloupe, Coll. 2012, 58mm.

The « Beau's Lyria » is a classic rarity among the volutes endemic to the West Indies and Lesser Antilles in the Caribbean Sea. One of S. Peter Dance's fifty choice Rare Shells (1969); this lovely volute was discovered by Comm. andant Beau, whom it is named after, near the island of Marie-Galante. It is a carnivorous species living in rather deep water around the depth of -100~150m, and is still a scarce species today. Greatly variable in size and less in colouration, although a darker coloured form is known as *Lyria beauii* f. *archeri* (Angas, 1865). Average shell length about 50mm. but can range from dwarves less than 40mm. to giants more than 70mm., and the current world record size is a staggering 82.6mm. from Guadeloupe.



Provocator corderoi Carcelles, 1947
VOLUTIDAE

-200~300m, Trawled by fishing boat, Uruguay, 58mm.

The « Cordero's Volute » is a rare sub-Antarctic volute ranging from southern Uruguay to Argentina to Falkland Islands. Vast majority of records are north of 55°S, and it is not found in circum-Antarctic waters. It is a carnivorous species living on sandy to muddy bottoms in a depth range between -100~700m. Like many other cold water volutes of this region, it is reported to have symbiotic relationships with commensal anemones, particularly the actiniid anemone *Isosicyonis alba* (Studer, 1879). The shell is pale white and covered by a very thin light yellowish brown periostracum which is rarely preserved in specimens, the specimen shown here is unusual in retaining it. Protoconch often glazed over like its congeners. With an average shell length of about 50mm., it is by far the smallest extant species in genus *Provocator*. Very large specimens may approach 70mm.



Circomphalus disjectus (Perry, 1811)
VENERIDAE

Scuba dived, Port Lincoln, South Australia, Ex-Coll. Peter Clarkson, 53mm.

The « Wedding Cake Venus » is an extremely beautiful venus clam with many rows of delicate frilled lamellae endemic to Southeastern / Southern Australia and Tasmania. Understandably famed for its attractiveness, it is highly sought-after by collectors. It is a filter-feeding species which lives in shallow intertidal and subtidal waters buried in sand and mud, preferring sheltered locations. A comm.on species in its natural habitat, specimens with intact lamellae are uncomm.on. Although often beached, beached specimens often have very worn out lamellae. Average shell length approximately 55mm., very large specimens may approach 70mm.



Phyllocoma scalariformis (Broderip, 1833)
MURICIDAE

Intertidal, Perlas Island, Panama, 29.8mm.

The « Scaled False Triton » is a member of the peculiar muricid genus *Phyllocoma* which superficially resemble tiny versions of large ranellids complete with strong, flared varices. It has strong spiral ribs and slightly weaker axial ribs making the shell have a latticed appearance. An uncomm.on species, it is not often offered on the market. It is a carnivorous species native to rocky substrates in intertidal to very shallow water around -10m depth of East Pacific Ocean from Mexico to Ecuador, including the Galápagos Islands. Average shell length around 30mm., very large specimens may reach 38mm.



Nautilus macromphalus Sowerby, 1848
NAUTILIDAE

-200m, By traps, New Caledonia, 155mm.

The « Bellybutton Nautilus » is one of five currently recognised species of extant nautilids, and is native to Southwestern Pacific Ocean around New Caledonia, Loyalty Islands, and Northeastern Australia. It is easily distinguished from its congeners by the wide open umbilicus which characterises this species. Like other nautilids it is capable of changing its depth by controlling buoyancy of the shell. It is generally a scavenger but sometimes also a predator. During daytime it dwells in rather deep water up to about -500m depth but rises to shallow water less than -20m deep to feed during the night. A locally protected species in New Caledonia, it is locally comm.on in its habitat but uncomm.on on the market. It is the smallest extant nautilid with an average shell length of 150-160mm., although specimens up to 180mm. have been recorded.



Boreotrophon candelabrum (Reeve, 1848)
MURICIDAE

-15m, By scuba diver on oyster bed, Posyet Bay, Primorsky Krai, Russia, 47.1mm.

The « Candelabrum Trophon » is a very variable cold water muricid ranging from Japan Sea to Sakhalin, Russia. The frequency and size of winged varices differ greatly, both slender form with small wings and wide form with elaborate wings (shown here) are known. It is a predatory gastropod mainly feeding on bivalves and inhabits shallow water from intertidal zone down to about -30m deep. An uncomm.on species on the market, the large-winged form being more uncomm.on than the small-winged form. Average shell length about 40-45mm., very large specimens may exceed 55mm.



Angaria poppei K. Monsecour & D. Monsecour, 1999
ANGARIIDAE

Masbate, Philippines, 55.6mm.

The « Poppe's Delphinula » is a colourful angariid native to Malaysia, Indonesia, and Philippines; best known from the Visayas, Philippines. A highly variable species, specimens differ greatly in spine length and comes in many colour forms, the two most comm.on are green with black spines and red with white spines. It is a herbivorous gastropod living in moderate depths, most comm.on around the depth of -10~40m. It prefers sandy bottoms with coral patches where there is strong current and is often found together with spondylids. A comm.on species, long-spined specimens are less comm.on than short-spined ones. Average size around 40-45mm., large specimens like the one shown often exceeds 55mm.



Chondropometes magnum elisabethae Torre & Bartsch, 1938
ANNULARIIDAE

Lying at base of cliffs or large boulders, « Giant's Cave », near the exit to Hoyo de los Helechos, Valle de San Carlos, Pinar del Río, Cuba, Coll. Simon Aiken, viii/2008, 21.2mm.

This is a seldomly seen cave-dwelling annulariid landsnail endemic to Cuba. The animal exhibits a very curious behaviour of hanging from cave walls with a single thread of mucus, presumably a predator evasion strategy. It has very frequent delicate lamellae on shell surface, in a regular manner. The apex is deciduous and falls in mature specimens, a comm.onplace in annulariids. Curiously the operculums remains with the shell in most dead specimens, which is also known from other annulariids. Although locally comm.on, it is rarely offered on the market due to its remote habitat. Average size about 20mm., large specimens may exceed 25mm.



Provocator palliatus (Kaiser, 1977)
VOLUTIDAE

-400m, From Russian Trawler, Falkland Islands, Coll. 1984, 114.3mm.

A scarcely seen sub-Antarctic to Antarctic paper volute, *Provocator palliatus* is endemic to the Scotia Sea which borders South Atlantic Ocean and Southern Ocean. It is a deep water carnivore and inhabits sandy to muddy bottoms in depths ranging from around -200~1000m. Due to its remote distribution vast majority of specimens seen on the market originate from Antarctic trawlers around the Falkland Islands prior to 1990s, and as a consequence it is very rare and fetches high prices. In most specimens the protoconch is glazed over, a comm.on feature of genus *Provocator*. The lip is slightly thickened and flared in mature specimens. Average size about 90mm., very large specimens such as the one shown here may exceed 110mm.



Provocator mirabilis (Finlay, 1926)
VOLUTIDAE

Dredged from extremely deep water, Chatham Rise, New Zealand, 100.7mm. The « Astonishing Volute » or the « Golden Volute » is an elegant deep water volute endemic to sub-Antarctic Pacific waters around New Zealand. It is a locally not uncomm.on predatory gastropod living on muddy bottoms and has a rather wide bathymetric range between approximately -200~1500m. Unlike other members of genus Provocator it has a rather thick shell and no columellar folds, and is thus often placed in its own genus Iredalina. The protoconch is usually glazed over and forms a posterior spike-like structure, which varies in length and is rarely preserved completely. Colour uniform, varying from pale to rather dark orange; a scarce white form occurs Auckland Islands. Adults have thickened lip and the average shell length is about 100mm., but giants exceeding 160mm. (with long, well preserved spike) are known to exist.



Septa peasei (Beu, 1987)
RANELLIDAE

Nuku Hiva, Marquesas, French Polynesia, 35.1mm.

The « Pease's Triton » is an uncomm.on triton endemic to Polynesia. Characterised by a single, protruding white rib on the varix, this species is best known from the Marquesas where it is much more comm.on than other parts of the Polynesia where it is scarce. Rather rarely offered on the market due to its restricted range like many species endemic to this area. It is a shallow water predatory gastropod inhabiting depths less than -20m. Average shell length about 30mm., giants such as the specimen depicted here may exceed 35mm.



Volutharpa ainos Kuroda & Kinoshita, 1956
BUCCINIDAE

-400~450m, Trawled, Rausu Bay, Nemuro, Hokkaido, Japan, Coll. viii/2002, 43.2mm.

This is a rather rare deep water buccinid endemic to northern Japan around the depths around -400~700m. It has paper-thin shell partly due to living in deep water where calcium carbonate dissolves more readily, and instead has a much thicker insoluble periostracum. The hairy periostracum has a complex lacy structure and is certainly one of the most beautiful in the genus. It is a carnivorous / scavenging species, with an average shell length of about 40mm. but very large individuals can exceed 55mm.



Gloripallium speciosum (Reeve, 1853)
PECTINIDAE

Dived, Okinawa, Japan, 61.1mm.

The « Specious Scallop » is a delicate and colourful scallop from Western Pacific with a range from southern Japan to Indonesia to Northwestern Australia. Extremely variable in colouration and patterning but the sculpture is usually consistent. Somewhat similar to *Gloripallium pallium* (Linnaeus, 1758) from the same region but it has undivided scales on ribs as opposed to divided to 2~3 in *G. pallium*. May also be confused with *Gloripallium spiniferum* (Sowerby I, 1835) from Polynesia but *G. spiniferum* has less ribs (around 7) than *G. speciosum* (around 11). It is a rather comm.on filter-feeding species living in moderately shallow water around the depth of -10~50m. Specimens with complete, undamaged scales uncomm.on. Average size around 55mm., very large specimens may exceed 65mm.



Haliotis elegans Koch in Philippi, 1844
HALIOTIDAE

-5~8m, Under limestone rocks in weed beds, Jurien Bay, 160km north of Perth, Western Australia, 62.9mm.

The « Elegant Abalone » is an uncomm.on abalone endemic to Western Australia. It is a nocturnal algae grazer living beneath rocks and in rock crevices of subtidal waters down to depths of about -30m. Rather consistent in shape and sculpture but is slightly variable in colour and pattern. The sculpture is distinctive and characterises this species. Average shell length about 80mm., but specimens in excess of 110mm. are known to exist.



Provocator pulcher Watson, 1882
VOLUTIDAE

-200m, Trawled, Kerguelen Islands, French Southern and Antarctic Lands, Coll. vii/1999, 91.7mm.

The « Handsome Paper Volute » is a very famous classic rarity among the volutes and one of S. Peter Dance's fifty choice « Rare Shells » (1969). Discovered by the renowned HMS Challenger expedition of 1872-1876, Dance noted this as the second most remarkable mollusc found by the expedition, after the legendary *Guivillea alabastrina* (Watson, 1882). It is a subantarctic to antarctic volute virtually only known from waters around two island groups on the Kerguelen Plateau, southern Indian Ocean: the Kerguelen Islands and the Heard Island and McDonald Islands (HIMI). A carnivorous species, it inhabits sandy to muddy bottom and has a enormous bathymetric range including depths between -155~3240m. One of the most sought-after volutes, it is still very rare on the market today due to lack of new materials from its remote habitat; most specimens in circulation were taken by research vessels before or during the 1990s. It is unique among the genus *Provocator* to have a stepped shoulder and is thus unmistakable. The outer lip is slightly thickened in mature specimens, and is often flared. Average shell length around 80mm., very large specimens may exceed 100mm.



Clinopegma chikaoi Tiba, 1968
BUCCINIDAE

Trawled, Central Sea of Okhotsk, Russia, Coll. Russian fisherman, 136.2mm.

The « Chikao's Whelk » is a large cold water whelk endemic to the Okhotsk Sea. A quite variable species in strength of spiral structure, and also differs in colouration of the periostracum from light brown to almost black. The periostracum is thin and has tendency to peel when dried. Its distribution is more northerly than most other large cold water buccinids of the same region and therefore most specimens come from Russian boats instead of Japanese ones. A locally uncomm.on species, it is scarcely offered on the market and very rarely available in exceptional condition like the specimen shown here. It is a carnivorous / scavenging species found in rather deep water around -100~300m in depth. Average shell length around 110~120mm., giant specimens may exceed 135mm. It is named after Mr Chikao Toba, the first director of the « Sea and Shells Museum » in Japan. He worked closely with Mr Ranji Tiba who named this species.



Boreotrophon alaskanus Dall, 1902
MURICIDAE

-150~300m, In shell trap, 78 miles south of Magadan, Sea of Okhotsk, Russia, Coll. local whelk fisherman vii/2013, 50.7mm.

The « Alaska Trophon » is a rather scarce trophon native to North Pacific Ocean with a quite wide range from northern Japan to Alaska, USA. Somewhat variable in spine development, it is a very fragile species and good quality specimens are rare. It is a predatory gastropod living in rather deep water around -100~500m. Common size around 45mm., giant specimens may approach 60mm.



Scaphander lignarius (Linnaeus, 1758)
SCAPHANDRIDAE

-45m, Trawled by fishermen, Liverpool Bay, Western England, United Kingdom, Coll. iv/2005, 53.3mm.

The « Woody Canoe Bubble » is a comm.on, large bubble shell with a range extending from Norway and Iceland to Morocco including the Mediterranean Sea. It is a carnivorous gastropod which feeds on polychaetes and bivalves, mostly found on sandy bottoms around -20~80m depth but can range from sublittoral zone down to -700m. Most interestingly, it has a gizzard consisting of a modified muscular esophagus with two large and one small shelly plates. The gizzard functions as a mill to grind food. The specimen shown is missing the small gizzard plate. The soft parts are much larger than the shell and cannot retract completely, which is comm.onplace in shelled opisthobranchs. Average shell length around 55mm., giants may exceed 70mm.



Pteropurpura macroptera (Deshayes, 1839)
MURICIDAE

-15m, Dived in silt/sand and sides of rocks, Monterrey, California, USA, 45mm.

The « Frill-Wing Murex » is a comm.on muricid with three large blade-like varices per whorl ranging from California, USA to Baja California, Mexico. It is a predatory gastropod primarily feeding on other molluscs living in shallow water around the depth of -10~30m. Extent of varix development highly variable but nearly always with 'wavy' edge, the shown specimen is typical of the species. Most specimens brown in colour but can also be pale or uncomm.only brown with pale rays. Comm.on shell length around 40~50mm., giants may rarely exceed 65mm.



Lambis robusta (Swainson, 1821)
STROMBIDAE

-15m, Scuba dived, Pueu, Tahiti, French Polynesia, 130.43mm.

The « False Spider Conch » is a bizarre spider conch endemic to Southeast Polynesia, characterised by the black tips on digits. It lives on sandy or coral rubble bottoms in shallow water around -10~30m depth, and is a herbivore feeding mainly on algae and other organic particles. A locally uncomm.on species, it is rather rare on the market due to its restricted range. It is usually well disguised with overgrowths in habitat and difficult to find. Like all spider conchs it has very strong foot and is capable of jumping action. Average shell length around 130mm., giants may exceed 150mm. Most similar to *Lambis scorpius* (Linnaeus, 1758) and *Lambis indomaris* Abbott, 1961, but is easily distinguished from them by the much less « wavy », less curved digitation, and the black digit tips.



Chicoreus damicornis (Hedley, 1903)
MURICIDAE

-100m, Trawled Cape Moreton, Queensland, Australia, 36.4mm.

The « Long Horned Murex » is a moderately uncomm.on muricid endemic to Eastern Australia from Queensland to Victoria. It is characterised by the bifurcated tip on the longest shoulder spine, and may grow to 80mm. in shell length. A subtidal carnivore, it lives in moderately deep water around -30~250m. Rather variable in colouration, may be uniformly white / fawn or with distinct spiral brown bands.



Scaphella junonia (Lamarck, 1804)
VOLUTIDAE

Trawled by shrimp boat, Gulf of Mexico, Florida, USA, 137.2mm.

The « Juno's Volute » is perhaps the most famous of all volutes and certainly one of the most striking with many rows of large, regular brown dots. One of S. Peter Dance's fifty « Rare Shells » (1969), it was very rare before mid-1900s and without doubt the most coveted of all volutes back then. It is native to moderately deep water around -20~150m from North Carolina to Gulf of Mexico, and is most famously known from Sanibel Island, Florida where it is known as « Pride of Sanibel » and very rarely washed up on shore. A carnivorous species living on sandy bottoms, its average shell length is around 100-110mm. while giants like the one shown here may exceed 130mm. Quite a variable shell and many forms have been described. It is a thin-lip species normally with badly damaged or filed lip at large size and is also prone to growth scars; the giant specimen shown here is unusual in having an unfiled lip with only three tiny chips.



Poirieria zelandica (Quoy & Gaimard, 1833)
MURICIDAE

-15m, Dived, Ohope Beach, Bay of Plenty, New Zealand, 45mm.

The « New Zealand Murex » is an eccentric muricid endemic to New Zealand. Very prominently spinous and also typically has long siphonal canals which increases its perceived spyness. The development of spines is actually very variable however, and many specimens are short spined. It is a predatory gastropod known from a wide range of depths ranging from 0 to -540m, but is most comm.on in dethps around -20~200m. Average shell length about 50mm., but giants may reach 65mm.



Pellicaria vermis (Martyn, 1784)
STRUTHIOLARIIDAE

-30m, Dredged, Omaha, New Zealand, 46mm.

The « Small Ostrich Foot » is a member of the ostrich foot family endemic to a small part of New Zealand ranging from the Cook Strait to North Island. It is the only extant species in genus *Pellicaria* (although a few subspecies exist) and many fossil specimens are known from Pliocene. It gains its comm.on name from the fact that it is smaller than the closely related « Large Ostrich Foot », *Struthiolaria papulosa* (Martyn, 1786). It uses its large gill for filter feeding and is locally not uncomm.on from low tide down to depths around -100m. The shown specimen is slightly imm.ature, mature specimens have thickened inner and outer lip and may exceed 55mm. in shell length.



Panopea glycymeris (Born, 1778)
HIATELLIDAE

-80m from mud, Malaga, Spain, 205mm.

The « European Geoduck » is a very large bivalve native to the Mediterranean Sea and Northwest Africa, most specimens coming from Spain. This species is well known in the fossil record since around the Triassic and fossil specimens are comm.on, but live collected fresh specimens are quite uncomm.on on the market. It is a filter feeding species with a very long muscular siphon and lives buried, mostly in mud, in depths around -10~100m. One of the largest Mediterranean bivalves with an average shell length around 200~230mm., but giants can exceed 300mm.



Epitonium imperiale (G. B. Sowerby, 1844)
EPITONIIDAE

-10m, Dived in anemones, Garden Island, West Australia, 30mm.

The « Imperial Wentletrap » is a beautiful and relatively large wentletrap with exceptional frequency of costae. Native to the Southwest Pacific, this uncommon species is best known from Australia. It is a predatory gastropod living in sandy bottoms of shallow water about -2~20m depth and feeds exclusively on tissue of anemone. Average size about 25~30mm., giants may grow to 40mm.



Trochia cingulata (Linnaeus, 1771)
MURICIDAE

False Bay, South Africa, 25.9mm.

The « Corded Rock Shell » is a very uniquely sculptured muricid endemic to South Africa. The best known and perhaps the most comm. only seen three corded form is unmistakable, although the cords are quite variable and can actually be anything from zero to four in number. It is a carnivore mainly preying on bivalves found from intertidal down to shallow water of about -30m. Average size about 30mm. in shell length but large specimens often exceed 40mm.



Siratus pliciferoides (Kuroda, 1942)
MURICIDAE

-100m, East China Sea, 115.6mm.

The « Japanese Spike Murex » has a wide range in the West Pacific from south Honshu, Japan to Australia to New Caledonia, and is a comm.on carnivore inhabiting sandy bottoms about - 50~200m deep. Like many members of its genus, this species is very variable in varix development and specimens differ in spine strength and webbedness. An uncomm.on, deep water form has large wing-like webbed varices. Large specimens may reach 150mm. in shell length.



Erosaria engleri (Summers & Burgess, 1965)
CYPRAEIDAE

Dived in shallow water, Easter Island, Coll. xi/2012, 23.1mm.

The « Father Engler's Cowry » is a famous and sought-after cowry best known from Easter Island. A beautiful cowry with distinct white spots, it is endemic to two islands in the easternmost point of the Polynesian Triangle: Easter Island and Isla Salas y Gómez. Although long considered a rare cowry, it is not uncommon in its habitat and its apparent rarity on the market was mostly due to its restricted range. Much easier to obtain nowadays, its current market rarity is perhaps best described as uncommon. It is an omnivorous gastropod living in rocky crevices of reefs from depths of around 2~40m, and has been reported to live in association with sea urchins. It is named in honour of Father Sebastian Engler, a well known pioneering missionary priest of Easter Island. Average adult shell length is about 22~25mm. and the record size is 28.8mm.



Tylospira scutulata (Gmelin, 1791)
STRUTHIOLARIIDAE

Trawled, Coffs Harbour, New South Wales, Australia, 31.2mm.

An endemic species of Eastern Australia, this is an example of the « Ostrich Foot » family, a very small family of about five species virtually restricted to Australia, New Zealand, and Southern Ocean. This species is the only extant species in genus Tylospira and is unusual in the family in having a very smooth shell. It relies on filter-feeding with its gills for food and lives in sandy bottoms around the depths of -5~90m. Uncomm. only offered on the market but it is in fact locally comm.on. Average size about 40mm., giants may exceed 60mm.



Ophioglossolambis violacea (Swainson, 1821)
STROMBIDAE

Mauritius, 1213mm.

The « Violet Spider Conch » is one of the most famous classic rarities of the conchology world, and perhaps the most beautiful of the spider conchs. Renowned for the deep violet hue inside the aperture, which distinguishes it from all other spider conchs. It is generally considered the most desirable strombid of the Indian Ocean, and was one of the fifty species chosen by S. Peter Dance in 'Rare Shells' (1969). Vast majority of specimens have been collected from Mauritius (especially Saint Brandon), and it appears to be endemic to the Mascarene Basin. Although it is probably not really a rare species in its locality, it is a rare species on the market even today due to limited access to its constrained habitat and the fact that shell collection is restricted by law in Mauritius. Development of digitation and length of siphonal canal highly variable. Immature specimens have unfilled digitation, lacks yellow spots on the outer lip, and has much weaker lirae in the aperture. Average shell length around 110-120mm. but giant specimens may approach or even exceed 140mm.



Ampulla priamus (Gmelin, 1791)
VOLUTIDAE

Dredged, Almeria, Spain, 67.1mm.

The « Spotted Flask » is a rather large volute ranging from West Medineteranean (Alboran Sea) to Northwest Africa. It is a representative volute of the Mediterranean region which is home to extremely few volutes. The spotted pattern is highly variable and there are both extensively spotted and completely unspotted forms. It is a comm.on carnivorous gastropod found in moderate depths around -50~250m, on sandy and muddy bottoms. Average size is about 60-70mm. but giants may grow as large as 100mm.



Pterynotus martinetus (Röding, 1798)
MURICIDAE

-20m, Dived in the night, Balicasag Island, Bohol, Philippines, Coll. i/2011, 37.7mm.

The « Fenestrate Murex » is a very colourful and beautiful muricid. This species appear to undergo colour change as growth progresses and comes in two forms, a smaller pink form and a larger yellow form shown here. The yellow form was known under the name of *Murex fenestratus* Dillwyn, 1817 but is generally accepted today as larger adults of the pink form, although some still consider it a separate species. The yellow form is rare and usually above 30mm. in size and may approach 60mm., while the pink form is not uncommon and below 30mm. in shell length. Interestingly, the yellow form is generally found in shallower depths (-5~50m) than the pink form (-50~300m). It is a predatory gastropod with a vast range from West Indian Ocean and Red Sea across to Philippines, Japan, and Hawaii. Specimens of the yellow form usually have lost the intricate scales and frills between varices, but the shown specimen is superb and retains them.



Sveltia lyrata (Brocchi, 1814)
CANCELLARIIDAE

Trawled, Ndayane, Petite-Côte, Sénégal, 41.0mm. quality fresh dead collected vi/2013.

The « Lyrate Nutmeg » is an uncomm.on cancellariid native to West Africa ranging from Mauritania to South Africa. One of the easier to obtain species in genus *Sveltia*, which contains very unusual cancellariids including the elusive *S. gladiator* (Petit, 1976). A carnivorous gastropod, *S. lyrata* lives in moderate depths around -40~120m. Average size about 40mm., although they may grow to about 55mm.



Cymatium ranzani (Bianconi, 1850)
RANELLIDAE

Ras Hafun, Somalia, 156mm.

The « Ranzani's Triton » is a famous rarity among the tritons and one of S. Peter Dance's fifty Rare Shells (1969). Although described in 1850, it has a remarkable history of being « lost » for more than a century in literature until re-discovered by K. J. Grosch when diving in Mozambique in 1953. The remarks on Grosch's find was published by William K. Emerson and Anthony D'Attilio, who identified the species, in 1962. The angular but low shoulder and two distinct dark patches on the parietal callus together easily separates it from other *Cymatium* species. A predatory gastropod, it inhabits shallow water to about -40m depth and ranges from Northern Arabian Sea to Mozambique including Southern Red Sea. Average shell length is about 160mm., but giants are known to exceed 240mm.



Campanile symbolicum Iredale, 1917
CAMPANILIDAE

-5~8m by scuba diver, Crawling in sand among rock ribbon weed, Canal Rocks, Southwestern Australia, 163mm.

The « Bell Clapper » or « Giant Creeper » is a large gastropod endemic to Southwestern Australia. It is the only surviving member of family Campanilidae, which was abundant in the Tertiary Period and included one of the most gigantic gastropods *Campanile giganteum* (Lamarck, 1804) which is known to reach 60cm in shell length. The family has changed very little over time and this extant species is remarkably similar to its extinct relatives. It is a herbivorous species not uncommon in sandy bottoms of intertidal to shallow sublittoral waters. The record size is 244mm., although the average shell length is about 150mm.



Drupa elegans (Broderip & Sowerby I, 1829)
MURICIDAE

Manihi Atoll, Tuamotu Archipelago, 163mm.

The « Elegant Pacific Drupe » is a famous rarity among the genus *Drupa*. It is characterised by an unmistakable dark ring in the aperture which is unique to this species. It is greatly sought-after by collectors but very difficult to obtain as it is endemic to a small part of the French Polynesia and is rarely offered especially in fresh condition with operculum like the specimen shown. It is a carnivore living on intertidal rocks, and usually entirely encased in thick, hard overgrowth which takes a lot of effort to clean off. Adults range from 15 to 25mm. in shell length.



Rotaovula hirohitoi Cate & Azuma in Cate, 1973
OVULIDAE

Japan, 6.8mm.

Although small, the intriguing sculpture and enchanting colouration make this species perhaps the most beautiful of all extant ovulids. Most ovulids are carnivorous and are specialist ectoparasites of octocorals including this rare species, which feeds exclusively on the tissues of its host *Acanthogorgia inermis* (Hedlund, 1890) which it lives on. It is found around the depth range of -20~200m, and with an average size range of 5~8mm. one of the smallest ovulids. Ranges from Japan to Philippines, the amount of purple colour on the shell is variable but specimens from the Philippines tends to be more purple. It is named after Hirohito, the Emperor Showa of Japan, who was also a zoologist best known for his research in the taxonomy of hydrozoans.



Babelomurex latipinnatus (Azuma, 1961)
MURICIDAE

Philippines, 35.1mm.

The « Wide-Spined Latiaxis » is an uncomm.on member of the subfamily Coralliophilinae native to waters ranging from Japan to Vietnam to Philippines. Extremely variable in spine development but usually has wide, plate-like spines which merges with adjacent spines that may grow flat or curled upwards. The depicted specimen has unusually extensive spines and it is rather rare to find a specimen like this. Shell colour also quite variable usually from pale yellow to pale brown, but may even be pale purple. It is a deep water coral specialist found around the depth of - 100~200m, and large examples may exceed 40mm. in size.



Latiaxis pilsbryi Hirase, 1908
MURICIDAE

Philippines, 34.7mm.

The « Pilsbry's *Latiaxis* » is a fascinating beauty and classic rarity in the subfamily Coralliophilinae. It has very fragile spines and vast majority of specimens are seriously damaged, live taken specimens in superb condition like the one depicted are very rare. Similar to juvenile *Latiaxis mawae* (Gray, 1834) but spines has less tendency to curl upwards. The adults are easily differentiated as the body whorl of *L. pilsbryi* is much less detached from previous whorls compared to *L. mawae*. With a distribution from Japan to Vietnam to Northern Australia, this species is a deep water coral specialist inhabiting water depths of about -100~300m. Somewhat variable in shell colouration from white to light brown. Large specimens may exceed 40mm. in size.



Hirtomurex teramachii (Kuroda, 1959)
MURICIDAE

Keelung, Northeast Taiwan, 36.3mm.

The « Teramachi's Latiaxis » is one of the most intricately sculptured beauties in the subfamily Coralliophilinae. A classic rarity historically best known from Japan and Taiwan. Although now more specimens are turning up from Philippines and East China Sea, the scaly sculpture is easily destroyed during cleaning and specimens in exceptional condition such as the one shown is still very hard to come by. It ranges from Japan to Australia, and is a deep water coral specialist found around the depth range of -150~400m. It is named after Mr. Akibumi Teramachi, a famous 20th Century Japanese shell collector as well as painter. Very large specimens may approach 60mm. in shell length.



A superb specimen of Hirtomurex teramachii (Kuroda, 1959), MURICIDAE, Keelung, Northeast Taiwan, 36.3mm.



Pteropurpura centrifuga (Hinds, 1844)
MURICIDAE

-50m, Dredged by fishermen, San Jose Island, Panama, 52.3mm.

The « Centrifugal Murex » is a winged muricid native to moderately deep waters around - 30~150m from west Mexico to Peru including Galápagos Islands. The shell is uniform in colour from pale to light brown with yellow-brown tan, and the tip of the shoulder spine curves slightly. A carnivorous species, it may exceed 90mm. in shell length. Although moderately comm.on, it is uncomm.on to find a clean and close to perfect specimen.



Nodipecten fragosus (Conrad, 1849)
PECTINIDAE

Dived, Florida, USA, 79.63mm.

This species has long been thought to be a synonym of *Nodipecten nodosus* (Linnaeus, 1758) and called the « Lion's Paw Scallop », but is now recognised as a separate species. *N. fragosus* has a range extending from North Carolina, USA down to the Gulf of Mexico, whereas *N. nodosus* is now considered a Caribbean species. *N. fragosus* has 7-8 strong radial ribs as opposed to *N. nodosus*' 9-11 and are easily told apart. Both valves of *N. fragosus* tends to have knobby and finely sculptured, much more so than *N. nodosus*. Although *N. fragosus* is a locally comm.on species, specimens vary greatly in the extent of nodule development (shown specimen has poor nodules), and those with extensive nodules fetch high prices. It is a filter feeding species inhabing moderate depths around -35~150m.



Angaria tyria (Reeve, 1842)
ANGARIIDAE

Dived, Shark Bay, West Australia, 65.7mm.

The « *Tyria Delphinula* » is a peculiar angariid endemic to Western Australia. Adults have no long spines unlike most congeners and instead have thousands of very fine and short hollow spines, although juveniles often still possess long spines. Shell white with a characteristic broad purple band which is lacking in rare albinistic specimens. An uncommon angariid, it can reach 70mm. in size but averages at about 50mm. and the specimen depicted is a giant. It is a grazing herbivore living in shallow water up to depth of about -30m.



Cymia tectum (Wood, 1828)
MURICIDAE

-2.5~3m, Dived, Coiba Island, Panama, 51.3mm.

With numerous strong spiral ridges and large nodules, this is a very attractive rock shell native to the Pacific coast of Costa Rica to Ecuador. Rather variable in size reaching 75mm., the nodules are more sparse with increase of size and tends to point downwards in very large specimens. Also variable in colouration from cream to dark brown. It is a shallow water carnivore inhabiting rocky surface mostly less than -5m deep.



Tropidophora cuvieriana Petit, 1841
POMATIIDAE

On and between limestone rocks, 20km west of Ambilobe, Diana Region, Madagascar, 65mm.,
Coll. x/1994.

The « Cuvier's Torpid Snail » is the largest species and the type species of genus *Tropidophora*, and also one of the most spectacular with its distinct double-keel sculpture. Perhaps the most famous of all Malagasy landsnails, it is endemic to Northwestern Madagascar and is a ground living herbivorous snail. Thought to be extinct until 1980s due to complete lack of supply of live-taken specimens for many years, but now some living populations have been re-discovered. Uncomm.on on the market and most specimens seen are from old collection. Up to about 65mm. in size but averaging at around 50mm., the shown specimen is a very large one. It is named after the French 18-19th Century naturalist Georges Cuvier.



Marginella goodalli Sowerby I, 1825
MARGINELLIDAE

Trawled Ndayane, Petite-Côte, Sénégal, 28.33mm.

The « Goodall's Marginella » is a gorgeous margin shell native to West Africa from Morocco to Guinea. It is a carnivore / scavenger which lives around depths of -10~80m. It is quite variable in size, a comm.on feature of many species in its family, and adult shell size ranges from 20mm. to more than 50mm. The depicted specimen is a rather small one.



Glabella pseudofaba (Sowerby II, 1846)
MARGINELLIDAE

Trawled, Niditah, Petite-Côte, Sénégal, 29.1mm., Coll. local fisherman vi/2013.

The « Queen Marginella » is one of the most eye-catching West African marginellids. The stunning pattern varies to a certain extent, and so does the spire height. An uncomm.on medium sized species which grows to 40mm., it ranges from Mauritania to Guinea. It is a carnivorous / scavenging gastropod found around the depth range of -10~50m.



Cassis tessellata (Gmelin, 1791)
CASSIDAE

Trawled, Mbour, Petite-Côte, Sénégal, 125.1mm., Coll. local fisherman vi/2013.

The « West African Helmet » is a large cassid native to West Africa with a range extending from Senegal to Angola. Although its average size is said to be about 180~200mm. specimens readily available on the market are typically only about 120mm. An uncomm.on species, large specimens above 200mm. are quite rare and the record size is at 312mm. It is a shallow water carnivore that lives from very shallow water up to about -50m deep.



Annularia pulchra (Wood, 1828)
ANNULARIIDAE

In limestone crevices, Dry Harbour Mountain, Jamaica, 29mm.

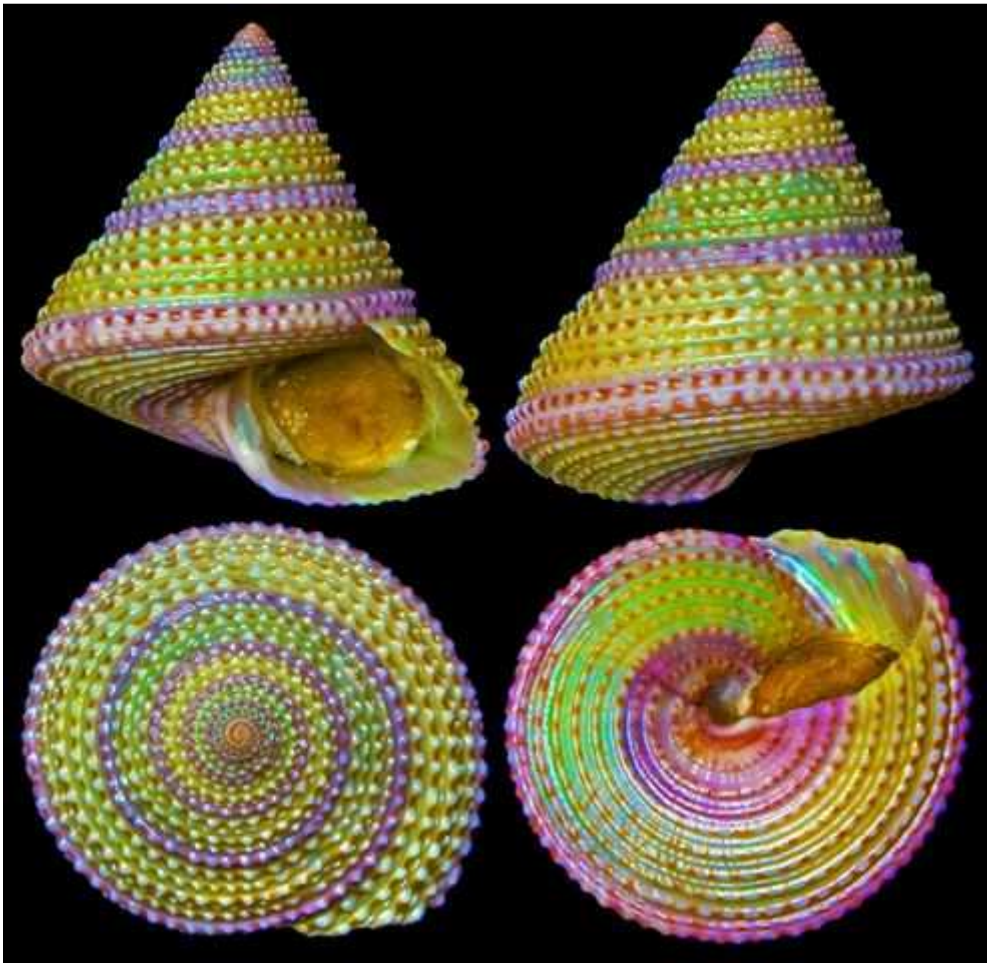
This is the largest extant species of the family Annulariidae, and with fantastic star-burst lip surely one of the most spectacular. Furthermore, the intricate microstructures on the shell surface produces a silky texture difficult to capture with photography. It is one of many hundreds of landsnails endemic to Jamaica and lives nocturnally in limestone karsts. Like most members of this family, the apex is deciduous and naturally falls when the snails mature. Average size around 28-30mm. Rather rare on the market due to its inaccessible habitat, like many other landsnails from this region.



Calliostoma annulatum (Lightfoot, 1786)
CALLIOSTOMATIDAE

-50~60m on kelp, Monterey Bay, California, USA, 23.7mm.

With alternate hues of gold and purple, the « Ringed Top » is one of the most attractive top shells in the world. It is a herbivorous gastropod feeding on giant kelp leaves around -20~100m deep, and has a rather wide distribution on the Atlantic coast of Americas from south Alaska, USA to Baja California, Mexico. Majority of specimens on the market however comes from California, USA. Large specimens may reach 35mm. Although a comm.on species, its price has risen recently due to its beauty causing a high demand. The lovely colouration fades to a certain extent over the years.



Hexaplex stainforthi (Reeve, 1843)
MURICIDAE

Dampier, Western Australia, 50.7mm.

The « Stainforth's Murex » is a comm.on muricid native to Northwest Australia, although some records exist from as far north as the Maluku Islands in Indonesia. It is a shallow water carnivore and can be found in intertidal waters. There exists an albinistic form which has white varices instead of black, and is more uncomm.on. May exceed 70mm. in shell length.



Pleuroploca clava (Jonas, 1846)
FASCIOLARIIDAE

Pamban, India, 112.8mm.

The « Persian Horse Conch » is a large fasciolariid native to the Indian Ocean, with most specimens originating from Sri Lanka and India. A rare species until recent years and better known under the synonym *Pleuroploca persica* Reeve, 1847, today it is still uncomm.on. A predatory gastropod, it lives in shallow water down to about -20m. Average size 100~115mm., although occasionally giant specimens may exceed 130mm.



Ancistrolepis vietnamensis Sirenko & Goryachev, 1990
BUCCINIDAE

Deep water, South China Sea, 97.2mm.

This is a deep-water carnivorous species endemic to -400~700m of the South China Sea and is a highly distinctive member of the genus *Ancistrolepis* characterised by strong spiral ridges. First described from Vietnamese waters (hence the specific name) and for some years it was one of the most representative rare species of Vietnam. In recent years however, Chinese ships have brought to surface a vast number making it now fairly comm.on, and price has dropped more than tenfold. It has a very thick shell for the genus and adult specimens have thickened lip, a feature not seen in most congeners. Has a fairly thick periostracum, but most specimens from Chinese dealers have it removed and it is uncomm.on to find a specimen with original periostracum. Large specimens may exceed 110mm.



Ancistrolepis (Ancistrolepis) vietnamensis
Sirenko, B.I. & V.N. Goryachev, 1990

Shell size 70 - 105 mm.
South China Sea

My shell is 104 mm., but i would like that Chong Chen could tell me something more about this beautiful shell!!!!!!



Chicoreus cervicornis (Lamarck, 1822)
MURICIDAE

-40~50m, Trawled, Kupang, Timur Island, Indonesia, 48.2mm.

The « Deer Antler Murex » is a muricid with very extensively branched spines which ranges from Indonesia to Northern Australia. It is a comm.on predatory gastropod living in shallow to moderate depths around -10~150m. Development of spines rather variable, and highly branched specimens such as the one depicted are sought-after by collectors. Average size about 55mm., although very large specimens may exceed 70mm.



Semicassis whitworthi (Abbott, 1968)
CASSIDAE

-150~200m, crayfish trap on flat reef, Cervantes, Western Australia, 75.8mm.

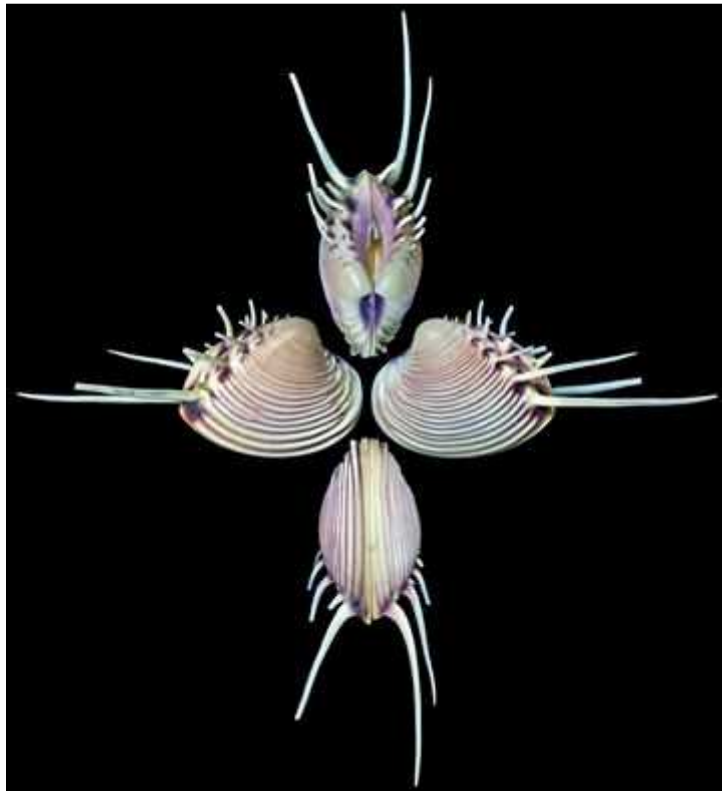
The « Whitworth's Bonnet » is a rare cassid endemic to Western Australia. Much sought-after by collectors, it is a deep-water carnivore found mostly around depths of -100~200m and usually taken by lobster traps or trawls. The numerous beaded cords are characteristic of this species, and unique among the genus *Semicassis*. The depicted specimen is rather large for the species, but may very rarely exceed 80mm.



Hysteroconcha lupanaria (Lesson, 1831)
VENERIDAE

-25m, dived, Baja California, Mexico, 54.4mm.

The « Panamic Comb Venus » is an immediate standout among bivalves because of its long spines protruding from the posterior slope of each valve. It is very unusual for a non-spondylid bivalve to have long spines, and in this species younger specimens tends to have longer spines. It is a locally common burrowing filter feeder living on sandy bottoms from intertidal to -3m depth. Distributed in the Eastern Pacific Ocean from Mexico to Peru, it is very similar to its congeners *H. dione* (Linnaeus, 1758) and *H. multispinosa* (Sowerby II, 1851). *H. dione* tends to have shorter spines and is distributed only in the Western Atlantic Ocean, whereas *H. multispinosa* is also an Eastern Pacific species but has more prominent, erect ribs and more numerous spines.



Blaesospira echinus infernalis (Torre & Bartsch, 1941)
ANNULARIIDAE

In the shade, crevice of large boulder, high on Sierra de la Penitencia, Viñales, Pinar del Río Province, Cuba, 8.4mm., operculum dried inside, Coll. Simon Aiken, viii/2008.

With specific and subspecific names literally meaning the « spiny snail from hell », this species must be one of the most strikingly ornamented landsnails known. A tiny species 5~10mm. in size, it is endemic to two high altitude localities in Pinar del Río Province, Cuba. Mature shells develop a magnificent « star-burst » lip but naturally loses the apex, although very rarely adult specimens retaining the apex are found. Not often offered because of the difficulty to reach their habitat.



Turbo jourdani Kiener, 1839
TURBINIDAE

By diver, Esperance, Western Australia, 212mm.

The « Jourdan's Turban » is the second largest extant turban shell, just behind *Turbo marmoratus* Linnaeus, 1758 which holds the record. The specimen depicted is quite large for this not uncomm.on species, but they may reach 240mm. This species is endemic to Western and Southern Australia. It inhabits shallow water to about -30m depth just offshore along rocky reefs, it is a grazing herbivore. Most specimens seen on the market have filed lips because it is a thin-lipped species almost always with chipped lip. This is especially true for large ones over 200mm., and finding a specimen with natural lip is quite difficult.



Trigonostoma scalare (Gmelin, 1791)
CANCELLARIIDAE

Balocasag Island, Philippines, 253mm.

The « Triangle Nutmeg » is a uniquely shaped and sculptured nutmeg shell like many in its genus. Once ago rare and better known under the synonym *Trigonostoma pellucida* (Perry, 1811), it is today a rather comm.on species mostly originating from Philippines. A widely distributed carnivorous species ranging from Sri Lanka to Australia, it inhabits offshore waters of moderate depths, most comm.only around depth of -10~30m and may reach 40mm. in shell length.



Cabestana spengleri (Perry, 1811)
RANELLIDAE

-10~15m, Dunalley Bay, Tasmania, Australia, 136.4mm.

The « Spengler's Triton » is a large triton native to southern & eastern Australia and New Zealand (including Kermadec Islands). It is a comm.on carnivorous species in both rough and calm waters up to about -30m depth living among rocks and seaweed. The specimen shown here is wider than usual and is « double-lipped ». Large specimens may exceed 160mm. in shell length.



Naquetia barclayi (Reeve, 1858)
MURICIDAE

Balut Island, Philippines, 78mm.

The « Barclay's Murex » is a classic rarity among the muricids. First described from two specimens collected by Sir David Barclay in St Brandon, Mauritius, it was chosen by S. Peter Dance as one of his fifty « Rare Shells » (1969). It remained very scarce until late twentieth century but like many other Indo-Pacific classic rarities it became rather common when its stronghold was found in the Philippines. It has a very wide range covering the Indo-Pacific and lives offshore on rocks in about -50~200m depth. Also well known under the synonym *Naquetia annandalei* (Preston, 1910).



Neptunea decemcostata (Say, 1826)
BUCCINIDAE

Deep water, Portland, Maine, USA, 64.5mm., Coll. vii/1981.

The « New England Whelk » is a comm.on North Atlantic buccinid native to North America ranging from Newfoundland, Canada to North Carolina, USA. Numerous strong spiral ridges makes this an attractive and unforgettable species. Colour of shell and ridge is rather variable, sometimes distinct and sometimes not (also fades over time). A carnivorous species, it lives in a very wide range of water depths ranging from about -5m to more than -600m. Good quality specimens with intact protoconch is uncomm.on, large specimens can reach 100mm. Previously considered a subspecies of *Neptunea lyrata* Gmelin, 1791, it is now considered a full species in its own right.



Ocenebra erinacea (Linnaeus, 1758)
MURICIDAE

-40~60m, Malaga, Spain, 52.53mm.

The « European Sting Winkle » is a comm.on murex quite widely distributed throughout the Mediterranean and Black Sea, its range also includes Northwest Europe and Northwest Africa. Very variable in sculpture, varix strength, and varix formation. The specimen shown here is the form *O. erinacea* f. *hanleyi* (Dautzenberg, 1887) with strong, angular varices. It is a carnivore occurring in variable depths ranging from intertidal to -150m. The specimen shown is a quite large example, although this species may attain shell length of more than 60mm.



Vokesimurex hirasei (Dautzenberg in Hirase, 1915)
MURICIDAE

Cebu, Cebu Island, Philippines, 85.53mm.

The « Hirase's Murex » is a carnivorous species found in rather deep water about -100~300m from south Honshu, Japan to New Caledonia. Although rather comm.on, it has a very long and delicate posterior siphonal canal which is broken in most specimens, and specimens with complete siphons such as the one depicted is uncomm.on. Very large specimens may exceed 110mm.



Pagodula lochi Marshall & Houart, 2011
MURICIDAE

-550m (-300 fathoms), Sydney, New South Wales, Australia, 34.23mm.

This is a recently described new species of uncomm.on murex endemic to New South Wales, Australia. It lives in very deep water around -400m and attains maximum size of 36mm. The depicted specimen is in very good condition for this species which has very fragile varices.



Voluta musica Linnaeus, 1758
VOLUTIDAE

-30~40m, Puerto Francés, Venezuela, 93mm.

The « Comm.on Music Volute » is one of the most famous and representative species of Volutidae. Aptly named from its intriguing pattern which resembles the musical staff, it is a comm.on species in the moderate depths of southern Carribean. Greatly variable in size, both length (very large specimens may exceed 100mm. in shell length, although the average is about 70mm.) and more notably breadth. Also variable in colouration and pattern, some specimens are almost completely golden although the characteristic music staff pattern is always present. Depicted here is a very large specimen for the form *V. musica* f. *guinaica* Lamarck, 1811, from old collection.



Austrotrophon catalinensis (Oldroyd, 1927)
MURICIDAE

Deep water, Avalon, Santa Catalina Island, California, USA, 53.7mm.

This is my other specimen of the « Catalina Trophon », smaller and not as good condition as the one posted earlier. Although once rather comm.on in southern California when deep dredging was permitted, after the dredge ban it is only obtainable from old collection. Due to this, its market value has rocketed as it is today a rarely seen on the market and very difficult to obtain.



Forreria belcheri (Hinds, 1843)
MURICIDAE

-5~10m, dived, Los Angeles (Harbour Region), California, USA, 100.8mm.

The « Giant *Forreria* » is a large muricid comm.on in the shallow water of California, USA to Baja California, Mexico. A carnivorous gastropod feeding mostly on bivalves such as oysters, it can exceed 160mm. in shell length. Rib development variable and often broken, the shown specimen is quite good in condition for the species.



Ancistrolepis hikidai Kuroda, 1944
BUCCINIDAE

-700m, Rausu, Hokkaido, Japan, 85.2mm., Coll. 13/vi/1981, Female specimen.

The « Hikida's Whelk » is a rare deep water whelk native to Hokkaido, Japan, the Sea of Okhotsk, and Kuril Islands, occurring mostly between depths of -100~500m. Very similar to *Ancistrolepis gramm.atus* (Dall, 1907) which generally lives in shallower water (-100~300m), it differs by having more numerous spiral ridges which are narrower and slightly weaker. This is especially clear when the specimen is compared in the umbilical view. *A. hikidai* also tends to have a slightly broader spire than *A. gramm.atus*.



Nucella lamellosa (Gmelin, 1791)
MURICIDAE

Low tide, Barkley Sound, Vancouver Island, Canada, 37.9mm.

The « Frilled Dog Winkle » is an abundant muricid found in intertidal to subtidal (up to about - 50m) waters of the west coast of North America. An extremely variable species, specimen greatly varies in development of frills, colouration, pattern, size, shell thickness and height; and individuals living in same area can be very different from one another. The specimen shown here has extremely well-developed frills and is more stout than usual. It is a predatory gastropod and mainly preys on bivalves and barnacles; may exceed 80mm. in shell length.



Spondylus americanus Hermann, 1781
SPONDYLIDAE

-30~37m (-100~120 ft), Boca Raton, Florida, USA, 160mm.

The « Atlantic Thorny Oyster » is a large thorny oyster native to the Atlantic coast of the Americas, ranging from North Carolina, USA to Brazil. Like most thorny oysters, it is very variable in colouration (white to orange to purple) and spine development. Specimens taken from locations shielded from currents usually have much longer spines than those from exposed locations. Although a comm.on species, highly sought-after close-to-perfect long spined specimens are not easy to obtain and can comm.and high prices. It is a sessile filter feeder living around depth of -15~50m.



Harpa gracilis Broderip & G. B. Sowerby I, 1829
HARPIDAE

Mataiva Atoll, Tuamotu Archipelago, French Polynesia, 19mm.

The « Graceful Harp » is one of the great rarities of the genus *Harpa* native to the Polynesia region (although there are also records from Clipperton Island). Today it is probably the second rarest *Harpa* on the market (the rarest being *Harpa goodwini* Rehder, 1993 from Hawaii). It is a small harp shell, maximum shell length is about 40mm. The only *Harpa* species with a white protoconch, it is easily differentiated from *Harpa amouretta* Röding, 1798 on that basis. The specimen shown has a hole and is either very fresh dead or a broken live collected shell, and has better colouration than most specimens seen on the market.



Tudivasum zanzibaricum (Abbott, 1958)
TURBINELLIDAE

By fishing boat, Nungwi, Zanzibar Archipelago, Tanzania, 51.5mm.

The « Zanzibar Tudicula » is a classic rarity among the vase shells. As the name suggests it is endemic to rather deep waters of the Zanzibar Archipelago. In addition to long shoulder spines, adults develop a thick and glossy parietal shield which may be white or yellow, but most specimens available on market for reasonable price are juvenile specimens lacking the shield. Although much easier to obtain today, adult specimens are still rather rare. Very large specimens may exceed 60mm. in shell length.



Ancistrolepis gramm.atus (Dall, 1907)
BUCCINIDAE

-200m, Hokkaido, Japan, 116.7mm.

The « *Gramm.atus* Whelk » is the most famous of all Japanese cold water whelks and surely one of the most majestic buccinids. A rare species endemic to Hokkaido and the Sea of Okhotsk, vast majority of specimens come from Hokkaido. Although there are a few other similar Japanese buccinids, this species has the strongest spiral ridging. It is a carnivorous gastropod living in rather deep water around -150~400m and shell length may reach 120mm. Has thick, dark periostracum typical of the genus, and the ostracum is pure white.



Conus crocatus Lamarck, 1810
CONIDAE

-15~20m, Olango Island, Cebu, Philippines, 66.9mm., Coll. vii/2013.

The « Saffron Cone » used to be a rare species until the late 20th Century and was selected by S. Peter Dance as one of his fifty « Rare Shells » (1969). It is today however only uncomm.on and may be obtained at a fraction of its value in the old days. Widely distributed in the Indo-Pacific from Japan to East Africa, it is a hunting carnivore like other cones. Most specimens have significant growth scars, and large perfect specimens are still quite scarce.



Vasum capitellum (Linnaeus, 1758)
TURBINELLIDAE

-5m, Plage de Bois Jolan, Sainte-Anne, Guadeloupe, 49.6mm.

The « Caribbean Vase » is a comm.on vase shell found throughout the southern Caribbean. Development of spines and sculpture on the shell is very variable depending on the environment where an individual lives, specimens from rough waters are typically very worn whereas specimens from calm waters (such as the one shown) often show extensive sculpture and well-developed spines. It is a carnivorous species living in shallow water up to -10m depth, and can grow to more than 70mm. in shell length.



Trophon geversianus (Pallas, 1774)
MURICIDAE

-10m, Strait of Magellan, Chile, 67.4mm.

The « Gevers Trophon » is a large comm.on trophon species widely distributed in the South Atlantic waters of South America. Famous for being extremely variable, some specimens have elaborate frills and lattice while others completely lack them; colour also varies from white to dark brown. A carnivore living in relatively shallow water but empty shells have been found from more than -600m deep.



Austrotrophon catalinensis (Oldroyd, 1927)
MURICIDAE

About -100m, Santa Barbara Channel, California, USA, 72.2mm.

The « Catalina Trophon » is a very rare and elusive trophon found in waters around -50~100m deep from southern California to Mexico, with majority of specimens originating from California. A highly sought-after collector's item among the trophons, it is perhaps one of the rarest shells of California. The depicted specimen is unusual in being actually wider than tall (72.2mm. vs 71.2mm.), most specimens are more slender.



Busycon carica (Gmelin, 1791)
BUCCINIDAE

Low tide (-0.9m) in front of oyster bed, Simpson's Creek, Nassau Sound, Florida, USA, 163.5mm., Leg. Jeff Ward 3pm 22/vii/2013. Female specimen.

The « Knobbed Whelk » is a large comm.on species (often >200mm.) native to the North Atlantic coast of the USA and is the state shell of New Jersey and Georgia. A carnivorous subtidal species mainly feeding on bivalves, it migrates between very shallow water to depths of about -50m across seasons. A very variable shell, its shoulder keel / knobs can range from virtually absent to very pronounced as in the specimen shown. This species lays egg cases in a chain, which is sometimes called « Mermaid's Necklace ». Its meat is edible and is comm.ercially quite important both in USA and exported.



Bufonaria foliata (Broderip, 1826)
BURSIDAE

Tanzania, 86mm.

The « Filled Frog Shell » is an uncomm.on bursid distributed across East Africa to South Africa. It used to be considered as a subspecies of *Bufonaria crumena* (Lamarck, 1816), but is now regarded as a separate species. Mostly found around depth range of -5 to -170m, it is a carnivorous / scavenging species.



Nautilus pompilius Linnaeus, 1758
NAUTILIDAE

-300~400m, Palawan Island, Philippines, 118mm.

The « Chambered Nautilus » is an extremely famous mollusc, for having changed relatively little through the last 500 million years and for its shell, which is a pressure resistant (~800m depth) deep-diving device. It is divided into many chambers, and the animal can control its depth by emptying or filling the chambers using osmosis. The multi-chambered shell is also famous for showing a fine example of logarithmic spiral in nature when sliced in half. It is a scavenger / carnivore living in relatively shallow water down to depths of -700m. Its large distribution range covers the Andaman Sea, Japan, and Australia.



Pterynotus bipinnatus (Reeve, 1845)
MURICIDAE

Olango Island, Cebu, Philippines, 34.5mm.

The « Pinnacle Murex » is very similar to *Pterynotus elongatus* (Lightfoot, 1786) but smaller and the spire concaves quickly near the apex. It is a shallow water species distributed widely in the West Pacific, south of Honshu, Japan.



Harpa kajiyamai Habe, 1970
HARPIDAE

Balut Island, Philippines, 51.13mm.

The « *Kajiyama's Harp* » is a beautiful harp with yellow-orange ribs. Widely distributed throughout the Indo-Pacific, most specimens originate around Balut Island. It is a carnivore living on sandy bottoms up to nearly ~200m deep. It can be distinguished from closely related *Harpa harpa* (L., 1758) by having smooth lower outer lip as opposed to digitated one. A very similar species, *Harpa goodwini* Rehder, 1993, is reported from Hawaii and is a rare endemic there.



Lyncina nivosa (Broderip, 1827)
CYPRAEIDAE

Phuket Island, Thailand, 61.7mm.

The « Cloudy Cowry » is a highly variable cowry known from India to Malaysia, although most specimens come from Thailand. Used to be very rare until early 1900s, it was selected as one of the fifty « Rare Shells » by S. Peter Dance (1969). It is variable not only in size but also in pattern, and although the species is comm.on today specimen with clear, uniform « snowy » spots are still uncomm.on.



Bolinus brandaris (Linnaeus, 1758)
MURICIDAE

South Coast of France, 71.3mm.

The « Purple Dye Murex » is a comm.on Mediterranean muricid famous for being the source of Tyrian purple or royal purple dye. The Tyrian purple is obtained from mucus secreted from the gastropod's hypobranchial glands, which is clear at first but turns purple upon contact with air. The ancient Phoenicians used this dye as early as 1600BC, and as it was a very expensive dye the colour purple often became symbol of imperial families. Distributed across Mediterranean and Northwest Africa, it is a carnivorous gastropod which inhabits sandy bottoms of shallow water.



Micromelo undatus (Bruguière, 1792)
APLUSTRIDAE

In tide pool on reef, Itapuã Beach, Salvador, Brazil, 10mm. (Coll. B. Linhares, viii.2001).

The « Miniature Melo » is a lovely opisthobranch gastropod that is not uncommon throughout the Caribbean and its adjacent regions. Like the norm for shelled opisthobranchs, its soft part is very large compared to the shell and cannot retract completely into the shell. With white markings and a golden fringe, the semi-transparent looking soft parts of this species is stunningly beautiful, perhaps more so than the shell. It is carnivorous and lives in very shallow water.



Turbo sarmaticus Linnaeus, 1758
TURBINIDAE

Low tide, Jeffreys Bay, South Africa, 88.3mm.

The « South African Turban » is a comm.on turbinid endemic to South Africa. It is easily recognisable from its strangely and extensively sculptured operculum and a dark patch near the columellar. Although a comm.on species, most specimens exported are polished to a great extent to reveal the attractive nacre layer and it is surprisingly difficult to obtain a specimen in natural condition such as the one shown here. It is a grazer living on rocks of shallow water and is a representative species of the South Africa province.



Polymita picta (Born, 1778)
HELMINTHOGLYPIDAE

On tree, Baracoa, Cuba, 32.2mm.

The « Painted Snail » is one of the most famous, attractive, and sought-after collector's items among landsnails; and a representative endemic species of Cuba. It is very variable in colouration from light blue to yellow to black and pattern from unstriped to multistriped, and many subspecies/form/variation names have been given to different types. A range of different variations of this species makes a truly wonderful display. Shown here is a very large specimen of the most well-known yellow form of the nominal *P. p. picta*. Although common, its population has dwindled in the recent years due to factors such as environmental destruction and overharvesting for ornament making.



Conus bullatus Linnaeus, 1758
CONIDAE

-100~200m, Pakilwaso, Balut Island, Philippines, 66.53mm.

The « Bubble Cone » is a famous cone which used to be considered very rare until recently. With beautiful and very variable colouration and pattern, it is still highly sought-after by collectors today. With a very wide distribution range ranging from the Mascarene Basin to Hawaii, it is a fish eater found from intertidal zone to about -240m in depth. Most specimens come from the Philippines where it is not uncomm.on. It is often washed ashore after typhoons, unlike closely related species such as *Conus cervus* Lamarck, 1822 which live in considerably deeper water and still rare.



Bolma rugosa (Linnaeus, 1767)
TURBINIDAE

-50m, Saronikos, Attica, Greece, 59.7mm.

The « Rough Star Turban » is a large turbinid found in the Mediterranean Sea and its adjacent regions. Its golden operculum is called the « Eye of Santa Lucia » and has been much prized in jewelry making. A grazing species inhabiting depth ranging from very shallow water up to about -100m, it is rather variable in strength of shoulder spines and sculpture.



Tricornis oldi (Emerson, 1965)
STROMBIDAE

Ras Hafun, Somalia, Coll. 1988, 113mm.

The « Bill Old's Conch » is one of the greatest collector's items in Strombidae. Characterised by a chocolate stripe inside the aperture, it is endemic to Somalia and Oman where it is rarely found in shallow water. It was named after Bill Old (then scientific assistant at AMNH), probably the first person to notice its scientific novelty, by his supervisor Dr William K. Emerson. It is very variable in lip development and most specimens are quite worn. Perfect specimens are still very scarce even today.



Colus terraenovae Bouchet & Warén, 1985
BUCCINIDAE

Gulf of Maine, 52.5mm.

Depicted here is a rare buccinid found in deep water (-100m plus) Canada, in the North Atlantic Ocean. It is seldom seen in collections, and live collected specimens, such as the one shown here, seems to be especially scarce.



Io fluviatilis (Say, 1825)
PLEUROCERIDAE

Tennessee River, USA, 46.53mm.

The « Spiny River Snail » is an attractive freshwater gastropod endemic to the Tennessee River and its affluents in the USA. Since 1960 This species has served as the emblem of the American Malacological Society. It is a grazer living in streams down to depth of -1.5m, preferring rapid flowing and well oxygenated water. Extent of shoulder spine development varies greatly. Once widespread and comm.on, now it is however extirpated from most part of its original range due to pollution and anthropogenic damage to its habitat. It is currently listed as an endangered species by the IUCN Red List.



Conus bengalensis (Okutani, 1968)
CONIDAE

Andaman Sea, Thailand, 119mm.

The « Glory-of-Bengal » is a gorgeous cone species endemic to the Bay of Bengal and Andaman Sea, where it is moderately rare. Most similar to the other two « glory-of » cones, « Glory-of-the-Sea » *C. gloriamaris* Chemnitz, 1777 and « Glory-of-India » *C. milneedwardsi* Jousseume, 1894; this species can be distinguished from them by height of spire (intermediate of the three species), being smaller in size (average size 100mm.), more slender, and difference in pattern (intermediate size of « tent patterns » in the three species). Inhabiting water around -30~200m, it is a predatory gastropod like all cones.



Trigonostoma milleri Burch, 1949
CANCELLARIIDAE

Panama, 22.5mm.

Perhaps the most spectacular of the genus, « Miller's Nutmeg » is loosely coiled with whorls detached from each other. Distributed across the Pacific side of Central America and northern South America including the Galápagos Islands, it is rather rare and found around the depth of - 50~100m. Rather variable in looseness of the coiling, strength of shoulder spines, and colouration (orange to gray).



Busycon coarctatum (Sowerby I, 1825)
BUCCINIDAE

Bay of Campeche, Yucatan Peninsula, Mexico, 136.1mm.

With stunning flame patterns, the « Turnip Whelk » is a handsome whelk species endemic to the Yucatan Peninsula and Bay of Campeche in Mexico. It is a classic rarity selected by S. Peter Dance as one of his fifty « Rare Shells » (1969), and for 125 years since its description money could not buy it. Today it is still a rarely offered species and very uncommon in collections, especially so outside North America.



Punctateon eloiseae (Abbott, 1973)
ACTEONIDAE

Low tide, Al Masirah Island, Oman, 27.5mm., Ex-coll: Dr Donald T. Bosch.

« The Eloise » is famous for producing one of the loveliest molluscan shells known, and the superb specimen depicted here shows this species in all its glory. Endemic to the Al Masirah Island in Oman, it was discovered by Dr Donald Bosch and named after his wife, Eloise Bosch. It lives in very shallow water and is most likely a sand/mud burrower feeding on polychaete worms; the largest specimen recorded is 38mm. in shell length.



Chicoreus palmarosae (Lamarck, 1822)
MURICIDAE

Sri Lanka, 100mm.

The « Rose-Branch Murex » is a muricid very famous for the beauty of its rose-coloured leafy spines that gives it the comm.on name. A very widely distributed species ranging from the Mascarene Basin in Indian Ocean to southern Japan in the Pacific Ocean, this species shows extreme variation in form in different localities. For example. the best known flowery-branched form (as shown here) is found from Sri Lanka to Somalia, whereas the Philippines form has much reduced spines.



Rostellariella martinii (Marrat, 1877)
ROSTELLARIIDAE

Tayabas Bay, Philippines, 158mm.

The « Martini's Tibia » is an elegant, thin-shelled tibia. One of S. Peter Dance's fifty « Rare Shells » (1969), this species was considered very rare until late 20th century. It inhabits rather deep water of about 100~200m and has a distribution from Taiwan to Borneo.



Haliotis scalaris (Leach, 1814)
HALIOTIDAE

-10m, Rottnest Island, Western Australia, 64.53mm.

The « Staircase Abalone » is arguably the most exquisite of all extant abalone species. With three rows of dorsal spiral ridges and a series of fan-like lamellae, it is also the most extensively sculptured and ornamented abalone species. Known from shallow waters of Southwestern and Western Australia, it is an uncomm.on species which can grow to 10cm in shell length.



Concholepas concholepas (Bruguière, 1789)
MURICIDAE

-10~20m, Chacao, Chile, 117mm.

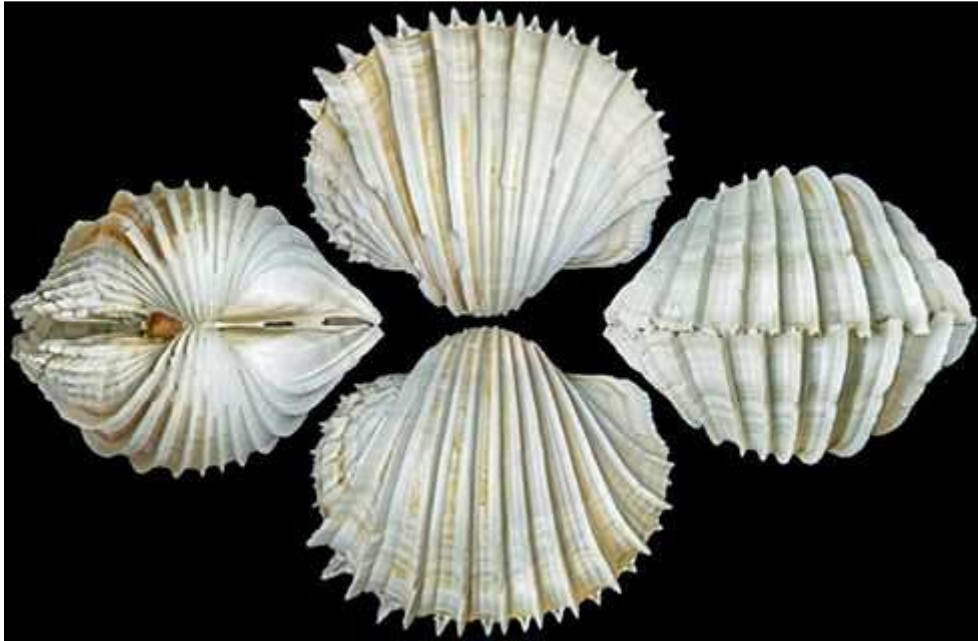
The « Barnacle Rock Shell » superficially resembles abalones or limpets, but its corneous operculum reveals its true identity as a muricid. Although it lives attached to rocks like true abalones or limpets, it is a carnivorous species like other muricids and feeds mainly on bivalves and barnacles. The foot of this species is edible and is a major product of the Chilean fishery. Inhabiting waters up to -40m deep, this species ranges from Chile to Peru.



Cardium costatum Linnaeus, 1758
CARDIIDAE

-50~80m, Mauritania, 81.5mm.

The « Great Ribbed Cockle » is a striking bivalve highly sought-after by collectors. Endemic to West Africa, its strongly elevated rib sculpture makes this species easily recognisable. The shell is thin and light, as the ribs are hollow inside. Shell length may reach 110mm.



Cymatium femorale (Linnaeus, 1758)
RANELLIDAE

Espírito Santo, Brazil, 154.2mm.

The « Angular Triton » is a famous ranellid instantly recognisable by its unique raised shoulder. It is extremely variable in size, the shown specimen being a giant but the species is said to grow beyond 20cm. Its range of distribution is from Florida, USA to Brazil.



Morum dennisoni (Reeve, 1842)
HARPIDAE

-60m, Punta de Gallinas, Guarija Peninsula, Colombia, 43.1mm.

Truly magnificent orange-red parietal shield ornamented with white pustulation makes « Dennion's *Morum* » one of the most beautiful *Moruminae* species. A great Caribbean rarity first described from John Dennison's cabinet, it was virtually unobtainable until late 20th century. Somewhat variable in size, colouration, extent of shield pustulation, and strength of shoulder spines. Usually found on muddy sand approximately -50~200m deep.



Cyrtulus serotinus Hinds, 1843
FASCIOLARIIDAE

Nuku Hiva, Marquesas Islands, French Polynesia, 78.3mm.

The « Marquesan Spindle » is a particularly strange and twisted-looking fasciolariid from the Polynesia. Usually the spire is bent to one side, enhancing the twistedness of the shell even more. It is uncomm. only found in shallow water, and is the only known species in genus *Cyrtulus*.



Epitonium scalare (Linnaeus, 1758)
EPITONIIDAE

Olango Island, Cebu, Philippines, 57mm.

The « Precious Wentletrap » is one of the most famous species throughout the history of shell collection, and surely one of the most exquisite. First appeared in Europe in the 17th century, it was so rare until the 19th century that it was worth more than gold of the same weight; and the legend often speaks of clever fakes made of rice paste coming from China. Today it is a comm.on species widely distributed in the Indo-Pacific region, with most specimens originating from the Philippines.



Macrocypraea cervus (Linnaeus, 1771)
CYPRAEIDAE

-18m on rock ledges, Clearwater, Florida, USA, 104mm.

The « Atlantic Deer Cowry » is the largest of the extant cowries, and are said to reach 190mm. in shell length. The average size however is about 100mm. and specimens above 130mm. are very rare. Comm.on in rather shallow waters from North Carolina, USA to northern Cuba.



Phalium fimbria (Gmelin, 1791)
CASSIDAE

-18~25m, Baixo do Pinda, Nampula, Mozambique, 102.2mm.

The « Fimbriate Bonnet » is a famous rarity in subfamily Phaliinae, which contains majority of the rare species in Cassidae. Ranges from East Africa to Indonesia, it inhabits shallow water and is often washed ashore after storms. A large specimen is depicted here, although huge specimens as large as 128mm. has been recorded.



Cymbiola cymbiola (Gmelin, 1791)
VOLUTIDAE

Arafura Sea, Indonesia, 65.5mm.

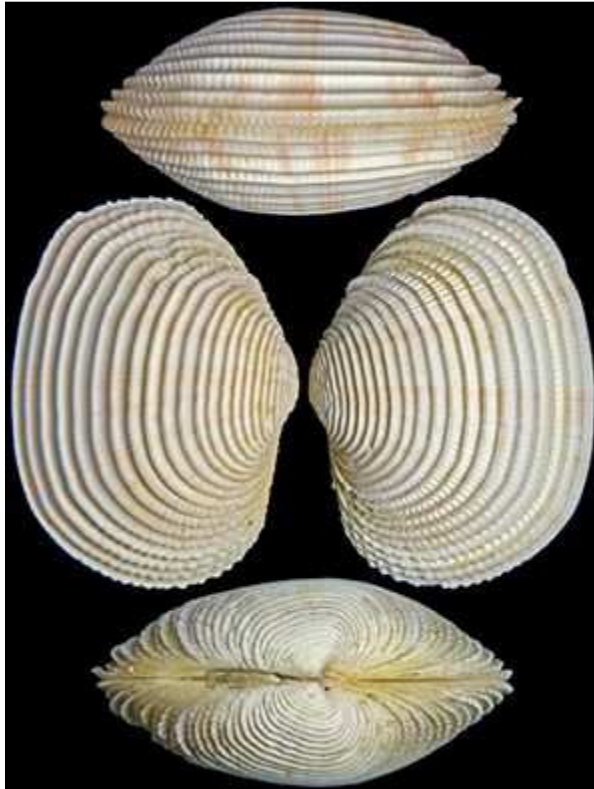
The « Crown Volute » is an uncomm.on volute found from Indonesia to Australia. It occurs in two forms, the cream form shown here and a rarer dark brown form. Shell shape and length of spines are somewhat variable, and the shell can be banded or unbanded. A rather famous volute sought after by collectors.



Fimbria soberbii (Reeve, 1842)
LUCINIDAE

North West Australia, 71.3mm.

The « Elegant Basket Lucina » was one of the most prized rare bivalves in the nineteenth century due to its beautiful frills. It was selected as one of the fifty « Rare Shells » by S. Peter Dance (1969), although this species was no longer rare then. One of the only two species in its genus today, it is today uncommon and lives between -5~20m in the South West Pacific.



Scaphella dubia (Broderip, 1827) f. kieneri Clench, 1946
VOLUTIDAE

-100m, Louisiana, USA, 130mm.

The « Kiener's Volute » is a particularly elegant form of the « Dubious Volute », ranging from west Florida to Mexico and inhabits rather deep water. A classic rarity, this form was made famous by S. Peter Dance who recognised it as one of the fifty « Rare Shells » (1969), when it was still thought to be a valid full species. It is still uncommon today, and most specimens appear to originate from Florida or Louisiana, USA.



Harpa costata (Linnaeus, 1758)
HARPIDAE

-20m, Mahébourg, Mauritius, 62.3mm.

The « Imperial Harp » is a classic rarity and the most sought-after of the harps. An extremely famous species chose by S. Peter Dance in his fifty « Rare Shells » (1969), it is the only harpid to have ribs in such frequency. The width and frequency of ribs vary greatly however, and the specimen depicted here has ribs very close together to one another and is my favourite form. This species is endemic to the Mascarene Basin.



Pterynotus loebbeckei (Kobelt, 1879)
MURICIDAE

Balut Island, Mindanao, Philippines, 56.3mm.

Depicted here is a not-so-perfect specimen of the « Loebbecke's Murex ». A classic rarity chosen as one of the fifty « Rare Shells » by S. Peter Dance (1969), this species is still rare today. The wings are variable in size and the wide-winged form is arguably the most spectacular of all muricids if perfect. Most specimens are orange but yellow, pink, and white specimens have also been found.



Tribulus planospira (Lamarck, 1822)
MURICIDAE

-1~2m, Bahia Isabel, Fernandina Island, Galápagos Islands, 46.6mm.

The « Eye-of-Judas » ranges from Mexico to Peru and is one of the most spectacular rock shells with its unforgettable aperture. It is a much sought-after collector's item, and specimens offered mostly originate from the Galápagos Islands or continental Ecuador. Although it seems to be most comm.on on the Galápagos Islands, tight collecting restrictions there probably plays a role in its apparent rarity on the market.



Angaria sphaerula (Kiener, 1838)
ANGARIIDAE

Zamboanga, Philippines, 84mm.

The « Kiener's *Delphinula* » is one of the fifty « Rare Shells » chosen by S. Peter Dance (1969) and was for a long time considered very rare. Today it is known to be rather comm.on in shallow water of tropical west Indo-Pacific region. Perhaps the most beautiful species of the family, it is also one of the most variable. The most desirable form has webbed spines like large petals of a flower, this form is still rare if the frills are intact and of a large size for the form (~50mm.). A very large specimen is shown here, although not the webbed form.



Festilyria festiva (Lamarck, 1811)
VOLUTIDAE

Ras Hafun, Somalia, 206mm.

The « Festive Volute » is a classic rarity in Volutidae. It was virtually unobtainable even into the late 1900s, a young and dead collected specimen was sold for an extreme price of 2175USD back in late 1960s. One of S. Peter Dance's fifty choice « Rare Shells » (1969), this species is still rare but much easier to obtain today. Most specimens collected are worn, faded, or damaged in some way; and large, specimen grade examples still fetch high prices.



Cryptospira elegans (Gmelin, 1791)
MARGINELLIDAE

Phuket Island, Thailand, 40.4mm.

The « Elegant Marginella » is a large species for this family, member of which are usually two centimeters or less in shell length. Marginellids are close relatives of volutes, and are also carnivorous molluscs.



Pinctada margaritifera (Linnaeus, 1758)
PTERIIDAE

Manihiki Island, Cook Islands, 151.2mm.

The « Black-lip Pearl Oyster » is a commercially important bivalve as it is the source of salt water black pearls (or Tahitian pearls). Members of the genus *Pinctada* is the source of vast majority of salt water pearls today, with different species producing pearls of different colour and shape. They are giant bivalves, and large specimens of the species shown here easily exceeds 30cm in shell length.



Siphonaria gigas Sowerby I, 1825
SIPHONARIIDAE

Intertidal, Palo Seco, Panama, 44.4mm.

The « Giant False Limpet » is a large limpet distributed from Mexico to Peru. It has a limpet-form shell, but it is a pulmonate and air-breathing species not closely related to true limpets (Patellogastropoda). Siphonariids can be distinguished from true limpets by a well defined lateral groove (used to take in air) and a clearly interrupted muscle scar due to presence of the pneumostome.



Siratus beauii (Fischer & Bernardi, 1857)
MURICIDAE

-180m, Dry Tortugas, Florida, USA, 82.9mm.

The « Beau's Murex » was first discovered by Comm. andant Beau in early 1800s and is named after him. For more than a century since its discovery it was a rare murex and one of the most desirable of all muricids, and it was also one of the fifty select species in S. Peter Dance's « Rare Shells » (1969). This species comes in two forms, the more comm.on form shown here and a very scarce deep water form with extensive frills, the latter is still very difficult to obtain even today.



Nautilus belauensis Saunders, 1981
NAUTILIDAE

-200m, Babeldaob Island, Palau, 196mm.

The « Palau Nautilus » is a nautilid endemic to waters around Palau. It is a large species, second in size only to giant specimens of *Nautilus pompilius* L., 1758 which is highly variable in size. Although very similar to *N. pompilius*, it is differentiated based on fine raised ridges along growth lines of the shell and difference in the radula.



Tudivasum armigerum (Adams, 1856)
TURBINELLIDAE

-15~20m, Cape Moreton, Queensland, Australia, 44.9mm.

The « Armoured Tudicula » is a particularly spiny member of the subfamily Vasinæ which looks remarkably like a muricid of genus *Bolinus*, especially *Bolinus cornutus* (L., 1758). This species can be easily told apart from a true muricid, however, by its lack of varices and a large round, smooth protoconch (as opposed to a smaller and more elongate one typical of true muricids).



Pteria gregata (Reeve, 1857)
PTERIIDAE

-10~20m, Pandanan Island, Philippines, 63.3mm.

The winged pearl oysters are sessile bivalves with very peculiar shape, this species being one of the most extreme. Widely distributed in the West Pacific, *Pteria gregata* lives attached to gorgonians and other substrates using its strong byssus threads. All pteriids have thick nacre (mother-of-pearl) inner layers, and species of the genus *Pinctada* is the main source of salt water pearls.



Vasum armatum (Broderip, 1833)
TURBINELLIDAE

-10~15m, Fakarava Atoll, Tuamotu Archipelago, French Polynesia, 49.2mm.

The « Armed Vase » is a rather rare endemic of East Polynesia. It is very seldomly found in good condition, the large specimen shown is exceptional in being almost perfect apart from a small chip in one of the shoulder spines. The subfamily Vasinae contains many famous rarities, for example *Altivasum flindersi* (Verco, 1914) and *Tudivasum zanzibarica* (Abbott, 1958).



Phasianella australis (Gmelin, 1791)
PHASINELLIDAE

Streaky Bay, South Australia, 91.5mm.

The « Painted Lady / Australian Pheasant » is the largest phasinellid and it is endemic to Australia (including Tasmania). The shells of this species vary greatly in shell form, colour, and pattern; extremes such as golden colouration and solid spiral bands are known. The operculum of the large specimen shown here is too small for the shell, probably taken from another smaller individual.



Acesta rathbuni (Bartsch, 1913)
LIMIDAE

Bantayan Island, Cebu, Philippines, 173mm.

The « Rathbun's Giant Lima » inhabits rather deep water (~600m depth) and ranges from Philippines to Australia. It normally lives attached on substrate using its strong byssal threads, but also capable of releasing themselves and swim to better environments when needed. The genus *Acesta* is often associated with cold-water corals and live attached to them.



Meiocardia cumingi (Adams, 1864)
GLOSSIDAE

Kantang, Trang Province, Thailand, 38.33mm.

The « Cuming's Heart Clam » belongs to the genus *Meiocardia*, which comprises about half a dozen very similar species all with recurved umbones like ram's horn and resemble a heart when viewed from the side. The large specimen depicted is uncommon in retaining periostracum, the ostracum is milky white to pure white.



Malleus albus Lamarck, 1819
MALLEIDAE

Bohol, Philippines, 198mm.

The « White Hammer Oyster » must be one of the most curiously shaped bivalve of all. Used to be one of the early rarities in European cabinets back in early 1700s when the Pacific Ocean remained little explored, it is now known to be a comm.on species widely distributed from Japan to Indo-West Pacific where it lives in shallow water attached to substrate with byssus threads.



Thersistrombus thersites (Swainson, 1823)
STROMBIDAE

New Caledonia, 153.1mm.

The « Thersite Conch » is a rather rare strombid from Central and West Pacific. This species has extremely thick shell for its size, and the large specimen depicted here weighs 500g. Most specimens have very corroded spire and dorsum, and specimens preserved in good quality are scarce.



Astraea heliotropium (Martyn, 1784)
TURBINIDAE

-35m, Foveaux Strait, New Zealand, 61.73mm.

The « Sunburst Star Turban / Imperial Sun » was first discovered during Captain James Cook's second voyage, in year 1773. It is a very attractive endemic of New Zealand and was once a choice collector's item, fetching extreme prices at auctions during the first hundred year or so after its discovery. Although it is fairly comm.on nowadays, specimens retaining all lamellae are still uncomm.on.



Clinopegma magnum unicum (Pilsbry, 1905)
BUCCINIDAE

Samani, Hokkaido, Japan, 88mm.

The « Unicum Whelk » is a recognised subspecies of the extremely variable « Magna Whelk », *Clinopegma magnum* (Dall, 1895). *C. m. unicum* has a much higher spire compared most specimens of *C. m. magnum*. Depth range approximately 100–400m. A large female specimen is shown here.



Vexillum filiareginae Cate, 1961
COSTELLARIIDAE

Bantayan Island, Philippines, 72mm.



Semicassis thachi Kreipl, Alf & Eggeling, 2006
CASSIDAE

Nha Trang, Vietnam, 36mm.

This is a rather rare cassid species recently described from Vietnam. It lives in rather deep water, around the depth of 200m. A different form is found in Philippines with much wider spiral ribs.



Ophioglossolambis violacea (Swainson, 1821)
STROMBIDAE

Saint Brandon, Mauritius, 118.2mm.

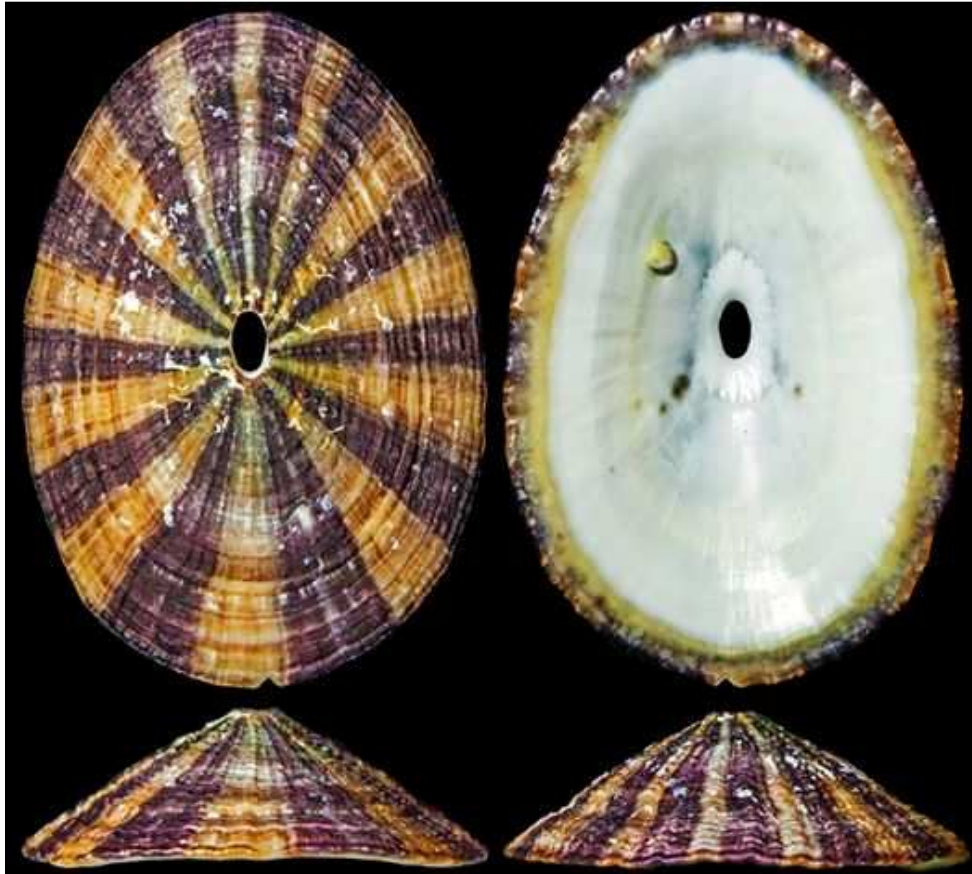
The « Violet Spider Conch » is one of the great classic rarities of the conchology world, and perhaps one of the most beautiful. It is the rarest strombid of the Indian Ocean, and was one of the fifty species chosen by S. Peter Dance in 'Rare Shells' (1969). Vast majority of specimens have been collected from Mauritius (especially Saint Brandon), and it appears to be endemic to the Mascarene Basin.



Fissurella maxima Sowerby I, 1834
FISSURELLIDAE

-10.5m, Coquimbo, Chile, 92mm.

The « Giant Keyhole Limpet » is a large member of Fissurellidae, a primitive family of gastropods. Its soft parts extend well beyond the shell and the mantle almost completely covers it, and thus although the shell resembles a true limpet they are easily told apart when alive. The central hole is used for respiration and excretion.



Umbilia armeniaca Verco, 1912
CYPRAEIDAE

Great Australian Bight, Australia, 100.13mm.

The « Apricot-Coloured Cowry » is a large cowry endemic to the Great Australian Bight and is a symbolic species of the Southern Australia. Although this species used to be very rare as it lives in rather deep water (~200m), it is only uncomm.on nowadays with modern fishing techniques. Adult shell length averages about 85mm., and large specimens over 100mm. are still highly sought-after by collectors.



Dolabella auricularia (Lightfoot, 1786)
APLYSIIDAE

Masbate, Philippines, 26.8mm.

Shown here is the shell of the « Wedge Sea Hare ». It is a rather large herbivorous opisthobranch, and the soft parts of the animal can reach 40cm. Like all sea hares, the shell is enclosed in the mantle and not visible from outside.



Homalocantha oxyacantha (Broderip, 1833)
MURICIDAE

Gulf of Montijo, Panama, 45.7mm.

The « Sharp-Spined Murex » inhabits shallow waters of Tropical West America, and has about seven spine bearing varices per whorl. The spines are sharp and not splayed out as in the Pacific species of this genus, such as *H. anatomica*.



Aplustrum amplustre (Linnaeus, 1758)
APLUSTRIDAE

Cebu, Philippines, 13.4mm.

The « Royal Paper Shell » is a shell-bearing opisthobranch comm.on throughout the Indo-West Pacific. It inhabits shallow waters less than 15m depth, in fine sand.



Harpulina arausiaca (Lightfoot, 1786)
VOLUTIDAE

Palk Strait, Sri Lanka, 69mm.

The « Gold-Banded Volute » is a famous volute best known from Sri Lanka. It has several distinct forms, of which the shown is most comm.on. The form with clear, thick horizontal bands and no vertical bands is much sought-after by collectors; although another similar form with regularly ordered thick and thin horizontal bands is perhaps rarer.



Conus pulcher Lightfoot, 1786
CONIDAE

Banjul, The Gambia, 190.2mm.

The « Prometheus Cone » is the largest extant cone shell, and very old specimens may reach 260mm. in shell length although majority of the specimens are 100mm. or less. Large specimens appear quite different from small ones and were once known by the name of *C. prometheus* Hwass in Bruguière, 1792, now a synonym of *C. pulcher*.



Sinustrombus sinuatus (Lightfoot, 1786)
STROMBIDAE

Bohol, Philippines, 103mm.

The « Laciniate Conch » is a comm.on species widely distributed across the Southwest Pacific. It is most closely related to the rare *S. taurus*, and at least one hybrid specimen is known from Guam. The shown specimen has a more flared lip than usual.



Bolma girgyllus (Reeve, 1861)
TURBINIDAE

Balut Island, Philippines, 65mm.

The « Girgyllus Star » is a spectacular representative of genus *Bolma*, which contains many exquisitely ornamented turbinids. The yellow spines resemble lightning patterns, and hence its Japanese name « Lightning Turban » and Chinese name « Lightning-God Star ».



Glossus humanus (Linnaeus, 1758)
GLOSSIDAE

Tarragona, Spain, 78mm.

The « Ox-Heart Cockle » is the only species in genus *Glossus*. When viewed from the side its shell closely resembles a human heart (hence its specific name), although its comm.on name refers to heart of an ox. In both Japanese and Chinese this species is referred to as the « Heart of Dragon King Cockle », from the same reasons.



Architectonica perspectiva (Linnaeus, 1758)
ARCHITECTONICIDAE

Negros Occidental, Philippines, 51mm.

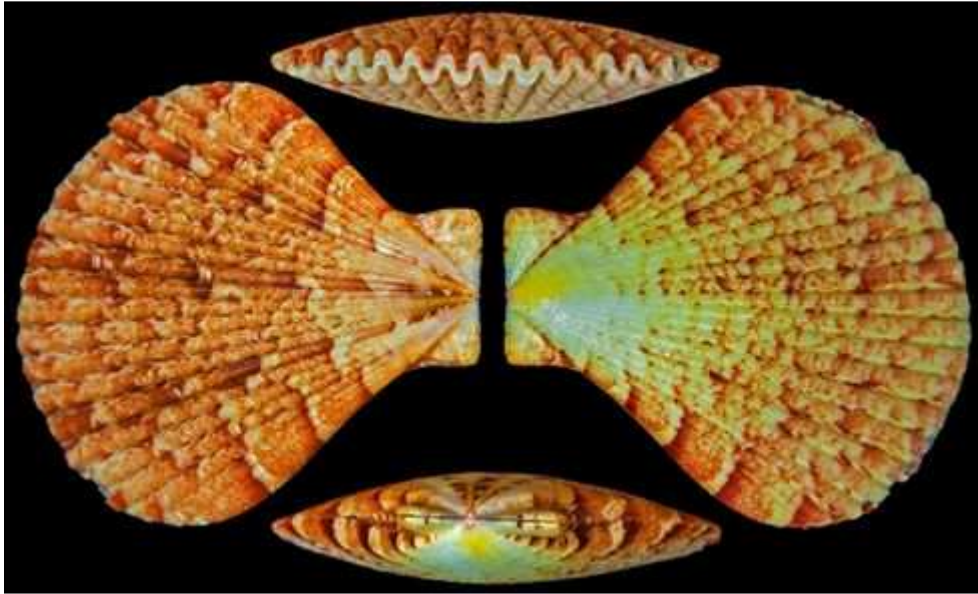
The « Perspective Sundial » is a large member of Architectonicidae, the sundial family. The family and genus are so named because their shells were given to architecture students as a model structure to work with.



Anguipecten superbus (Sowerby II, 1842)
PECTINIDAE

Mindanao, Philippines, 57.5mm.

Although this specimen is from the Philippines, the « Superb Scallop » is best known from the Ryukyu Islands, Japan. The complex patterns on both halves resembles traditional Japanese Nishiki textile.



Pharaonella rostrata (Linnaeus, 1758)
TELLINIDAE

Cebu, Philippines, 50mm.

The « Rostrate Tellin » gained its name from the elongated process of the shell. The shell is slightly recurved, a comm.on feature of many tellinids.



Homalocantha anatomica (Perry, 1811)
MURICIDAE

Wakayama Prefecture, Japan, 48.2mm.

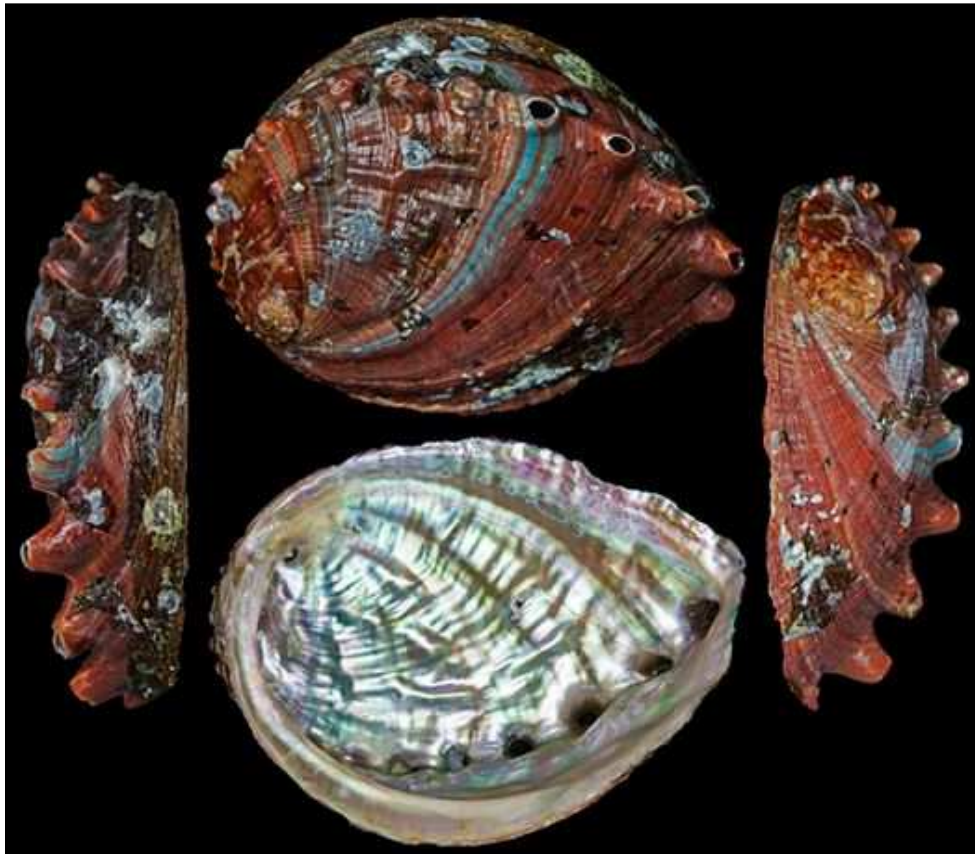
The « Anatomical Murex » is called 'Ginkgo Shell' in Japan, as the fan-shaped protrusions on the lip resembles the leaves of Ginkgo biloba.



Haliotis madaka (Habe, 1977)
HALIOTIDAE

Chiba Prefecture, Japan, 144.5mm.

An endemic of the Japonic Province, this is the largest Asian abalone species (second largest worldwide) and can exceed 24cm in shell length. The specific name 'madaka' means 'high holes' in Japanese, which refers to this species' characteristic elevated selenizone holes.



Zemiropsis papillaris (Sowerby I, 1825)
BABYLONIIDAE

Cape Province, South Africa, 36.7mm.

This species is endemic to Cape Province RSA, and is one of the rarer babyloniid species.



Ovula costellata Lamarck, 1810
OVULIDAE

Zanzibar Island, Tanzania, 383mm.

The aperture colour of « Pink-Mouth Egg Shell » ranges from pink to intense purple. The colour is intense when fresh and fades rather quickly over time.



Chicoreus orchidiflorus (Shikama, 1973)
MURICIDAE

Mindanao, Philippines, 34mm.

The « Orchid Murex » is a small but beautiful species, displaying three iconic features of genus *Chicoreus*: long curved spines, large frills, and intense colouration.



Oliva porphyria (Linnaeus, 1758)
OLIVIDAE

Baja California, Mexico, 109mm.

The « Tent Olive » is the largest of the olivids, and one of the most spectacular.



Papustyla pulcherrima (Rensch, 1931)
CAMAENIDAE

Manus Island, Papua New Guinea, 40.8mm.

The « Emerald Green Snail » is a famous endemic of Manus Island. It has been overharvested to make jewelry, which led to this species being listed in CITES II. This specimen was collected in 1970 before the listing.



Ancistrolepis kawamurai Habe & Ito, 1972
BUCCINIDAE

Sea of Okhotsk, Hokkaido, Japan, 104.43mm.

This is a classic example of buccinid genus *Ancistrolepis* most well known from the Japonic province, known for the beauty of their periostracum.



Columbarium pagoda (Lesson, 1831)
TURBINELLIDAE

Japan, 79mm.

Members of the genus *Columbarium* resembles Japanese pagoda, hence the specific name. The comm.on name of this species, « First Pagoda Shell », refers to the fact that this was the first described *Columbarium* species.



Turbo marmoratus Linnaeus, 1758
TURBINIDAE

Japan, 185.5mm.

The « Great Green Turban » is the largest species of family Turbinidae. Its calcareous operculum is very large and perhaps the heaviest of all extant gastropoda. It also has a very thick layer of mother-of-pearl and has therefore traditionally been used in the Japanese raden art.



Lobatus gallus (Linnaeus, 1758)
STROMBIDAE

Brazil, 141mm.

Commonly called the « Rooster-tail Conch », this species exhibit a great variety of colours from purple to gold to dark brown.



Drupa morum Röding, 1798
MURICIDAE

Philippines, 31mm.

The « Mulberry Drupe », a comm.on species with spectacular violet aperture.



Lopha cristagalli (Linnaeus, 1758)
OSTREIDAE

Philippines, 88mm.

The « Cockcomb Oyster », its shape is very variable as well as the number of 'folds'.



Argonauta hians Lightfoot, 1786
ARGONAUTIDAE

49mm.



Chama lazarus Linnaeus, 1758
CHAMIDAE

Philippines, 75mm.

« Lazarus Jewel Box ».



Murex pecten Lightfoot, 1786
MURICIDAE

Philippines, 155mm.

Bears the comm.on name of « Venus' Comb Murex ».



Liguus virgineus (Linnaeus, 1758)
ORTHALICIDAE

Hispaniola Island, Haiti, 47.2mm.

A colourful landsnail.



Tridacna squamosa Lamarck, 1819
CARDIIDAE

Philippines, 144mm.



Tenagodus anguinus (Linnaeus, 1758)
SILIQURIIDAE

Philippines, 70mm.

Two specimens entangled together.



Aporrhais pespelecani (Linnaeus, 1758)
APORRHAIIDAE

Portugal, 40.1mm.



Spondylus varius G. B. Sowerby I, 1827
SPONDYLIDAE

Philippines, 1383mm.



Homalocantha zamboi (Burch & Burch, 1960)
MURICIDAE

Philippines, 59mm.



Circomphalus disjectus (Perry, 1811)
VENERIDAE

Australia, 51.8mm.



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