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NEW SOUTH WALES MARGINELLIDAE.

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(Plates V-VI.)

Marginella is common in, but not confined to Australian seas. About a thousand species have been described, many from the tropics, but the majority from temperate waters of the southern hemisphere. In Australia, particularly in the south, they form a conspicuous element of the marine molluscan fauna.

The most complete list of Australian species is that published by Bernard C. Cotton,¹ of the South Australian Museum. He lists 92 species, including several that are new. Fifteen more new species are now added from New South Wales, and no doubt a number still remain to be described, particularly from Western Australia, north Australia and Queensland. It is interesting to note that most of the described species have a fairly wide geographical distribution, and many are common to several zoo-geographical provinces. As is to be expected, there is a somewhat closer relationship between New South Wales species with those of Tasmania, than with those of the Flindersian fauna (Victoria, South Australia and the southern portion of Western Australia), but many species are common to all three areas. It is very probable that *Marginella*, like *Cypraea*, has a free swimming larval stage of some length, and is thus able to migrate more rapidly and widely than most other molluscs.

The number of species occurring in New South Wales is probably not yet completely known, as no doubt more will be found, particularly on the continental shelf. Hedley's "Check List of New South Wales Mollusca", published in 1917, allowed 27 species. In the present paper 45 species and three varieties are dealt with, and four of Hedley's list are regarded as doubtful. Of these, 23, or practically one-half, occur in Tasmania, 19 in Victoria, while only 10 are found in South Australia. The total number of species in each of these areas is about 50, Australian tropical species are fewer in number, and practically none of them are common with species from the colder waters of the south.

Practically nothing is known of the life history of *Marginella*, and the animals of only two Australian species have so far been described. In 1916, Hedley described both the animal and radula of *M. mustellina* Angas,² and in 1944 Cotton described the animal of his own species, *M. weedingi*.³ As the former inhabits the reefs in shallow water, and the latter is a deep-water dredged species, it is interesting to note that the general characters of each animal are much the same. There is the same long, narrow foot, blunt head, prominent tentacles with eyes at the outer base, long siphon and mantles at either side covering the shell. In *M. mustellina* the mantles are papillate, while in *weedingi* they are covered with small divided processes. These descriptions are very close to that of the animal of the Cypraeidae, with which family Marginellidae is evidently closely related.

M. mustellina and *M. angasi* are inhabitants of the reef, and *M. nympha* is common on seaweed, but most species are essentially sand living, and are found from the edge of the beach to very deep water beyond the continental shelf. It may be noted that the

¹ Cotton.—*South Australian Naturalist*, Vol. 22, No. 4, Nov. 30, 1944.

² Hedley.—*Proc. Linn. Soc. N.S.W.*, xli, 4, 1916, p. 709, Pl. I, figs. 30, 31.

³ Cotton.—*Loc. cit.*, p. 16.

animal is extremely active, a characteristic of many sand-living forms, particularly the carnivora.

Species are rather restricted to depth zones, and those living on the open beaches just below low water are seldom found in deeper water. Depths from about 5 to 20 fathoms have characteristic species, though it was noticed in Jervis Bay that species from five fathoms were quite different from those from 15 fathoms, even though the nature of the bottom was identical. Again, in 20 to 60 fathoms, on the continental shelf, another distinctive group of species is to be found; while from the few really deep water dredgings, still further species have been found.

One genus or many? When the number of species in any genus is very large, many modern systematists have advocated its division, largely on the grounds of convenience. The view is held here that unless very definite generic characters can be given the procedure is not only unscientific but defeats its own end by creating a confused and unwieldy nomenclature.

Marginella is a case in point. At first sight it would seem to be divisible into fairly natural groups, but there are too many intermediate species to make these groups hard and fast and to warrant new generic names. Cotton in his paper has used such groups as a guide to the student of local species, and this is all that is necessary, at least until our knowledge of their anatomy and life history is much further advanced. He uses seven groups, designated from A to G, based mainly on the length of spire, general form, and presence or absence of colour bands. This is a convenient subdivision as far as it goes, but, as he himself recognizes, not definite enough for generic separation. A more important character, which may have genetic value, is the number of plications on the columella. What does seem a natural group is a series of small shells, centred around *M. angasi*, with the columella multi-plicate. In most species the number of plications is four, and species with six or more, occupying the greater length of the inner margin, stand out from the others. Some species have less than four plications, but in these, rudimentary folds are often present right inside the aperture, and invisible from in front. Another group which may later justify generic separation is that about *M. ovulum*, in which the shell is entirely involute, and the spire invisible externally.

I have not followed Cotton's grouping in this paper, as the smaller number of species dealt with does not necessitate it. The species nevertheless are arranged so that, as far as possible, allied forms are kept together. They are all figured, and a glance at the plates will show the gradual transition from one extreme form to another. Fortunately in this controversial subject there is one point which seems reasonably sure. Whatever future classification is decided on, each species dealt with here is undoubtedly a *Marginella*.

Acknowledgements.—Much of the credit for the collection of material for this and future papers goes to my son John, who has been my companion in all collecting trips, and whose keen eye has brought to light many finds. Mr. T. Iredale, formerly Conchologist of the Australian Museum, has continually helped me from the storehouse of his great knowledge and experience. To Miss J. Allan, the present Conchologist, my thanks are particularly due. It was Miss Allan who suggested that I should write up the material collected in the last twenty years; she has looked up references for me, made suggestions, and finally read through and checked the paper itself.

Types.—All types, as well as specimens illustrated, have been presented to the Australian Museum, where they will be available for future reference.

REVIEW OF SPECIES.

References.

- Hedley, 798.—The number is that in Hedley's Check List of N.S.W. Mollusca, Supplement to *Journ. Roy. Soc. N.S.W.*, Vol. LI, 1917.
 May, 695.—Number in May's Check List of the Mollusca of Tasmania, Govt. Printer, Hobart, 1921.

Marginella turbinata Sowerby. (Pl. v, fig. 1.)

Hedley 798.

This is one of our commonest species, mostly found on the outer beaches. It apparently lives in the sand below low tide, but ranges into deeper water. The ribbing on the shoulder is characteristic, but varies somewhat, as some specimens are practically smooth.

Localities.—Fifteen fm. between Heads, Port Jackson, the specimen figured 9.5 mm. in length; Cronulla and other beaches; 14 fm. off Long Reef; dredged in Pittwater; 30–35 fm. off Crookhaven.

Marginella turbinata var. *pusilla*, var. nov. (Pl. v, fig. 2.)

In the Roy Bell Collection in the Australian Museum are specimens from 60 fathoms, Twofold Bay, indistinguishable from *turbinata*, except that they are much smaller, the specimen figured being only 6.5 mm. in length, and somewhat broader. The ribbing is also a little more pronounced. Specimens of *turbinata* from 30–35 fathoms off Crookhaven are somewhat intermediate in character, and it seems that this species in deeper water tends to become smaller and broader, denoting racial but not specific difference. From South Australia, Cotton has described *M. pattisoni* from shallow water, a species which greatly resembles this variety. Further collecting from intermediate localities may link *pattisoni* with *turbinata*, which is a variable species, and which may possibly be divisible into many local races.

Marginella olivella Reeve. (Pl. v, fig. 3.)

Hedley 790.

Localities.—Dredged North Harbour, the specimen figured 6.5 mm. in length. This specimen is yellowish with a white base, and a white band near the top of the whorl. Pure white specimens were abundant associated with *infelix* in 6–9 fathoms, Sow and Pigs Reef, and it was also taken alive in 15 fathoms, Jervis Bay. It also occurs with *infelix* and other species on the outer beaches.

Some confusion has in the past existed as to the exact identity of *olivella* and *infelix*. Hedley allowed both species in his check list, but May synonymized *infelix* with *olivella*. May previously had synonymized a species of his own, *procella*, under *infelix*. After examining long series from several localities, both in our own and the Australian Museum collections, I am satisfied that two forms exist, a narrow and a broad one; the broad form rounded, the narrow with nearly straight sides. The narrow form also has a squarer shoulder at the top of the aperture, a feature more apparent from the back of the shell. From Reeve's original description, and from specimens in the Australian Museum compared with the type, the narrow form is the true *olivella*. I think their association together is somewhat accidental, as live specimens of *olivella* in deeper water are by themselves, while *infelix* is particularly abundant on the beaches, with *olivella* only occasionally present.

Marginella infelix Jousseaume. (Pl. v, fig. 4.)

Hedley 791.

Localities.—Six to nine fm., Sow and Pigs Reef, the specimen figured 7 mm. in length. Also common on outer beaches, where it evidently lives just below low tide.

The differences between this and *olivella* have already been discussed, and though Hedley labelled specimens in the Museum as *olivella*, var. *infelix*, I think the differences are constant enough to be considered specific.

Marginella inconspicua Sowerby. (Pl. v, fig. 5.)

Hedley 780.

This is not a common beach shell, but is found abundantly in moderately deep water, from 5 to 20 fathoms, on sandy or muddy sand bottoms.

Localities.—Dredged in North Harbour, Port Jackson, 6 fathoms, the figured specimen 5.5 mm. in length. The shell is ivory coloured with a pale yellow band near the top of the body whorl. Specimens from 5 fathoms, Jervis Bay, alive on a pure sand bottom,

are a little broader, dark grey from the animal within, and with a light coloured sub-sutural band. Also obtained from 14 fathoms off Long Reef, and from 20 to 35 fathoms off Crookhaven.

Marginella schoutanica May. (Pl. v, fig. 6.)

May 688.

A number of specimens, from 5 to 25 fathoms, Twofold Bay, were sorted from the Roy Bell Collection, and agree very well with May's *schoutanica*. This is a new record for New South Wales. The specimen figured is 7.5 mm. in length. This species is like *inconspicua*, but is larger, broader, and has a slightly different contour. It is ivory coloured and highly polished, with a tendency to develop faint plications on the shoulder.

Marginella punicea, sp. nov. (Pl. v, fig. 7.)

Shell regularly ovate, white when dead, but when taken alive, a delicate mauve pink, base and spire white. Animal reddish. Spire of moderate height, of three whorls, pointed. Shoulders sloping, regularly curved. Aperture long, of moderate width, widening slightly anteriorly. Outer margin with sloping shoulder, joined to the body whorl above its maximum width, but well below the suture. Canal broad, the outer margin rounded and expanding. External varix slight. The outer margin thickened and microscopically dentate. Plications on columella four, oblique, slight, and within the anterior fourth of the aperture. Length 8.5 mm.

Localities.—Fifteen fathoms, Jervis Bay (type), four specimens alive on pure sand bottom; 6-9 fathoms, Sow and Pigs Reef, Port Jackson, one specimen.

This is a well marked species, distinguished by the regularly rounded body whorl, with complete absence of any shoulder.

Marginella pipire, sp. nov. (Pl. v, fig. 8.)

Shell small, narrowly ovate, narrowed anteriorly, white. Spire of three whorls, of moderate length. Body whorl regularly curved, not shouldered. Aperture long, narrow above, widening anteriorly, joining the body whorl just above its maximum curvature, but below the suture, and with a distinct shoulder. Outer margin without an external varix, but inflected and thickened. Canal narrow and rounded. Columella plications four strong, oblique and of equal size, and within about half the total length of the aperture. Length, 3.5 mm.

Locality.—Sixty fathoms, off Twofold Bay (type), Roy Bell Collection.

This is the species identified by Mr. J. R. le B. Tomlin as *caducocincta*, and recorded by Iredale as a new record for New South Wales.⁴ It is, however, definitely not *caducocincta*, being much smaller and of an entirely different shape. Nor will it fit with any other Australian species. There is no outstanding characteristic to serve as a ready recognition mark.

Marginella strangei Angas. (Pl. v, fig. 9.)

Hedley 795.

Localities.—Eight to ten fathoms, off Point Halliday, the specimen figured 4.5 mm.; 6-9 fathoms, Sow and Pigs Reef; outer beaches at Port Hacking and Crookhaven Heads.

It has been difficult to decide what is exactly Angas's species. In the Australian Museum is a tube labelled *strangei* and "compared with the type in London", but as there are more than one species in the tube, this does not help us. The original figure is rather small, and the description not quite full enough to make identification beyond doubt, but this is the only species examined which reasonably fits. Additional points which might be noted are that the aperture is high and joins the body whorl right at the suture or a little above, and that the four columellar plaits are within the lower two-fifths of the aperture; they are oblique, and the upper one is smaller, and barely visible from in front. From the beaches some specimens are a little smaller, just less than 4 mm., but are otherwise indistinguishable.

⁴ *Proc. Linn. Soc. N.S.W.*, xlix, 1924, p. 261.

Marginella frequens, sp. nov. (Pl. v, fig. 10.)

Shell small, ovate, white. Spire of three whorls, short, body whorl regularly curved with very slight shoulder. Aperture long, fairly wide and only slightly wider at the posterior extremity, joined to the body whorl right at the suture, and with a rounded but pronounced shoulder. Outer margin with a slight varix, but inflected, the edge smooth and not denticulate. Canal rounded and not expanded. Columellar plications four, oblique, strong, the lower three sub-equal, the posterior one separate, and more within the aperture, the whole within about half the length of the aperture. Length, 3.2 mm.

Localities.—Thirty to fifty fathoms off Sydney, common (type); 30–35 fathoms off Crookhaven, common.

This is apparently a common and widely distributed species on the continental shelf, and it is surprising that it has escaped notice. It is certainly not any of the species recorded by the "Thetis" and other expeditions. The shouldered aperture, and its junction right at the suture, are good recognition points. Its nearest relation is *M. strangei*, of which it may be the deep water representative. It is, however, much smaller, is white and glassy when alive instead of yellowish, the upper plication on the columella is more widely separate and the whole lie higher up than in *strangei*.

Marginella binivitta, sp. nov. (Pl. v, fig. 11.)

Shell oval, white and translucent, with two pale yellow bands on the body whorl, which are apt to fade fairly rapidly. Spire very short and small, of two or three whorls. Body whorl rounded with a very slight shoulder. Aperture as long as the shell, of moderate width above but broadening below, its junction almost at the apex, the rounded shoulder level with or even above the apex. Outer margin rounded, with a slight varix, narrowly inflected, the edge plain with no trace of denticulation. Canal of moderate width, rounded. Columella plications four, the lower two well marked and oblique, the third much smaller. The fourth plication is well above the third and is very small, almost obsolete, so that at first sight the shell seems tri-plicate. The four plications are within the lower two-fifths of the aperture. Length, 6.5 mm.

Localities.—Fifteen fathoms, Jervis Bay (type), several specimens from a pure sand bottom; 30–35 fathoms, off Crookhaven, abundant in sandy mud.

This approaches close to *M. altilabra* May, but has a still higher and more expanded aperture. It is also like the species May records from Tasmania as *agapeta* Watson, but which has but three plications. Incidentally this is nothing like the original figure of *agapeta*, the Tasmanian record of which is exceedingly doubtful. The nearest relation, however, is *olivella*, from which it is distinguished by the very high aperture and more tapering anterior extremity.

Marginella victoriae Gatliff and Gabriel. (Pl. v, fig. 12.)

Hedley 799.

Locality.—Six to nine fathoms, Sow and Pigs Reef, Port Jackson, the specimen figured 4.5 mm. in length; also dredged in Pittwater, and from 15 fathoms off the Clarence River.

This is a common species in Harbour dredgings, and can be recognized by the dentate edge of the outer margin. Specimens in the Museum Collection from Middle Harbour are labelled as "confirmed by Gabriel as *M. victoriae*", and our specimens are the same as these.

Marginella sinuata, sp. nov. (Pl. v, fig. 13.)

Shell small, white, ovate. Spire short and blunt, 3 or 4 whorls. Body whorl rounded with a slight shoulder. Aperture rather wide, joining the body whorl at the suture. Outer margin with a wide and prominent external varix, thickened and widely inflected, the inflected platform with a prominent sinus at its posterior end. Canal rounded. Columella plications strong, the lower two moderately oblique, the upper two nearly transverse, the upper somewhat separate from the others, and all occupying fully one-half of the length of the aperture. Length, 3.3 mm.

Locality.—Eight to ten fathoms off Point Halliday, in pure sandy bottom, common.

This is another of what might be termed the *strangei* group of *Marginella*, and approaches closest to *frequens* (Fig. 10), but differs chiefly by the stronger and more widely placed columella plications, and by the sinus in the inner edge of the outer margin.

Marginella subbulbosa Tate. (Pl. v, fig. 14.)

Hedley 796.

Localities.—Beach at Huskisson, Jervis Bay, the specimen figured 3.6 mm. in length; also on outer beaches at Manly, Crookhaven Heads and other localities.

This is a well-marked species, and can be easily recognized by the denticulate edge of the margin, and by being strongly lirate within the aperture. Originally described from South Australia with four columella plications, and figured from Tasmania with the same number, it is interesting to note that there are actually six, but the upper two can be easily overlooked, as they are very small and generally quite invisible from in front. This suggests relationship with *M. angasi*, and other multi-plicate species.

Since writing the above Miss Allan has checked specimens in the Museum from both South Australia and Tasmania, and finds the extra plications present in both cases; so this character is persistent throughout the entire range, and further confirms the identification of the New South Wales species.

Marginella sinapi, sp. nov. (Pl. v, fig. 15.)

Shell small, elongate-ovate, yellow and translucent. Spire rather long, of two or three whorls. Body whorl long and rather narrow, with practically no shoulder. Aperture joining the body whorl at its maximum diameter, and well below the suture, the shoulder sloping. Outer margin with slight external varix, but strongly inflected, the edge plain with no denticulation. Canal rounded. Columella plications four, strong, the lower two oblique, the upper two separate and more transverse, the whole occupying one-half the length of the aperture. Length, 2.5 mm.

Locality.—Six to nine fathoms, Sow and Pigs Reef (type), not uncommon; also on the ocean beaches at Manly and Port Stephens. Specimens in the Australian Museum from Broughton Island are labelled as "Undescribed species", and it was obviously Hedley's intention to name this at some future date. It is a very distinctive little species, not readily to be confused with any other on the coast.

Marginella parsobrina sp. nov. (Fig. 1.)



Figure 1.

Shell small, broadly spindle shaped, white. Spire rather long, blunt, of three whorls. Body whorl rounded, widest medially, narrowed posteriorly, shoulder rounded. Aperture narrow, of even width throughout, comparatively short. Outer margin joining the body spire at the maximum width, well below the suture, shoulder sloping, nearly continuous with the line of the spire, outer varix strong and wide, the margin edge thick and evenly inflected, not denticulate. Canal narrow and rounded. Columella plications four,

occupying about half the length of the aperture, strong, the lower two very oblique, the upper two more transverse. Length, 4 mm.

Locality.—Thirty to thirty-five fathoms off Crookhaven.

This species was sorted from a parcel of mud and sand which came to hand from my friend Mr. T. Nielsen, of Crookhaven, after the main part of this paper had been written, and so could not be included in the prepared plates. It is quite a distinctive species, resembling in outline *sinapi* and *translucida*, between which species it is intermediate in size. The narrow, sloping shoulder of the aperture is a good recognition character.

Marginella translucida Sowerby. (Pl. v, fig. 16.)

Hedley 797.

Localities.—Dredged, 6 fathoms, North Harbour, Port Jackson, the specimen figured 5.8 mm. in length. Specimens from here are yellow with a white sub-sutural band, but fading to a dead white. Also alive from 5 fathoms, Jervis Bay, on a pure sandy bottom. Common on the outer beaches in many localities, Port Stephens, Crookhaven Heads, *et cetera*.

Marginella humerica, sp. nov. (Pl. v, fig. 17.)

Shell large, solid, broadly ovate, yellowish. Spire rather long, of three whorls. Body whorl with fairly pronounced shoulder. Aperture comparatively wide, joining the body whorl at the suture, with wide rounded shoulder. Outer margin thick, with prominent external varix, strongly inflected, edge not denticulate. Canal broad and rounded. Plications on columella four, strong, oblique, occupying about two-fifths of the length of the aperture. Length, 8.5 mm.

Locality.—Twelve fathoms off Tacking Point, Port Macquarie. Specimen in Australian Museum, collected by Mr. J. Brazier. (Type.)

This species is close to *translucida*, but is much larger, the aperture is comparatively longer, and its shoulder more pronounced.

Marginella freycineti May. (Pl. v, fig. 18.)

May 661.

Locality.—Thirty to fifty fathoms off Sydney, the specimen figured 1.8 mm. in length. This is a minute, colourless, glassy shell, and may be recognized by its three columella plaits and high aperture. It agrees very well with May's *freycineti*, which is a common Tasmanian deep-water shell, and thus is a new record for New South Wales.

A broader variety, but otherwise indistinguishable, is from 30–35 fathoms off Crookhaven, length 2 mm. (Pl. I, fig. 19). A longer series is necessary to determine whether the differences are sufficient to be considered specific.

Marginella cratericula Tate and May. (Pl. v, fig. 20.)

Hedley 778.

Locality.—Sixty fathoms off Twofold Bay (Roy Bell Collection), the specimen figured 2 mm. in length. This is a minute, glassy shell with two columellar plaits, and can be readily recognized by the hollowed-out spire.

Marginella stilla Hedley. (Plate v, fig. 21.)

Hedley 794.

Locality.—Twenty-five to sixty fathoms off Bateman's Bay, the specimen figured 5 mm. in length.

This is a fairly common deep-water species, and may be considered as typical of the continental shelf, from which Hedley records it from many localities. The strongly denticulate outer margin is a good recognition character.

Marginella quinqueplicata, sp. nov. (Pl. v, fig. 22.)

Shell large, broadly ovate, white and solid. Spire short and blunt, of four whorls. Body whorl with a pronounced shoulder, tapering anteriorly. Aperture fairly broad, joining the body whorl below the suture. Outer margin with rounded, sloping shoulder, thick, external varix not strong, but widely inflected, the edge strongly dentate and

transversely striated. Canal broad, truncate and expanded. Columella plaits five, oblique, decreasing regularly in size posteriorly, the upper two faint, the last barely visible from in front, the whole within nearly half the length of the aperture. Length, 9 mm.

Locality.—Five fathoms, Twofold Bay (Roy Bell Collection).

This is a prominent and well-marked species, allied perhaps to *turbinata*. It is the only species I have seen with five columella plaits, and this and its large size make it readily recognizable.

Marginella mustellina Angas. (Pl. v, fig. 23.)

Hedley 787.

Locality.—Alive under rocks, North Harbour, Port Jackson, the specimen figured 6.5 mm. in length.

This is a common shallow-water species right along the coast, and is one of the few *Marginellas* which inhabit the reefs. Its rich mottled brown colouring with two white bands makes it an easily recognizable shell.

Marginella haswelli, sp. nov. (Pl. v, fig. 24.)

Shell of moderate size, elongate, regularly ovate, colour of dead specimens very pale brown, with two broad white bands. Spire of two whorls, the apical small, the second inflated. Body whorl long and narrow. Aperture long, widening anteriorly, joining the body whorl just below the suture. Outer margin with narrow sloping shoulder, with strong external varix, narrowly inflected, the edge finely denticulate. Canal moderately wide, rounded. Columella plaits four, oblique, the lower pair stronger, the whole occupying about one-fourth of the length of the aperture. Length, 8 mm.

Locality.—Eighty fathoms, 22 miles east of Narrabeen, three specimens (including the type) in the Museum Collection, presented by the late Professor Haswell.

In the Expedition of the H.M.C.S. "Miner", 1906, this species was determined as *M. stanislaus* Ten.-Woods, which has since been synonymized under *mustellina*. It is undoubtedly related to *mustellina*, of which it may be considered the deep-water representative, and from which it mainly differs in its much more elongate form, the narrower inflection of the margin, and the curious rather bulbous spire. Another related species is *M. occidua* Cotton from Western Australia, which is smaller, has a smooth outer margin and a more pronounced shoulder.

Marginella muscaria Lamarck. (Plate vi, fig. 25.)

Hedley 786.

Locality.—Ocean Beach, Cronulla, the specimen figured 14 mm. in length.

This is the largest as well as one of the commonest of our species, living in the sand just below low tide, and washed up in great numbers on all the outer beaches right along the coast.

Marginella johnstoni Petterd. (Pl. vi, fig. 47.)

Hedley 781.

Locality.—Ocean Beach, Cronulla, the specimen figured 9 mm. in length.

The species *johnstoni* is almost a replica of *muscaria*, with which it is commonly associated, and from which it can practically only be separated by its size. It lives in similar locations, but when *muscaria* is found within inlets, as in Crookhaven, *johnstoni* is generally absent.

Marginella tasmanica Ten.-Woods. (Pl. vi, fig. 26.)

May 691.

Localities.—Six to nine fathoms, Sow and Pigs Reef, Port Jackson; the specimen figured 9 mm. in length.

This was recorded from New South Wales by Iredale⁵ from the Roy Bell Collection, and he remarks that it was common at Twofold Bay, below low tide mark associated with *muscaria*. Other specimens from Twofold Bay are labelled as from 5–25 fathoms.

⁵ Iredale.—*Proc. Linn. Soc. N.S.W.*, xlix, 1924, p. 261.

They are indistinguishable from the Port Jackson specimens. *Tasmanica* is closely allied to both *muscaria* and *johnstoni*, but can be distinguished by the longer spire and shorter aperture. It apparently generally inhabits somewhat deeper water.

Marginella kemblensis Hedley. (Plate vi, fig. 27.)

Hedley 782.

Locality.—Eighteen fathoms off North Head, the specimen figured 8 mm. in length. Also 14 fathoms off Long Reef. The type came from 63 fathoms off Port Kembla.

The long spire and dentate outer margin are good recognition points.

Marginella mayii Tate. (Plate vi, fig. 28.)

Hedley 784.

Locality.—The specimen figured was sorted from the Roy Bell Collection, from 60 fathoms off Twofold Bay, and is 13 mm. in length. Another specimen in the Australian Museum is from 9 fathoms, Port Jackson (C. Hedley).

This is apparently a rare species. It is allied to *kemblensis*, but differs in its larger size, different outline and longer aperture.

Marginella gabrieli May. (Pl. vi, fig. 29.)

May 663.

Localities.—Thirty to fifty fathoms off Sydney, the specimen figured 3.5 mm. in length, another 4 mm. Also 14 fathoms off Long Reef. Recorded from New South Wales by Iredale from the Roy Bell Collection from 60 fathoms off Twofold Bay.

This is a well-marked little species with long spire, the outer margin not dentate, and in fresh specimens three narrow, bright, orange bands on the body whorl. It is apparently a characteristic species of the continental shelf.

Marginella maugeana Hedley. (Plate vi, fig. 30.)

May 677.

Locality.—Fifteen fathoms, Jervis Bay, the specimen figured 5 mm. in length.

This is a new record for New South Wales. *Maugeana* is like *gabrieli*, but is larger, has no shoulder to the aperture, a different disposition of the columella plications, and one very broad and one narrow orange band on the body whorl.

Marginella cuneata, sp. nov. (Pl. vi, fig. 31.)

Shell of medium size, spindle shaped, the first two whorls glassy and colourless, the remainder ivory coloured with a colourless sub-sutural band. Spire long, of four whorls, the first dome shaped. Body whorl with shoulder well below suture, and median to the total length of shell, tapering below to give the regular spindle shape to the whole. Aperture about half the total length, with sloping shoulder continuing in the line of the whorls above, rather broad. Outer margin rounded, with a strong external varix, slightly inflected, the inner edge not dentate. Canal narrow and rounded. Columella plications four, strong, occupying more than half the length of the aperture, the lower pair the strongest, and very oblique, the upper pair more transverse. Length, 6 mm.

Locality.—Five to twenty fathoms, Twofold Bay, Roy Bell Collection (type).

Specimens in the Roy Bell Collection are labelled *M. dentiens* May, and were identified by Tomlyn and recorded by Iredale as such on the N.S.W. list, but this species is certainly not *dentiens*. Its nearest relation seems to be *M. jaffa* Cotton, a South Australian species from 130–200 fathoms, which is smaller and has a tooth on the outer margin.

Marginella geminata Hedley. (Pl. vi, fig. 32.)

Hedley 779.

Locality.—Fifteen fathoms off Clarence River, length of specimen figured 4.6 mm. It has been recorded from many stations down to 75 fathoms on the continental shelf, and specimens are occasionally washed up on the outer beaches.

This is the largest of a group of species with a wing-like expansion of the aperture, but I do not think this character alone warrants generic separation. The New South

Wales specimens were originally known as *M. laevigata* Brazier, but Hedley separated them, restricting *laevigata* to North Queensland and Torres Strait.

Marginella ochracea Angas. (Pl. vi, fig. 33.)

Hedley 789.

Localities.—Alive under rocks, North Harbour, Port Jackson, the specimen figured 3 mm. in length, also alive in mussel beds from the same locality, and common on the beach at Manly, Port Stephens and other localities.

This is another of the few species which is typically a reef dweller, and the shore form may be taken as the true *ochracea*. From deeper water I have separated one species and one variety, but it is possible that others may still have to be named. An allied species, *M. borda* Cotton, from South Australia, is half as large again, and has a smooth outer lip.

Marginella ochracea Angas, var. *crecere*, var. nov. (Pl. vi, fig. 34.)

Shell with the general characters of *ochracea*, but much broader, and a more pronounced shoulder. Length 2.7 mm.

Locality.—Eight to ten fathoms off Point Halliday, common.

This may possibly be *M. gatliffi* May, a Tasmanian deep-water species, but I am not satisfied with the identification. *Gatliffi* was added to the New South Wales list by Iredale from the Roy Bell Collection, the locality given as 60 fathoms off Twofold Bay. Examination of these specimens shows them to have a typical *ochracea* shape, though a little larger, the length being 4 mm. In view of their habitat, they may possibly be different, but no difference in shell characters could be detected. I think that without further evidence their separation is not justified, and in the meantime *gatliffi* should not be admitted to the New South Wales list.

Marginella laeviplicata, sp. nov. (Pl. vi, fig. 35.)

Shell small, subtrigonal, yellow. Spire of moderate length, three whorls, rounded, sutures distinct. Body whorl inflated medially, tapering to a point anteriorly. Aperture comparatively wide, joining the body whorl well below the suture, the shoulder well expanded, almost square, outer margin sinuate, thickened and reflected, smooth. Canal narrow and rounded. Columella plications four, occupying about half the length of the aperture, the lower two of moderate strength and very oblique, the third small and more transverse, the upper one very small and nearly obsolete, generally invisible from in front. Length, 3.2 mm.

Locality.—Thirty to thirty-five fathoms off Crookhaven, common, on sandy to muddy bottom (type).

This is very like *M. ochracea*, with which it is evidently closely allied. The main difference is in the weak columella plications, particularly the nearly obsolete upper one. This is such a definite shell character that I think it warrants specific separation, particularly in view of the very different location. The shoulder of the aperture is also much more expanded.

Marginella malina Hedley. (Pl. vi, fig. 36.)

Hedley 783.

Locality.—One hundred fathoms off Wollongong, specimen figured in Aust. Museum collected by C. Hedley, 3 mm. in length. We have it also from 30–35 fathoms off Crookhaven, where the specimens are slightly smaller.

This is a well-defined species, the high expanded aperture, as high as the spire, making it easily recognizable.

Marginella ovulum Sowerby. (Pl. vi, fig. 37.)

Hedley 792.

Localities.—Six to nine fathoms, Sow and Pigs Reef, Port Jackson, the specimen figured 9 mm. in length. Also 14 fathoms off Long Reef, and 30–35 fathoms off Crookhaven.

This and the following three species form a fairly well defined section of *Marginella* in which the spire is entirely submerged, and which is perhaps worthy of at least sub-generic rank. There are, however, connecting links, and I do not think this step, in the light of our present knowledge, is justified. *Ovulum* is the largest of the group, and is a well defined and constant species.

Marginella whani Pritchard and Gatliff. (Pl. vi, fig. 38.)

Hedley 800.

Localities.—Six to nine fathoms, Sow and Pigs Reef, the specimen figured 6.5 mm. in length; 30–35 fathoms off Crookhaven.

Associated with *M. ovulum*, than which it is smaller and much narrower, and with only three instead of four columella plaits.

Marginella nymphe Brazier. (Pl. vi, fig. 39.)

Hedley 788.

Localities.—Alive on seaweed at Point Halliday, the specimen figured 2 mm. in length, and also on seaweed in rock pools in numerous other localities along the coast. Also under stones and in mussel beds in North Harbour, Port Jackson. It is exceedingly abundant in shell sand on most of the outer beaches.

The animal is black. This is the smallest of this group of *Marginella*, and it is readily separated by this character alone, but the dentate outer margin is another useful recognition mark.

Marginella nielseni, sp. nov. (Pl. vi, fig. 40.)

Shell small, regularly oval, glassy and colourless, animal brown yellow. Spire entirely submerged. Aperture curved, the full length of the shell, narrow, widening anteriorly. Outer margin commencing from summit of shell, expanded in a regular curve above it, thickened, with a broad external varix, inflected, the edge not denticulate. Canal moderately broad, rounded. Columella plications three, occupying less than one-fourth the length of the aperture, the lower two strong, moderately oblique, the upper minute, separate, barely visible from in front. Length, 3.2 mm.

Locality.—Twenty-five to sixty fathoms off Bateman's Bay, weedy bottom, three specimens.

The nearest ally to this seems to be *M. flindersi*, Pritchard and Gatliff, which it generally resembles in form and size, but from which it differs in having three instead of two columella plaits. I have much pleasure in naming it after Mr. T. Nielsen, of Crookhaven, who has been continually sending me mud and sand obtained while trawling on the south coast.

Marginella rotunda, sp. nov. (Pl. vi, fig. 48.)

Shell broadly oval, of moderate size, white. Spire entirely submerged. Aperture curved, of nearly uniform width, but widening slightly anteriorly, longer than the shell. Inner margin with a broad band of callus extending right to the summit. Outer lip, commencing from summit, above which it is arched, regularly rounded, with a strong external varix, the edge thickened, slightly inflected, not denticulate. Canal fairly wide, rounded. Columella plications four, occupying about one-fourth of the total length of aperture, fairly strong, moderately oblique, the upper smaller and separate. Length, 4.4 mm.

Locality.—Thirty to thirty-five fathoms off Crookhaven.

This is a well-marked species, generally resembling *M. ovulum*, but less than half the size, broader, and with quite a different contour.

Marginella angasi Crosse. (Pl. vi, fig. 41.)

Hedley 775.

Localities.—Alive on seaweed in rock pools, North Harbour, the specimen figured 1.7 mm. in length, also under rocks, in kelp roots and in mussel beds from the same

locality. This species is also very common in shell sand on the outer beaches right along the coast.

When taken alive, the animal is bright red, making it a very conspicuous little shell. With the next three species, and possibly *subbulbosa*, it constitutes still another group of *Marginella* which later may be raised to generic or sub-generic rank. These are all small species and characterized by multi-plicate columellae, the number of plications being in the neighbourhood of 6 or 7. *Angasi* seems a typical shallow-water form, and I have never seen it in dredgings from deeper water.

Marginella angasi Crosse, var. *melania*, var. nov. (Pl. vi, fig. 42.)

Locality.—Alive under rocks, North Harbour, Port Jackson, the specimen figured 1.7 mm. in length.

The animal of this variety is quite black instead of the bright red of typical *angasi*. Comparison of the shells shows no appreciable difference, the shoulder of the aperture is a little higher, but no more than can be allowed by individual variation. Only two specimens were found, and a much longer series is needed, also a study of the animals themselves, to decide finally if more than one species is indicated. It seems better, however, to put this colour variation on record with a varietal name for future reference.

Marginella amphora, sp. nov. (Pl. vi, fig. 43.)

Shell small, subtriangular, white. Spire of two or three whorls, practically involute, but just visible from in front. Body whorl inflated, with prominent shoulder, tapering anteriorly. Aperture moderately wide, widening slightly anteriorly, the outer margin joining the body whorl at the suture, and rising in an even curve well above the top of the shell, slightly flattened medially, external varix very slight, the edge greatly thickened, very slightly inflected, not denticulate. Canal wide and rounded. Columella multi-plicate, eight plications in all, occupying the greater length of the aperture, the lower pair oblique, the others becoming more transverse, the upper four small separate and transverse. Length, 2.8 mm.

Locality.—Eight to ten fathoms off Point Halliday (type). I have also seen it on the outer beaches near Sydney, and it is probably not uncommon associated with *M. angasi*.

This is another of what might be termed the *angasi* group of *Marginella*, characterized by the multi-plicate columella. It differs from *angasi* by being larger, with a different contour, and by the prolongation of the aperture above the spire. From *multidentata* May, it chiefly differs by the broad nearly truncate top of the body whorl, which in the former is greatly restricted.

Marginella multidentata May. (Pl. vi, fig. 44.)

May 680.

Locality.—In going through the Roy Bell Collection a specimen was picked out from 60 fathoms off Twofold Bay, which agrees very well with this species, the length of the specimen 3 mm. This is a new record for New South Wales. The narrow top of the body whorl and more complete involution of the spire separate it from *M. amphora* previously described.

Marginella subauriculata May. (Pl. vi, fig. 45.)

May 690.

Locality.—Shell sand, Port Stephens, several specimens, the one figured 1.3 mm. in length.

This is the smallest of our *Marginella* species, and can be readily picked out by its exceedingly broad form. It agrees very well with May's figure and description, with which it has been identified, but it is noted that *subauriculata* is described as from 40 fathoms, while this is evidently a shallow water form. This is a new record for New South Wales.

Marginella carinata Smith. (Pl. vi, fig. 46.)

Hedley 777.

Locality.—The figure is taken from a specimen in the Australian Museum, 5 mm. long, labelled as presented by Prof. W. A. Haswell, from 800 fathoms 35 miles east of Sydney. It was collected during the excursion of the "Woy Woy" in 1906, conducted by Professor Haswell.

The original *carinata* was described by Smith from material of the "Challenger" Expedition from 400 fathoms, off Sydney, the station about which there has been much controversy. Smith mentions it as having three columella plications, while the specimen here figured has definitely four. Otherwise they agree well enough.

UNFIGURED SPECIES.

Marginella agapeta Watson.

Hedley 774.

This species was described by Watson as from 35 fathoms, east of Port Jackson, hard ground, Lat. S. 33° 51' 15", Long. E. 151° 22' 15". It has not since been found in New South Wales, but May recorded it from Tasmania, and includes a figure in his check list. May's figure, however, does not conform with the original, the only point of resemblance being the three columella plaits. The Tasmanian species is evidently something different and requires re-identification or a new name. If *agapeta* really occurs in New South Wales it is surprising that it has not come to light on one of the official dredging expeditions or in material brought up by the trawlers. According to the description it should be a conspicuous shell, something like *subbulbosa*, but about twice the size and with only three columella plaits. Pending confirmation by fresh material, it must be considered as a doubtful member of the N.S.W. fauna.

Marginella brazieri Smith.

Hedley 776.

This species was procured by the "Challenger" Expedition, as from 410 fathoms, off Sydney. This is the station, about the location of which there has been much controversy, and most of the material so labelled still awaits confirmation from local waters.

Hedley included *brazieri* in the list of mollusca from 80 fathoms off Narrabeen, procured by the "Miner" (1906), but later (*Proc. Linn. Soc. N.S.W.*, 1914, XXXIX, Pl. 4, p. 725) corrected this listing, making his specimen the type of *Marginella malina* Hedley, pointing out that *brazieri* is a larger shell with more exsert spire and lives in deeper water. There are four specimens in the Australian Museum collection identified by Hedley as *Marginella brazieri* Smith, from 250 and 300 fathoms, 23–27½ miles E. of Sydney, and these appear to be the specimens from which he made his comparison between that species and *malina*. They certainly more closely resemble Smith's figure and description than any other known *Marginella* from New South Wales.

Marginella multiplicata Tate and May.

Hedley 785.

This was admitted to the New South Wales list, from one immature specimen identified by Hedley from the "Thetis" collections. The species was taken in 63–75 fathoms off Port Kembla, N.S.W. (St. 49).

Marginella pumilio Tate and May.

Hedley 786.

This was also recorded by Hedley from "Thetis" material, but only one specimen was obtained from the same station as *multiplicata*. *Pumilio* is a minute species, and further material of it, and *multiplicata*, would help considerably in substantiating their inclusion in the New South Wales list.

EXPLANATION OF PLATES.

Plate v.

- Fig. 1. *Marginella turbinata* Sowerby.
 Fig. 2. " *turbinata* Sowerby var. *pusilla* Laseron.
 Fig. 3. " *olivella* Reeve.
 Fig. 4. " *infelix* Jousseaume.
 Fig. 5. " *inconspicua* Sowerby.
 Fig. 6. " *schoutanica* May.
 Fig. 7. " *punicea* Laseron.
 Fig. 8. " *pipire* Laseron.
 Fig. 9. " *strangei* Angas.
 Fig. 10. " *frequens* Laseron.
 Fig. 11. " *binivitta* Laseron.
 Fig. 12. " *victoriae* Gatliff and Gabriel.
 Fig. 13. " *sinuata* Laseron.
 Fig. 14. " *subbulbosa* Tate.
 Fig. 15. " *sinapi* Laseron.
 Fig. 16. " *translucida* Sowerby.
 Fig. 17. " *humeric* Laseron.
 Fig. 18. " *freycineti* May.
 Fig. 19. " *freycineti* May var.
 Fig. 20. " *cratericula* Tate and May.
 Fig. 21. " *stilla* Hedley.
 Fig. 22. " *quinqueplicata* Laseron.
 Fig. 23. " *mustellina* Angas.
 Fig. 24. " *haswelli* Laseron.

Plate vi.

- Fig. 25. *Marginella muscaria* Lamarck.
 Fig. 26. " *tasmanica* Ten.-Woods.
 Fig. 27. " *kemblensis* Hedley.
 Fig. 28. " *mayii* Tate.
 Fig. 29. " *gabrielii* May.
 Fig. 30. " *maugeana* Hedley.
 Fig. 31. " *cuneata* Laseron.
 Fig. 32. " *geminata* Hedley.
 Fig. 33. " *ochracea* Angas.
 Fig. 34. " *ochracea* Angas var. *creocere* Laseron.
 Fig. 35. " *laeviplicata* Laseron.
 Fig. 36. " *malina* Hedley.
 Fig. 37. " *ovulum* Sowerby.
 Fig. 38. " *whani* Pritchard and Gatliff.
 Fig. 39. " *nympha* Brazier.
 Fig. 40. " *nielsenii* Laseron.
 Fig. 41. " *angasi* Crosse.
 Fig. 42. " *angasi* Crosse var. *melania* Laseron.
 Fig. 43. " *amphora* Laseron.
 Fig. 44. " *multidentata* May.
 Fig. 45. " *subauriculata* May.
 Fig. 46. " *carinata* Smith.
 Fig. 47. " *johnstoni* Petterd.
 Fig. 48. " *rotunda* Laseron.

Unfigured: *M. agapeta* Watson; *M. brazieri* Smith; *M. multiplicata* Tate and May;
M. pumilio Tate and May.



