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MONOGRAPHS OF THE GENERA *MEGALACRON* AND
RHYTIDOCONCHA (PAPUININAE: CAMAENIDAE)

By WILLIAM J. CLENCH* and RUTH D. TURNER*

Pls. 8-11, Text figs. 1-9.

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MONOGRAPHS OF THE GENERA *MEGALACRON* AND
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SUMMARY

This present study is a companion report to the one published in this Journal, No. 6, January, 1963, which covered the genera *Papustyla*, *Forcartia* and *Meliobba*. The two genera, *Megalacron* and *Rhytidoconcha*, reviewed in this report occur in the Bismarck Archipelago with two species, *M. boyeri* F. & B., found only on Woodlark Id., off the north-east coast of New Guinea, and *M. alfredi* Cox from Buka and Bougainville Islands in the northern Solomon Islands.

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ABBREVIATIONS

AM — Australian Museum, Sydney.

AMNH — American Museum of Natural History, New York.

BM — Berlin Museum, Berlin, Germany.

BMNH — British Museum (Natural History), London.

BPBM — B. P. Bishop Museum, Honolulu, Hawaii.

CM — Chicago Natural History Museum, Chicago, Illinois.

DM — Dominion Museum, Wellington, New Zealand.

MCZ — Museum of Comparative Zoology, Cambridge, Massachusetts.

MM — Manchester Museum, Manchester, England.

SMF — Senckenberg Museum, Frankfurt am Main, Germany.

UM — Museum of Zoology, Univ. of Michigan, Ann Arbor, Michigan.

UMK — Univ. Museum, Kobenhavn, Denmark.

USNM — United States National Museum, Washington, D.C.

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Genus *MEGALACRON* I. Rensch.

Pileolus Lesson, 1830, *Voyage Autour du Monde . . . la Coquille*, *Zoologie*, 2:313; non *Pileolus* Sowerby, 1823; Ehrenberg, 1843; Spriesterbach, 1919. [Two species are described, *tuffetii* and *gaberti*, the former is here selected as the type species.]

Megalacron I. Rensch, 1934, *Archiv. für Naturgeschichte*, N.F., 3:487 (type species, *Helix novaegeorgiensis* Cox, original designation).

Emiralena Iredale, 1941, *Australian Zoologist*, 10:84 (type species, *Helix moseleyi* Smith, original designation).

Lisprelia Iredale, 1941, *Australian Zoologist*, 10:85 (type species, *Helix novaegeorgiensis* Cox, original designation).

Pinnadena Iredale, 1941, *Australian Zoologist*, 10:84 (type species, *Helix lombei* Pfr. [sic.], original designation).

The genus *Megalacron* is limited mainly to the Bismarck Archipelago with two outliers, *M. boyeri* F. & B. occurring only on Woodlark Island, off the north-eastern tip of New Guinea, and *M. alfredi* Cox from Buka and Bougainville Islands in the northern Solomons.

There are three rather well defined species groups in this genus. The species group of *M. lambei* Pfr. occurs in the easterly portion of the Bismarcks, from Mussau on the north, south through New Ireland, eastern New Britain and Buka-Bougainville Islands in the northern Solomon group of islands, and in Woodlark Island, off the south-east coast of New Guinea.

The species group of *M. phaeostoma* v. Martens occurs on Manus Island, Admiralty Islands, then jumps to New Hanover, New Ireland and Nisson.

The species group of *M. novaegeorgiensis* Cox occurs only on Manus Island and its associated islands, Admiralty Islands, and two outliers, in the Ninigo Group and on the French or Vitu Islands, between the Admiralty Islands and New Britain.

The genus *Megalacron* is composed of species with imperforate shells which range from lenticular to moderately attenuate in shape. The whorls of some species may be strongly convex and rounded, while in others the whorls may be flat sided and sharply keeled. The papuinoth notch on the outer lip is absent or only faintly indicated. Colour patterns are of spiral bands and zigzag markings of brownish to blackish brown. Yellow is present in some specimens of *M. klaarwateri* Rensch. The sculpture is quite similar in all species other than *M. alfredi* Cox, which is smooth. This sculpture consists of irregular, interlacing, incised lines which separate small areas from one another. Above the whorl periphery these are arranged in a diagonal pattern, while below the periphery they are in spiral arrangement.

ANATOMICAL NOTES

In our earlier paper we reiterated the statement of Pilsbry that a study of the variation in the genitalia and radulae of the many species complexes should prove fruitful and contribute greatly to an understanding of the phylogeny and paths of dispersal of the Papuininae, and this is certainly proving to be the case. In this study we are considering 18 species, 16 in the genus *Megalacron* and 2 in *Rhytidoconcha*. Species such as *tabarensis* and *lambei*, which are found on several islands, have

produced clearly defined subspecies, bringing the total number of forms considered to 27. Of the 18 species the soft parts of only 9 were available for study, but fortunately these were well distributed throughout the species complexes of *Megalacron* as established on the basis of the shells. The following were studied: *tabarensis*, *lihirensis* and *spadicea dunckeri* in the "lambei group"; *phaeostoma*, *admiralitatis* and *melanesia* in the "phaeostoma group"; *novaegeorgiensis*, *klaarwateri* and *lufensis* in the "novaegeorgiensis group" and *confirmata* in the genus *Rhytidoconcha*.

Rensch figured the reproductive system of *Megalacron lambei vuatomensis* Rensch (1934, p. 449) and that of *Rhytidoconcha inquierenda* Rensch (1933, p. 314). Both agree with the closely related species which we have studied.

All species studied in the genus *Megalacron* are similar to *Papustyla* in having a long spermathecal duct, in having a small inconspicuous epiphallus, in lacking a flagellum and having the jaws ribbed. Most species in *Megalacron* have the denticles on the radula arranged in V-shaped rows as in *Papustyla*, the denticles of one transverse row offset from those of the next, but in *klaarwateri*, *novaegeorgiensis* and *lufensis* they are in nearly straight rows, the transverse rows of denticles lining up with each other. Species in *Papustyla*, at least as seen in *hindei*, produce a few rather large eggs with calcareous shells, there being 16 in the specimen studied. In *Megalacron* both *klaarwateri* and *novaegeorgiensis* are ovoviparous, producing only two large young at a time. Unfortunately in no other species were the dissected specimens carrying young or eggs. Additional material is needed for study in order to fill in the many gaps in our knowledge of the life histories of the Papuininae.

All specimens dissected were preserved, some of them for many years; therefore, notes on the coloration of the animal are tentative. The amount of shrinkage which has occurred is impossible to estimate, and there is no way of knowing the age or the phase of the breeding cycle most of the specimens were in, though all had shells with fully developed lips and were therefore considered adults. Consequently no significance is given to minor differences in proportions. Brief notes are given with each species dissected, pointing out major characteristics. The various organs have been separated somewhat for purposes of illustration. The spermatheca and its duct are normally closely attached to the uterus and prostatic gland, and the vas deferens passes down the side of the oviduct and vagina, through the penio-oviducal angle and up the side of the penis to which it is closely attached.

As with our previous paper, only the anatomy of the reproductive system is illustrated here, as it is this system which is most useful in classification. It is hoped, however, that with the completion of these studies sufficient preserved material will be available so that a survey of the anatomy of the subfamily Papuininae will be possible.

Species Group of *Megalacron lambei* Pfeiffer.

The several species contained in this group are characterized by having depressed and strongly convex whorls, the whorl periphery being round or sharply keeled. Shell usually with spiral bands, with or without zigzag marks between the bands.

Distribution: Occurring in the easterly Bismarcks from Mussau south through New Ireland, eastern New Britain, Buka and Bougainville in the northern Solomons and Woodlark Island, off the north-eastern tip of New Guinea.

Megalacron coniformis (Férussac).

Plate 9, fig. 9.

Helix (Helicostyla) coniformis Férussac, 1821, *Tableaux Systématiques des Animaux Mollusques*, p. 47, pl. 108, fig. 1 (locality unknown [Port Praslin, New Ireland]). [Type probably in the Paris Museum.]

Helix (Pileolus) tuffetii Lesson, 1830, *Voyage Autour du Monde de la Coquille, Zoologie*, 2:313, pl. 10, fig. 3 (Port Praslin, New Ireland [Bismarck Archipelago]).

Helix turbinata Deshayes, 1831, *Encyclopédie Méthodique*, vers. 2:265 (New Zealand).

Helix coniformis Quoy and Gaimard, 1832 [in] Dumont d'Urville, *Voyage de l'Astrolabe*, 2:105, pl. 8, fig. 15-17 (Carteret Harbor, New Ireland).

Helix coniformis Férussac. Férussac and Deshayes, 1850, *Hist. Nat. Gén. et Part. des Mollusques*, 1:322, pl. 108, fig. 1 (Port Praslin [Praslin], New Ireland).

Helix touffetii 'Lesson' Férussac and Deshayes, 1850, *Hist. Nat. Gén. et Part. des Mollusques*, 1:322 [error for *tuffetii* Lesson].

Description: Shell trochiform, reaching about 23.5 mm. in greater diameter, nearly smooth, very finely sculptured and imperforate. Whorls 5, strongly convex. Spire elevated and cast at an angle of about 75°. Color consisting of 2 spiral bands of reddish brown, one above and one below the periphery. Peripheral area white; remainder of shell, between the suture and the spiral band, a pale ivory, marbled with irregular reddish brown markings. Lip white, rather broad, reflected and cast at an angle of about 25° from the base. Sculpture consisting of minute and irregular incised lines which cross the growth lines at a right angle.

Height	Width	
21 mm.	20 mm.	Férussac and Deshayes (figure).
23 mm.	22 mm.	New Ireland.
22.2 mm.	23.5 mm.	"
20 mm.	23.2 mm.	"

Remarks: We have seen but three specimens of this species contained in the collections of the University of Michigan and the British Museum. In the specimens studied there are a few small and irregular patches of brown in the ivory area above the supraperipheral band. Both Férussac and Quoy and Gaimard described this species under the same name. The figures are somewhat different, but the descriptions would indicate that only one species was involved. The two type localities, Carteret Harbor and Port Praslin, are only about ten miles apart. It is quite possible that *tuffetii* is a dark phase of this species.

Specimens examined: NEW IRELAND: (UM; BMNH).

Megalacron lambei (Pfeiffer).

Plate 8, fig. 1.

Helix lambei Pfeiffer, 1856, *Malakozologische Blätter*, 3:239 (Admiralty Islands). [Lectotype, British Mus.; paratypes, Mus. Comp. Zool., no. 72049.]

Helix lombei Pfeiffer, 1856 [1857], *Proc. Zool. Soc. London*, p. 382, pl. 36, fig. 6-7 [error for *lambei* Pfeiffer].

Description: Shell subdepressed, conic, light in structure but strong, reaching 20 mm. in height, imperforate and smooth. Whorls 5 and strongly convex. From the second and to the body whorl there are two bands above and below the periphery which overlay in part a series of

irregular subaxial bars of brown. There is considerable variation in the amount of coloration even among specimens obtained from one locality. Spire depressed and produced at an angle of 95° . Aperture subcircular and slightly descending. Parietal lip consisting of a very thin glaze, palatal lip white, somewhat thickened, reflected and produced at an angle of 55° from the base. Columella white flattened and strongly arched. Suture well defined and slightly indented. Sculpture consisting of numerous and fine growth lines. The fine sculpture consists of oblique, irregular depressions and ridges. Protoconch consisting of $1\frac{1}{2}$ smooth whorls.

Height	Width	
19 mm.	29 mm.	Paratype of <i>lambei</i> Pfr.
20.5 mm.	29.5 mm.	Duke of York Island, Bismarck Archipelago.

Remarks: The type locality, "Admiralty Islands", is certainly in error and also the locality, Solomon Islands, which has been frequently listed for this species. So far as now known, it occurs on Duke of York Island (Neu Lauenburg), off the Gazelle Peninsula of New Britain, New Britain and New Ireland, Bismarck Archipelago. Rensch has reported it from New Ireland without further data, but we have not seen his specimens.

Specimens examined: DUKE OF YORK ID.: (MCZ; BMNH). NEW IRELAND: (MCZ). NEW BRITAIN: Mope (MCZ).

Megalacron lambei vuatomensis (Rensch).

Plate 8, fig. 4; Plate 11, fig. 10-12.

Papuina lambei vuatomensis Rensch, 1934, *Archiv für Naturgeschichte, Leipzig*, N.F. 3:450, text fig. 1 (anatomy), (Vuatom Island, Neu Pommern Island [New Britain], Bismarck Archipelago). Holotype, Berlin Mus.; paratypes, Basel Mus. and Acad. Nat. Sci. Phila.

Description: Shell depressed, rather thin and reaching 23 mm. in greater diameter. Color light ivory white with two rather narrow bands of dark mahogany brown near and above and below the periphery. These bands are somewhat irregular with the color somewhat diffused. Whorls $4\frac{1}{2}$, convex and rather bluntly keeled at the periphery. Spire depressed, may be straight sided and produced at an angle of 105° . Aperture subovate and cast at an angle of 45° from the base. Parietal wall thinly glazed. Palatal lip reflected and slightly thickened. Columella short, arched to the right and moderately keeled on its inner edge. Umbilical depression rather deep. Suture clearly marked but not impressed. Sculpture consisting of numerous and fine growth lines which are crossed by fine and very irregular depressions.

Height	Width	
15.5 mm.	23 mm.	Paratype.

Remarks: This subspecies differs from the typical form by a reduction in the color pattern, with only the two peripheral bands of brown remaining. It is known only from the small island of Vuatom (Watom or Mau Id.), which is just off the north coast of the Gazelle Peninsula of New Britain Island.

Specimens examined: NEW BRITAIN: Vuatom Id. (Basel Mus.; ANSP).

Megalacron lambei novohibernica (M. Smith).

Plate 9, fig. 1.

Papuina lambei novohibernica M. Smith, 1946, *Nautilus*, 59:94, pl. 9, fig. A ([Kavieng] New Ireland [Bismarck Archipelago]). [Holotype, Florida State Museum, Gainesville; paratypes Mus. Comp. Zool. no. 157309; 157310.]

Description: Shell depressed-turbinate, imperforate and rather strong. Whorls $4\frac{1}{2}$ to 5, strongly convex and with a prominent keel at the whorl periphery. Color consisting of two solid bands of dark mahogany brown, one above and the other below the whorl periphery. Mottled color pattern consisting of strong subaxial, sigmoid, brown bars more or less in axial arrangement on a straw yellow to ivory background.

Height	Width	
16 mm.	26.5 mm.	Holotype.
16 mm.	24.5 mm.	Paratype.
16.5 mm.	27 mm.	"

Remarks: This subspecies differs from typical *lambei* by being more sharply keeled, having the whorls less globose and having a small basal tooth on the columella. The color pattern is similar, differing only in having the color bands produced almost centrally above and below the periphery, while in *lambei* they are both very close to the periphery. Thus on the early whorls the suprapерipheral band appears centrally placed in *novohibernica* and sutural in *lambei*.

Specimens examined: NEW IRELAND: Kavieng, North Cape (Florida State Mus.; MCZ).

Megalacron tabarensis (Rensch).

Plate 9, fig. 2.

Papüna tabarensis Rensch, 1933, *Zool. Anzeiger*, 102:316, fig. 4 (Tabar Island, Bismarck Archipelago). [Holotype, Basel Mus., Switzerland; paratypes, Berlin Mus. and Mus. Comp. Zool. no. 59848.]

Description: Shell depressed-turbinate, generally keeled, imperforate and minutely sculptured. Base color a light ivory with a varying pattern of dark reddish brown. A typical specimen has two spiral bands of brown, one above and one a little below the periphery. From the upper band to the suture and from the lower band to the umbilical area there are numerous, very irregular zigzag bars of this same coloration. The peripheral area between the bands is ivory. A few specimens lack the bands but have the zigzag bars and rarely a specimen has only the spiral bands. A very few specimens are nearly entirely ivory but show the pattern when viewed in transmitted light by the opaque and translucent areas of the shell. Some specimens show a fusion of the bands and the zigzag bars giving the shell a nearly uniform brown color. In transmitted light the brownish areas are translucent and the ivory areas opaque. Whorls $4\frac{1}{2}$ and moderately convex. Spire depressed. Aperture subcircular with the outer lip reflected and generally white, occasionally stained with brown opposite the spiral bands. Parietal lip consisting of a very thin glaze. Columella strongly arched and somewhat angled where it meets the base of the lip. Sutures moderately indented. Sculpture consisting of numerous and very fine diagonal incised lines above the whorl periphery. Below the periphery this same type of sculpture is spiral.

Height	Width	
17 mm.	27 mm.	Tabar Island, Bismarck Archipelago.
16.5 mm.	24.5 mm.	" "
14.5 mm.	23 mm.	" "

Remarks: This species is allied to *M. novohibernica* (M. Smith). It differs by being more elevated, being lighter in structure and having a more open pattern in its coloration.

M. tabarensis heads the assemblage of subspecies that occupy the line of islands that lie about 25 to 40 miles off the east coast of New Ireland in the Bismarck Archipelago.

Specimens examined: NEW IRELAND: Tabar Id. (AMNH; MCZ).

Megalacron tabarensis lihirensis (Rensch).

Plate 11, fig. 1-3; text figure 1.

Papilna lambei lihirensis Rensch, 1934, *Archiv für Naturgeschichte N.F.*, 3:450 (Lihir Island, Lihir Group, Bismarck Archipelago). [Holotype, Berlin Mus.; paratype, Acad. Nat. Sci. Philadelphia no. 167801.]

Description: This subspecies is close to the typical form but does differ by being slightly larger, more acutely keeled and in having a modification of the color pattern. The chevron-shaped pattern of the typical form in this subspecies differs by becoming nearly spiral, particularly so on the base.

Height	Width	
19 mm.	29.5 mm.	Malie Id., Lihir Group.
17 mm.	27.5 mm.	" "
16 mm.	27 mm.	" "

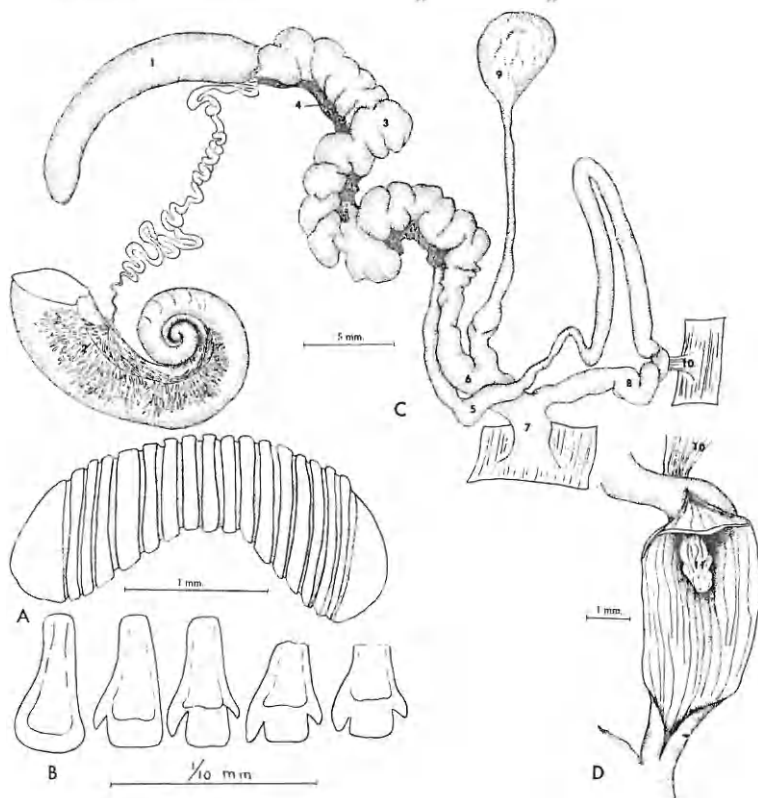


Fig. 1.

Megalacron tabarensis lihirensis (Rensch). A, jaw. B, radular teeth.

C, complete reproductive system. D, dissected penis.

Labelling for reproductive system:—1, albumen gland. 2, ovotestis. 3, uterus. 4, prostate gland. 5, vas deferens. 6, vagina. 7, atrium. 8, penis. 9, spermatheca. 10, penial retractor muscle. 11, penis papilla. 12, young in the uterus.

Remarks: Animal a uniform light tan. The jaws, denticles of the radula and the reproductive system are shown in text figure 1(a-d). The jaws are strongly ribbed (a) and the denticles of the radula are arranged in staggered V-shaped rows. The penis was thin walled, lacking pilasters and the penis papilla large.

Specimens examined: NEW IRELAND: Malle Id., Mashet Id. (both AMNH; MCZ).

Megalacron tabarensis mahurensis (Rensch).

Plate 8, fig. 5-6.

Papuina lambei mahurensis Rensch, 1934, *Archiv für Naturgeschichte N.F.*, 3:451 (Mahur Island, Lihir Group, Bismarck Archipelago). [Holotype, Senckenberg Mus. no. 7578.]

Description: This subspecies is close in its relationship to the typical species, differing mainly in its more convex whorls and by the color pattern. In *mahurensis* the zigzag bars are almost entirely lacking on the basal area and when present above the periphery they are usually reduced to a series of brownish dots margining the suture. The lower of the two peripheral bands is always wider. The one above the periphery and the upper band on many specimens may be lacking entirely.

Height	Width	
18.5 mm.	27 mm.	Mahur Id., Lihir Group, Bismarck Archipelago.
16.5 mm.	22.5 mm.	" " "
16 mm.	25 mm.	" " "

Remarks: This subspecies differs from both *tabarensis* and *lihirensis* by being somewhat smaller, proportionately higher and having the color marking more irregular, and in many specimens limited to only a series of dots along the suture.

Specimens examined: NEW IRELAND: Mahur Island, Lihir Group (AMNH; MCZ).

Megalacron tabarensis warrenae, new subspecies.

Plate 9, fig. 3-4.

Description: Shell subglobose, imperforate and rather solid, reaching about 30 mm. in width. Whorls $4\frac{1}{2}$ to $4\frac{3}{4}$, strongly convex and with a minor keel developed at the periphery. Shell egg shell-white, the color pattern consisting of two spiral bands of reddish brown, one just above and the other just below the whorl periphery. These bands vary considerably in width and intensity. In addition there may be irregular brownish zigzag lines between the upper band and the suture and rarely they may occur between the lower band and the base of the shell. When viewed with transmitted light the brown areas are translucent and the white opaque. In a large series the banded forms with the zigzag lines are far more abundant. Sculpture consisting of very fine interrupted striae which slant diagonally across the whorl. Periostracum very thin, pale yellow and deciduous.

Height	Width	
19 mm.	26 mm.	Holotype.
19 mm.	30 mm.	Paratype.
19.5 mm.	27 mm.	"
16.5 mm.	22.5 mm.	"

Types: Holotype, American Museum of Natural History no. 111300 from Boang Island, Tanga Group, off the east coast of New Ireland, Bismarck Archipelago, W. F. Coultas, collector, Whitney South Sea Expedition; paratypes, MCZ no. 181333; 181334.

Remarks: This subspecies is closely allied to *tabarensis* but differs in being more globose and in having a greater development of the banded forms and having the zigzag markings smaller and much more irregular.

Named for the late Mrs. Fiske Warren, who was much interested in tree snails. We had the use of her collection, and later this collection was donated to the Museum of Comparative Zoology.

Megalacron tabarensis anirensis (Rensch).

Plate 8, fig. 2-3.

Papuina lambei anirensis Rensch, 1934, *Archiv für Naturgeschichte N.F.*, 3:451 (Anir Island, S.E. of New Ireland, Bismarck Archipelago); Zilch, 1960, *Archiv für Molluskenkunde*, 89:193, pl. 17, fig. 21 [Holotype, Senckenberg Museum no. 7580.]

Description: We have not seen this subspecies. The following is a translation by J. C. Bequaert of the original diagnosis. "On the volcanic island Anir, S.E. of Neu Mecklenburg, which was also visited by the Hansa South Sea Expedition in 1909 . . . there developed a race, which becomes clear through the similar shape of the 4 specimens before me. The zigzag markings, almost as fine as in the specimens of *tabarensis*, are however almost colorless hyaline, only the brown stripe above and below the carina is strongly colored and contrasts with the whitish ground color of the shell. Size and shape agree with those of the typical race."

Remarks: On the basis of the description and the figures of the holotype (Zilch, 1960) it is a member of the *tabarensis* complex. According to Rensch it varies in its measurements from 18.5 mm. to 20.9 mm. in height and from 25.5 mm. to 29 mm. in greater diameter.

Megalacron spadicea (Fulton).

Plate 8, fig. 13; Plate 9, fig. 7.

Papuina spadicea Fulton, 1902, *Ann. Mag. Nat. Hist.*, (7), 9:318 (Neu Mecklenburg Island [New Ireland], Bismarck Archipelago, C. Wahnes, collector). [Holotype, BMNH no. 1902.5.28.34; paratypes, MCZ no. 159151; ANSP no. 84651.]

Papuina humilis Fulton, 1902, *Ann. Mag. Nat. Hist.*, (7), 9:317 (Nusa, Neu Mecklenburg [New Ireland], Bismarck Archipelago, C. Wahnes, collector). [Holotype, BMNH 1902.5.28.36; paratypes, USNM no. 220053; MCZ no. 92352; 159152; 187549; ANSP no. 84652.]

Description: Shell depressed-turbinate, imperforate, with a blunt keel and minutely sculptured. Color a light golden brown with a slightly darker spiral band just below the periphery and occasionally with a lighter band at the periphery. Spiral bands when present are indistinct. There is a darkened area just behind the lip. Whorls 5 to 5½, strongly convex and bluntly keeled. Spire conic and produced at an angle of 93°. Aperture subcircular, the outer lip reflected and somewhat irregularly curved. Inner lip consisting of a thin glaze. Columella short and arched into the base of the lip. Sutures indented. Sculpture consisting of very fine, irregular, incremental lines.

Height	Width	
19 mm.	27 mm.	Paratype (<i>humilis</i>).
20 mm.	25.5 mm.	" "
19 mm.	26 mm.	" "
20.5 mm.	28 mm.	" (<i>spadicea</i>).
22 mm.	25 mm.	" "
21.5 mm.	29 mm.	Kavieng, New Ireland.

Remarks: Both *humilis* and *spadicea* were described by Fulton based upon material collected by C. Wahnes. *M. humilis* came from Nusa, a small island just off Kavieng. Fulton did not localize the type locality of *spadicea* beyond New Ireland. We have, however, a series of this species collected at Kavieng, and we here limit the type locality to this place. So far as we can see, *humilis* is but a minor race of *spadicea*, the only difference being its slightly smaller size and the lack of the faint spiral bands possessed by *spadicea*. However, the presence or absence of the bands has little value, as this variation is quite common and banded and bandless forms occur in the same population in most other species in this complex.

Specimens examined: NEW IRELAND: Nusa Islet (MCZ; ANSP; USNM); Kavieng (MCZ; ANSP).

Megalacron spadicea dunckeri (Leschke).

Plate 8, fig. 8; Plate 9, fig. 5-6; text fig. 2.

Papuina dunckeri Leschke, 1912, *Jahrbuch der Hamburg Wissensch. Anstalten*, 29:105, fig. 7 (St. Matthias [Mussau] Island, Bismarck Archipelago).

Papuina enaiensis Leschke, 1912, *Jahrbuch der Hamburg Wissensch. Anstalten*, 29:106, fig. 8 (St. Matthias [Mussau] Island, Bismarck Archipelago).

Papuina lambei matthiae Boettger, 1918, *Abhandlungen Senckenbergischen Naturforschenden Gesell.*, 36:294, pl. 23, fig. 18a-c (small island near St. Matthias [Mussau Island, Bismarck Archipelago]). [Lectotype, Senckenberg Museum no. 5939.]

Description: Shell depressed-turbinate, imperforate, moderately to strongly keeled and minutely sculptured. Color a light golden brown with one or two spiral bands of dark brown, one above and one below the periphery. When only a single band is present, it is always below the periphery. All other characters appear to be the same as in the typical form. Rarely there are specimens which have developed numerous zigzag marks.

Height	Width	
17 mm.	29 mm.	Mussau Island, St. Matthias Group.
18 mm.	27.2 mm.	„ „ „
19 mm.	27.5 mm.	Emirau „ „

Remarks: This subspecies is very close to *M. spadicea* Fulton. It differs in being a little more depressed and in having the bands, when present, regular and darker in color. Other characters are the same as those of the typical form. Leschke's variety *enaiensis* is only a more strongly keeled specimen, but this character is variable as our present series illustrates, and *matthiae* Boettger appears to be an absolute synonym of *dunckeri*.

Head and dorsal part of the body a uniform tan. Edge of mantle and sole of foot pale ivory. The jaw, denticles of the radula and the reproductive system are shown in text figure 2(a-e). The jaw is moderately ribbed (a); the denticles of the radula (b) arranged in staggered V-shaped rows. The vas deferens extremely thick especially at its upper end near the prostate gland. The penis (d) is small, thin, and internally has three low fleshy pilasters running its entire length. There is a long, thin penis papilla, shown enlarged in (e).

Specimens examined: MUSSAU ISLAND: Emirau Island (both MCZ; USNM; ANSP); Bolin; Tasitel; 7 km. WSW of Tabol (all UMK).

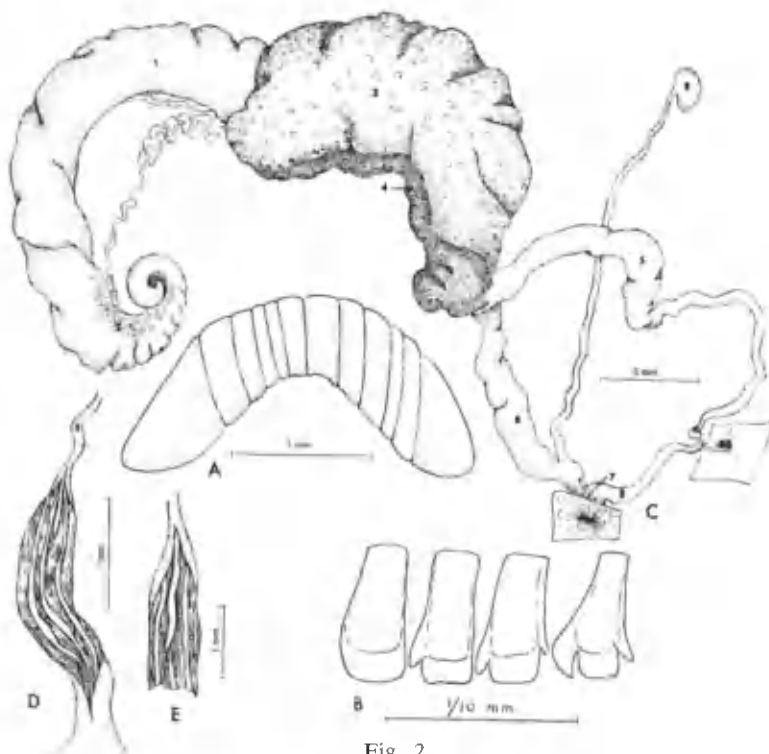


Fig. 2.

Megalacron spadicea dunckeri (Leschke). A, jaw. B, radular teeth. C, complete reproductive system. D, dissected penis. E, upper end of penis enlarged to show the slender penis papilla. (See figure 1 for labelling of the reproductive system.)

Megalacron juttingae, new species.

Plate 9, fig. 8.

Description: Shell trochiform, imperforate, strong and very finely sculptured. Ground color white. Whorl periphery with a white, spiral band, margined above and below by narrow black bands, and these two bands margined by two somewhat broader bluish bands. Whorls $5\frac{1}{2}$ and strongly convex. Spire elevated and produced at an angle of 70° . Aperture subovate and cast at an angle of about 30° from the base. Parietal wall thinly glazed. Palatal lip broad and reflected. Columella short and arched to the right and moderately keeled on its inner edge. Suture well defined and slightly indented. Sculpture consisting of exceedingly fine, irregular incised lines which are diagonal above the periphery and spirally arranged below.

Height

Width

24 mm.

28 mm.

Holotype.

Types: Holotype. University Museum, Kobenhavn, Denmark, from the "Noona Dan" Expedition: Kalili Bay ($3^\circ 27'S$; $151^\circ 56'E$), New Ireland, Bismarck Archipelago, May, 1962. A single, immature, dead paratype was collected 10 miles south-east of Kalili Bay, New Ireland, Mus. Comp. Zool. no. 248834.

Remarks: This species apparently is not closely related to any other species in the *lambei* complex. The peripheral bands on the early whorls are brownish but as the shell grows the bands become darker and are black upon maturity. It is our pleasure to name this species for Dr. W. S. S. van Benthem Jutting of the Zoologisch Museum, Amsterdam, in recognition of her excellent publications on the land and freshwater mollusks of Indonesia and Melanesia.

Megalacron boyerii (Fischer and Bernardi).

Plate 10, fig. 13.

Helix boyerii Fischer and Bernardi, 1856, *Jour. de Conchy.*, 5:297, pl. 9, fig. 8-9 (les îles de l'Amirante [Admiralty Islands]).

Helix (Papuina) boyerii Fischer and Bernardi, Pilsbry, 1891, *Man. of Conch.*, (2), 7:47, pl. 13, fig. 48-49 (Louisiade Islands).

Description: Shell trochiform, imperforate, strong and finely sculptured. Ground color a pale ivory, seen mainly as narrow peripheral and sutural bands; remainder of shell a straw-yellow which generally becomes a little darker where it margins the peripheral band of white. Whorls 5, strongly convex and with a slightly developed peripheral keel. Spire elevated and produced at an angle of about 70°. Aperture sub-quadrate and cast at an angle of 25°. Parietal wall thinly glazed. Palatal lip white and reflected. Columella arched to the right, rather broad and moderately keeled on its inner edge. Suture well indented. Sculpture consisting of exceedingly fine, irregular, incised lines, diagonal above the periphery and spirally arranged below. Protoconch poorly defined and not sculptured.

Height	Width	
22 mm.	26.5 mm.	Woodlark Island, New Guinea.
23 mm.	27.2 mm.	" "

Remarks: Many species of land and freshwater mollusks described during 1840-1890 had erroneous locality data. Both of the localities given above in the references are in error. This species does not occur in the Admiralty or the Louisiade groups, but is known only from Woodlark Id., off the north-east coast of New Guinea.

Its type of coloration would place it in the *M. lambei* group and somewhat similar to the *spadicea*-*dunckeri* complex of northern New Ireland and Mussau Island.

Specimens examined: WOODLARK IDS.: (MCZ; AM; USNM).

Megalacron alfredi (Cox).

Plate 8, fig. 7; Plate 10, fig. 6.

Helix alfredi Cox, 1871, *Proc. Zool. Soc. London*, p. 323, pl. 34, fig. 1-1a (Solomon Islands). [Holotype, Australian Mus. no. C.62688.]

Helix (Merope?) harnaclei E. A. Smith, 1877, *Ann. Mag. Nat. Hist.*, (4), 20:242 (Hawaii, Sandwich Islands). [Lectotype, British Mus. no. 77.7.14.1.]

Helix alfredi trichroa v. Martens, 1881, *Conchologische Mittheilungen*, 1:5, pl. 2, fig. 8-10 (New Ireland). [Holotype, Berlin Mus.]

Description: Shell moderately depressed, imperforate, light in structure and smooth. Ground colour light ivory or pale brown and generally with one or more spiral bands of a dark blackish brown. These dark bands vary greatly in their width on different specimens and occasionally broaden to the extent that the shell is nearly all blackish brown. The

most abundant form appears to be one with two narrow bands at the periphery, the peripheral area being either ivory or light brown. Whorls $4\frac{1}{2}$ to 5, and strongly convex. Spire slightly elevated and produced at an angle of 95° to 115° . Aperture subcircular to subquadrate and cast at an angle of about 45° . Parietal wall thinly glazed. Palatal lip narrow and reflected. Columella arched. Suture defined and slightly impressed. Sculpture consisting of very fine growth lines, the usual, minute incised lines being absent in this species. Protoconch not separable from the remainder of the shell.

Height	Width	
21.5 mm.	29 mm.	Bougainville Id., Solomon Islands.
22 mm.	32.5 mm.	" "
17.5 mm.	30 mm.	" "
22.5 mm.	30.5 mm.	Buin, "
19 mm.	31.5 mm.	Buka Id., "
14 mm.	22 mm.	" "

Remarks: A variable species in both coloration, shape and size. So far as known this species is limited to Bougainville and Buka Islands, Solomon Islands. Buka is a small island just off the north-western end of Bougainville. The earlier records of Hawaii and New Ireland are erroneous.

Megalacron alfredi (Cox) is not a typical member of this genus. It is admitted here because it possesses the coloration pattern of the species group of *M. lambei* (Pfr.) and by its shape. It is divergent from this group by being smooth, with no indication of the very fine microscopic sculpture found in other members of this species complex. It is also totally different from any other Solomon Islands group. Nothing is known of its soft anatomy.

Specimens examined: BOUGAINVILLE: Buin; Buka Id. (both MCZ).

Species Group of *Megalacron phaeostoma* v. Martens.

This species complex is characterized by shells which are attenuated, lack whorl peripheral bands, possess the zigzag color markings and are rounded or strongly keeled at the whorl periphery.

Megalacron bequaerti, new name.

Plate 9, fig. 10.

Helix gaberti of authors, not of Lesson, 1830.

Helix trochus Quoy and Gaimard, 1832, *Voyage de l'Astrolabe*, Zoologie, 2:100, pl. 8, fig. 5-7 (Carteret Harbor, New Ireland); non *H. trochus* Müller, 1821.

Helix trochoides 'Quoy' Deshayes, 1838 [in] *Histoire Naturelle Animaux Sans Vertèbres*, 2nd ed., 8:122 [new name for *H. trochus* Quoy, 1832; non *H. trochus* Müller, 1821]; non *H. trochoides* Poiret, 1789; Gmelin, 1790.

Description: Shell reaching about 28 mm. in greater diameter, trochoid in shape, light in structure, imperforate, bluntly keeled and minutely sculptured. Whorls 6, nearly flat-sided and bluntly carinated. Color consisting of a yellowish brown base overlaid with numerous irregular oblique bars of dark reddish brown. There is a clear area at the whorl periphery. Occasional specimens have 2 spiral bands, one above and one below the periphery which, however, are not very sharply defined. Spire extended and produced at an angle of 70° . Aperture sub-circular and cast at an angle of about 50° . Outer lip white and reflected. Inner lip consisting of a very thin glaze. Columella slightly angled and somewhat widened. Suture slightly indented. Sculpture consisting of very fine, irregular, oblique, incised lines which are crossed by very fine growth lines.

Height	Width	
22 mm.	23 mm.	New Ireland.
28 mm.	27.5 mm.	"
27 mm.	28.5 mm.	"

Types: This species is probably limited to the southern end of New Ireland. We here select Carteret Harbor to be the type locality and the specimen upon which the figures of Quoy and Gaimard of *Helix trochus* were based to be the lectotype.

Remarks: This species is figured beautifully by Quoy and Gaimard. It has long been known under the name of *Papuina gaberti* Lesson. However, this latter species came from Dore, Geelvink Bay, New Guinea, and is in no way related to *M. bequaerti* from New Ireland in the Bismarck Archipelago. Also, Lesson describes a shell which is much wider than high and strongly keeled, characters which do not apply to *Megalacron bequaerti*.

We introduce the name *bequaerti* as a new name for *Helix trochoides* Deshayes, 1838, which is preoccupied by Poiret, 1789, and Gmelin, 1790. We take pleasure in naming this species after our colleague and co-worker, Dr. J. C. Bequaert. See remarks under *M. phaeostoma* von Martens.

Specimens examined: NEW IRELAND (MCZ).

Megalacron phaeostoma (v. Martens).

Plate 8, fig. 12, 14-15, 16-17; Plate 9, fig. 11-12; text fig. 3.

Helix (Papuina) phaeostoma v. Martens, 1877, *Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin*, p. 276, pl. 1, fig. 10-11 (Wasserhafen, Neu Hanover, Bismarck Archipelago); Pfeiffer, 1877, *Novitates Conchologicae*, (1), 5:32, pl. 144, fig. 13-14. [Holotype, Berlin Museum.]

Papuina phaeostoma densepicta Rolle, 1902, *Nach. der Deutschen Malak. Gesell.*, 34:212 (Kung Id., near New Hanover, Bismarck Archipelago). [Lectotype, SMF no. 8654; Syntype, MCZ no. 157457.]

Papuina phaeostoma raremaculata Rolle, 1902, *Nach. der Deutschen Malak. Gesell.*, 34:212 (Kung Id., near New Hanover, Bismarck Archipelago). [Lectotype, SMF no. 8653; Syntype, MCZ no. 157458.]

Papuina phaeostoma fulgurata Rolle, 1902, *Nach. der Deutschen Malak. Gesell.*, 34:212 (Kung Id., near New Hanover, Bismarck Archipelago). [Lectotype, SMF no. 8652; Syntype MCZ no. 183769.]

Papuina phaeostoma gracilis Blume, 1920, *Archiv für Molluskenkunde*, 52:129 (Bismarck Archipelago).

Papuina phaeostoma pallida Blume, 1920, *Archiv für Molluskenkunde*, 52:129 (no locality given).

Description: Shell reaching about 28 mm. in greater diameter, trochoid in shape, light in structure, imperforate, rounded at the periphery and minutely sculptured. Whorls $5\frac{1}{2}$ and moderately convex. Color pattern variable but generally consisting of numerous irregular bars of dark reddish brown on a straw-yellow background. There is a clear area forming a band at the periphery. Spire extended and produced at an angle of about 75° . Aperture subcircular and cast at an angle of about 50° from the base. Outer lip usually brownish and well reflected. Inner lip consisting of a very thin glaze. Columella angled, broad, and occasionally producing a tooth-like ridge on its inner margin. Suture slightly indented. Sculpture consisting of very fine irregular, oblique, incised lines which are crossed by exceedingly fine growth lines.

Height	Width	
26.5 mm.	24.5 mm.	Kung Id., New Hanover, Bismarck Archipelago.
27.5 mm.	28.5 mm.	Kung Id., New Hanover, Bismarck Archipelago.
26 mm.	23.5 mm.	New Hanover, Bismarck Archipelago.

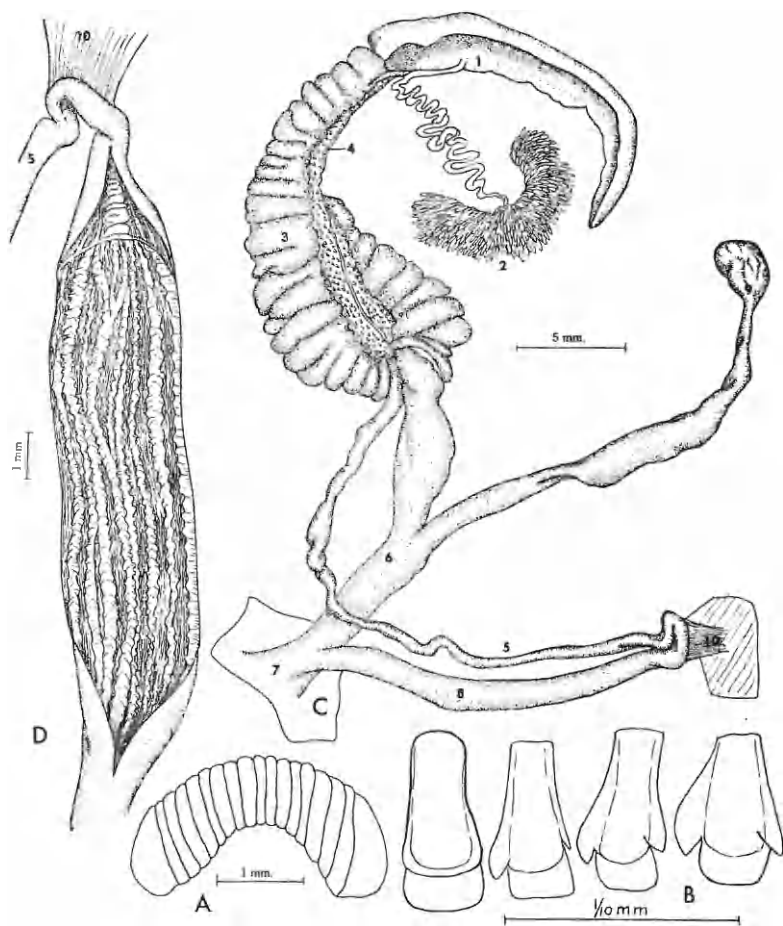


Fig. 3.

Megalacron phaeostoma (v. Martens). A, jaw. B, radular teeth. C, complete reproductive system. D, dissected penis. (See figure 1 for labelling of the reproductive system.)

Remarks: This species, as well as others in this complex, show a remarkable range in the variation of the color pattern as well as a moderate range in shape and size. The several synonyms above by Rolle are based upon nothing more than selected examples which occur within the color range and all were collected on Kung Islet, New Hanover Island. This species is close to *M. bequaerii*, but differs by having the periphery of the whorls rounded rather than keeled, having a brownish lip and having the columella broader and sometimes having a ridge-like tooth on the columella and extending to the base of the lip. The color pattern is quite similar.

Head and upper part of foot dark brown to nearly black with reticulate markings of light tan. Sole of foot and a narrow band just in from the edge of the mantle light tan. Mantle and spire a medium red brown. The jaws, denticles of the radula and the reproductive systems are shown in text figure 3 (a-d). The jaws (a) are very lightly ribbed; the denticles of the radula arranged in staggered V-shaped rows. Two specimens were dissected. The uterus was exceedingly large, particularly at its lower end so that in order to show the prostate gland it was necessary to turn the section over in the illustration. The penis is very long, thin, with a muscular wall and numerous irregular pilasters on the inner side.

Specimens examined: NEW HANOVER: Kung Island (BM; MCZ); Banatum (UMK; MCZ).

Megalacron phaeostoma mediensis (Rensch).

Plate 9, fig. 13-15.

Papuina phaeostoma mediensis Rensch, 1934, *Archiv für Naturgeschichte N.F.*, 3:455, fig. 4 (Medina, New Ireland, Bismarck Archipelago). [Holotype, Basel Museum; paratypes, MCZ no. 156954.]

Papuina phaeostoma lamassongensis Rensch, 1934, *Archiv für Naturgeschichte N.F.*, 3:455, fig. 4 (Lamassong and Fatmilak, New Ireland, Bismarck Archipelago). [Holotype, Basel Museum; paratypes, MCZ no. 156951.]

Papuina phaeostoma kandanensis Rensch, 1934, *Archiv für Naturgeschichte N.F.*, 3:456, fig. 4 (Kandan, New Ireland, Bismarck Archipelago). [Holotype, Basel Museum; paratype, MCZ no. 59849.]

Description: This subspecies is exceedingly close to typical *M. phaeostoma*. It differs in being proportionately wider, the whorls a little more swollen, the sutures more indented. In all other respects it is like the typical species. There is a wide range of variation in color intensity, the color ranging from nearly pure creamy white to a dark mahogany brown. Specimens intermediate between these two extremes show a color pattern similar to that of *M. phaeostoma*.

Height	Width	
25.4 mm.	27.5 mm.	Medina, New Ireland.
25 mm.	28.2 mm.	Kandan, „
30 mm.	31 mm.	Lamassong, „

Remarks: As noted under the description, there is a slight difference between this subspecies and the typical form, particularly in being wider than high and in having the whorls a little more globose. In our opinion, the three names given in the synonymy above all refer to the same subspecies. All are from localities that are close together and they appear to us to be nothing but minor population variations.

Specimens examined: NEW IRELAND: Medina; Kandan; Lamassong; Fatmilak (all Basel Museum and MCZ).

Megalacron admiralitatis (Rensch).

Plate 11, fig. 4-6; text fig. 4.

Papuna admiralitatis Rensch, 1931, *Zool. Anzeiger*, 95:188, text fig. 3 (Manus Island, Admiralty Islands). [Holotype, Berlin Museum.]

Description: Shell extended, conical, imperforate, rather light in structure and reaching 30 mm. in diameter. Whorls $5\frac{1}{2}$, moderately convex and having a blunt keel. Color a dull ivory and striped with numerous dark brown, zigzag axial bars of color. Occasional specimens with the zigzag markings much reduced or lacking. Spire extended and produced at an angle of 75° . Aperture subovate, outer lip reflected and

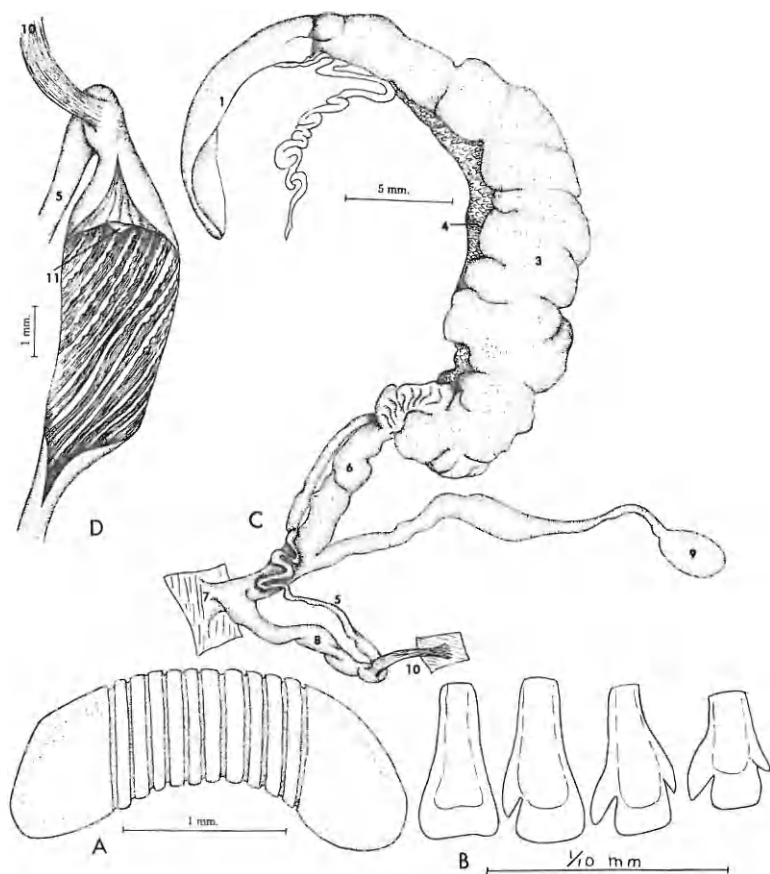


Fig. 4.

Megalacron admiralitatis (Rensch). A, jaw. B, radular teeth. C, complete reproductive system. D, dissected penis. (See figure 1 for labelling of the reproductive system.)

white. Inner lip consisting of a very thin glaze on the parietal wall. Aperture produced at an angle of about 40° from the base of the shell. Columella angled and sloping to the right to the base of the shell, forming a thin ridge-like tooth. Suture well defined. Sculpture consisting of very fine, wavy, irregular threads and crossed by exceedingly fine growth lines.

Height	Width	
23.5 mm.	30 mm.	Drabui, Manus Id., Admiralty Ids.
23.5 mm.	27.5 mm.	Malai, " "
25 mm.	26.5 mm.	Petaiya, " "

Remarks: This is a very distinctive species in this difficult complex. In relationship it appears nearest to *M. phaeostoma* v. Martens from New Hanover. It differs from this species by being proportionately wider and having much finer markings. It is also related to *M. densestriata*.

Head and dorsal part of body a uniform brown; eye stalks brown. Muscular edge of mouth and sole of foot ivory. The inner surface of mantle edge mottled with grey, and the sole of the foot greying toward the edge. The jaws, denticles of the radula and reproductive anatomy are shown in text figure 4 (a-d). The jaws are strongly ribbed and the denticles of the radula arranged in V-shaped rows. Three specimens were dissected. The penis is long and slender, the interior with more or less diagonally arranged, low, thin pilasters which are smooth at the lower end but scalloped at the upper end.

Specimens examined: MANUS ISLAND: Drabui; Petaiya; Tavi; Malai (all MCZ; AMNH); Lorengau (MCZ; UMK); Pundrau (BPBM); Lundren (UMK).

Megalacron melanesia, new species.

Plate 10, fig. 14; text figure 5.

Description: Shell extended, conic, trochiform, rather light in structure, imperforate and finely sculptured. Whorls 5, flat sided and acutely keeled. Color a dark chocolate-brown, a few specimens being a light brown and a few of the darker ones showing the zigzag markings so characteristic of this species group. Spire moderately extended and produced at an angle of 70° . Aperture subquadrate and produced at an angle of 45° from the base. Parietal wall thinly glazed. Palatal lip broadly reflected. Columella sloping and slightly wider than the outer or palatal lip. Suture well defined but only slightly indented. Sculpture consisting of very fine, irregular, incised lines which are diagonal above the whorl periphery and spirally arranged below. Periostracum thin, yellowish and deciduous.

Height	Width	
20 mm.	26.5 mm.	Holotype.
20.5 mm.	26 mm.	Paratype.
19 mm.	23 mm.	"
19 mm.	26 mm.	"
20 mm.	24 mm.	"

Types: The holotype is in the University Zoological Museum, København, and is from the "Noona Dan" expedition from the Waterfall, Lorengau, Manus Island, Admiralty Islands, Bismarck Archipelago, June 16, 1962. Paratypes from the same locality are in the same institution and in the Museum of Comparative Zoology no. 249306.

Remarks: In relationship, this species is probably nearest to *Megalacron admiralitatis* Rensch which also occurs on Manus Island. The relationship is indicated in the similar sculpture. Similar shape and the similar but relatively indistinct zigzag markings. It differs from *admiralitatis* in having a very acute keel, flatter whorls and a far less pronounced columellar ridge. It differs from *M. densestriata* Fulton by having very different sculpture and in being less attenuated.

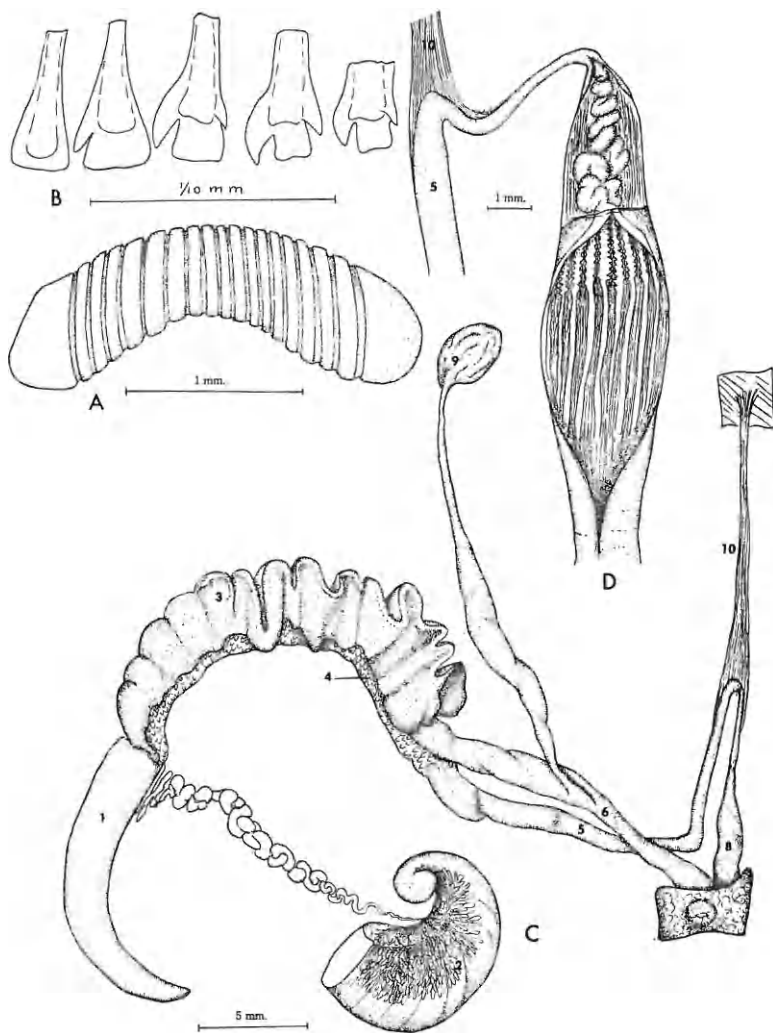


Fig. 5.
Megalacron melanesia Clench and Turner. A, jaw. B, radular teeth.
C, complete reproductive system. D, dissected penis. (See figure 1 for
labelling of the reproductive system.)

Head and dorsal part of the body a dark brownish grey. The muscular edge of the mantle yellowish tan, darker brown-grey behind. Sole of foot light tan. A light grey, more or less diamond shaped spot is located between and just behind the eye. The jaw, denticles of the radula and the reproductive organs are shown in text figure 5 (a-d). The jaw is heavily ribbed (a); the denticles of the radula arranged in staggered V-shaped rows. Five specimens were dissected. The uterus was thin, high and arranged in deep loops. The penis is small, thin walled and with 10 to 12 pilasters extending the entire length; these were broad and jagged at the upper end. Epiphallus rather large, thin walled and with a large, irregularly coiled pilaster.

Megalacron densestriata (Fulton).

Plate 10, fig. 5.

Papuina densestriata Fulton, 1902, *Ann. Mag. Nat. Hist.*, (7), 9:316 (Neu Mecklenburg [New Ireland], Bismarck Archipelago). [Holotype, British Mus. no. 1902.5.28.24; paratypes, Mus. Comp. Zool. no. 159153 and 187548; USNM; UM; ANSP.]

Description: Shell extended, conic, rather light in structure and reaching about 29 mm. in length, imperforate and finely costate. Whorls 6, slightly convex and with the last whorl having a slight keel at the periphery. Color dark, chocolate-brown, occasionally mottled with lighter brown and usually having a narrow band of light brown at the periphery. Lip and columella a dark, shiny brown with the inner margin of the columella and the extreme outer edge of the reflected lip being ivory. Spire extended and produced at an angle of about 60°. Aperture sub-quadrate, parietal lip consisting of a very thin glaze. Palatal lip reflected, broadly and slightly indented at the peripheral area and produced at an angle of 50° from the base. Columella sloping and rather broad. Suture well defined. Sculpture consisting of numerous and fine costae which are set obliquely. Protoconch consisting of 1½ whorls and smooth.

Height	Width	
28.5 mm.	25.8 mm.	Paratype.
24 mm.	23.5 mm.	„
27.5 mm.	22 mm.	„

Remarks: This is a very distinctive species and though the color is dark, obscuring much of the pattern, it is typical of the genus. It differs from all other species of *Megalacron* by being rather coarsely sculptured with diagonal riblets. It appears nearest in relationship to *M. admiralitatis* Rensch of Manus Island, Admiralty Islands.

Specimens examined: NEW IRELAND (MCZ; USNM; ANSP; UM).

Megalacron periwonensis (Dell).

Plate 10, fig. 3.

Papuina (Pinnadena) periwonensis Dell, 1955, *Pacific Science*, 9:327, text figure 2b-d (near Periwon Village, Nissan Island, Solomon Islands). [Holotype, Dominion Mus. no. MF 2507; paratype, Museum Comp. Zool. no. 190125.]

Description: Shell subdepressed, trochiform, strongly carinate, minutely sculptured and imperforate. Whorls 5, flattened and very sharply keeled. Color yellowish white with numerous brown diagonal and some-

what irregular bars of color. Spire low and produced at an angle of 98° . Aperture subquadrate and produced at an angle of 45° from the base. Outer lip widely reflected and pointed at the termination of the carina; inner lip consisting of numerous oblique and irregular depressions and ridges. Protoconch whorls 2 and smooth.

Height	Width	
19.1 mm.	28 mm.	Holotype.
19.5 mm.	27.8 mm.	Paratype.
19.5 mm.	26.3 mm.	"
18.5 mm.	27.4 mm.	"
19 mm.	25.2 mm.	"

Remarks: This species is readily differentiated from others in this complex by having flattened sides to the whorls, a very sharp keel and by having only the irregular color bars. No spiral bands are present. It appears to be most closely related to *M. tabarensis lihirensis* (Rensch) from the Lihir Group of islands. It has somewhat similar irregular bars of coloring and both forms possess a well developed keel. However, *periwonensis* lacks completely the spiral bands of *lihirensis*.

Specimens examined: NISSON ISLAND: Periwon Village (DM; MCZ).

Species Group of *Megalacron novaegeorgiensis* (Cox).

This species complex is characterized by shells which are depressed and with few exceptions, spirally banded but with no indication of any zigzag color markings.

Megalacron novaegeorgiensis (Cox).

Plate 8, fig. 9-11; text figure 6.

Helix novaegeorgiensis Cox, 1870, *Proc. Zool. Soc. London*, p. 170, pl. 16, fig. 3 (New Georgia, Solomon Islands [Admiralty Islands, Bismarck Archipelago]). [Holotype, Australian Mus. no. C.62676.]

Helix (Geotrochus) moseleyi Smith, 1884, *Proc. Zool. Soc. London*, p. 263, pl. 22, fig. 2-2a (Wild Island, Admiralty Islands [about 5 miles N. of Moseley Point, Manus Island]). [Holotype, British Mus. no. 84.6.12.580; paratypes from the same locality are in the Mus. Comp. Zool. and the Acad. Nat. Sci. Phila.]

Description: Shell subdepressed, rather light in structure, imperforate, banded and reaching about 25 mm. in greater diameter. Whorls $3\frac{1}{2}$ to 4, strongly convex and rounded at the periphery. Color a pale ivory white with one or more narrow spiral bands of chestnut brown. Specimens with 3 or 4 bands appear to be most abundant, though we have seen specimens with as many as 9 bands. Bandless forms are rare. Spire subdepressed, obtuse and produced at an angle of 110° . Aperture subcircular and descending. Parietal lip consisting of a very thin glaze. Palatal lip white, broad, somewhat thickened, reflected and produced at an angle of 45° from the base. Columella lightly thickened and arched. Suture well defined. Protoconch glass-like, nearly smooth and with exceedingly fine axial riblets. Later whorls finely rugose, the depressions and ridges running obliquely. Axial growth lines fine and slightly oblique.

Height	Width	
14.5 mm.	24.5 mm.	Drabui, Manus Islands, Admiralty Ids.
15.2 mm.	26.5 mm.	Tavi, " "
14.5 mm.	24.5 mm.	Malai, " "
13 mm.	22 mm.	Nauna Id., " "

Remarks: So far as now known *M. novaegeorgiensis* (Cox) is limited to the Admiralty Islands in the Bismarck Archipelago, though originally described as coming from New Georgia in the Solomon Islands. This locality was certainly in error. It is closely related to *M. n. creta* of the Vitu Islands which lie some 175 miles to the south-east. This latter sub-species, though similar in structural details, is much larger. It is less closely allied to *M. lufensis* Thiele, a species known only from the Ninigo Group of Islands which are located about 150 miles north-west of the Admiralty Islands. *M. lufensis* is much smaller, more delicate in structure and has the spiral bands confined to the area mainly above the whorl periphery. There appears to be no question but that *M. novaegeorgiensis* Cox and *M. moselevi* Smith are the same species.

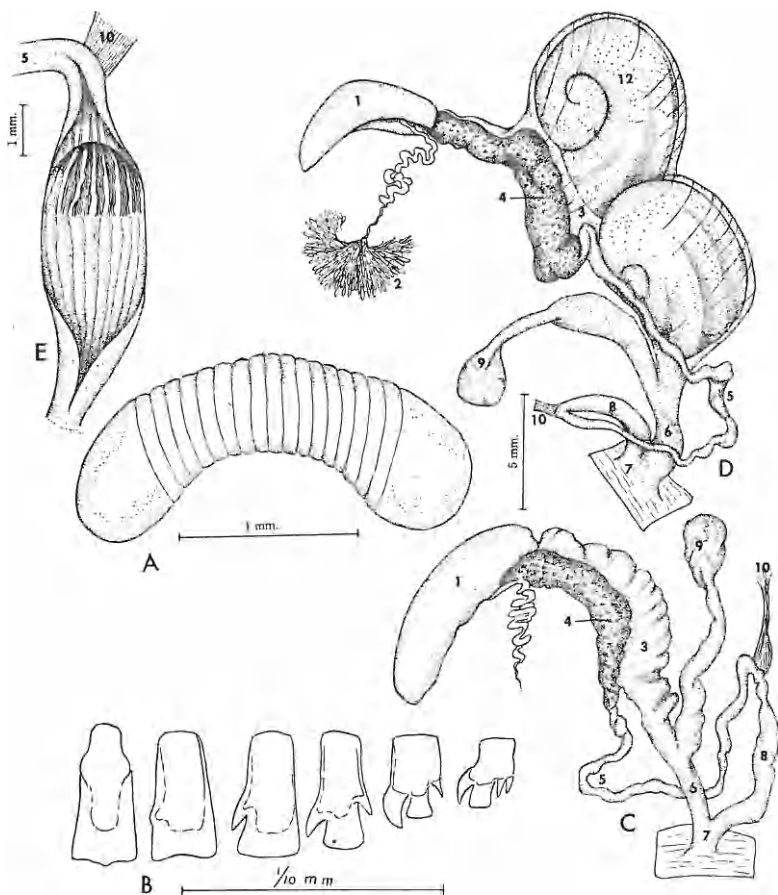


Fig. 6.

Megalacran novaegeorgiensis (Cox). A, jaw. B, radular teeth. C, reproductive system in non reproductive stage. D, complete reproductive system with two young in the uterus. (See figure 1 for labelling of the reproductive system.)

Head, foot and muscular edge of mantle all a uniform light tan with a band of darker greyish brown around the neck. The jaws, denticles of the radula and reproductive system are shown in text figure 6 (a-e). The jaws (a) are lightly ribbed and the denticles of the radula arranged in nearly straight rows. Four specimens were dissected, of which three had two large young shells in the uterus and these already showed color bands. One lacked any indication of young or division of the uterus into two chambers. The penis is small, slender, thin walled, the interior with only a few small fleshy pilasters at the upper end.

Specimens examined: ADMIRALTY ISLANDS: Tong Island (USNM); Rambutoy Island; Nauna Island (both AMNH and MCZ); MANUS ISLAND: Wild Island (BMNH; MCZ; ANSP); Pitylou Island (MCZ); Malai Village; Ravi Village; Drabui Village; Petaiya Village (all AMNH and MCZ); Tingau; Buyang; Pundrau (all BPBM); Lorengau (MCZ); Los Negros (MCZ; BPBM).

Megalacron novaegeorgiensis creta (Rensch).

Plate 10, fig. 4.

Papuina novaegeorgiensis creta Rensch, 1934, *Archiv. für Naturgeschichte N.F.*, 3:480 (Französischen Inseln [Vitu Islands] North of New Britain, Bismarck Archipelago). [Holotype, Berlin Mus.; paratype, Mus. Comp. Zool. no. 83856.]

Description: This subspecies is similar to the typical form but differs in being slightly larger and in having a small tooth at the base of the lip near its juncture with the columella. In the single paratype specimen which we have seen, the spiral bands are somewhat lighter in color.

Height	Width	
16.6 mm.	27 mm.	Holotype.
16.5 mm.	27 mm.	Paratype.

Remarks: See under *M. novaegeorgiensis* Cox.

Specimens examined: VITU ISLANDS: Unea (MCZ, ex B. Rensch).

Megalacron lufensis (Thiele).

Plate 10, fig. 1-2; text figure 7.

Papuina lufensis Thiele, 1928, *Zoologische Jahrbücher (Syst.)*, 55:139, pl. 5, fig. 30 (Hermit and Maty Islands [Ninigo Group, Admiralty Islands]). [Holotype, Berlin Mus. from Hermit Id.]

Papuina lufuensis 'Thiele' Jutting, 1933, *Nova Guinea*, 17:53 [error for *lufensis* Thiele].

Description: Shell subdepressed, light in structure, imperforate, banded and reaching about 18 mm. in greater diameter. Whorls $3\frac{1}{2}$ to $3\frac{3}{4}$, convex and slightly angulated at the periphery. Color a pale ivory to white with 4 to 7 spiral bands of dark brown which are generally confined to the area above the whorl periphery. A few specimens may have a band just a little below the periphery. Occasional specimens may lack these color bands, and in several the bands are interrupted. Spire depressed, obtuse and produced at an angle of 115° . Aperture subcircular and slightly descending. Parietal lip consisting of a very thin glaze. Palatal lip narrow, white, reflected, produced at an angle of 50° from the base and supporting a small, broad tooth at the base of the columella. Columella slightly thickened and angled toward the base of the lip. Suture well defined. Sculpture of the protoconch nearly smooth, having only very fine axial riblets. Later whorls finely rugose, the depression and ridges running obliquely.

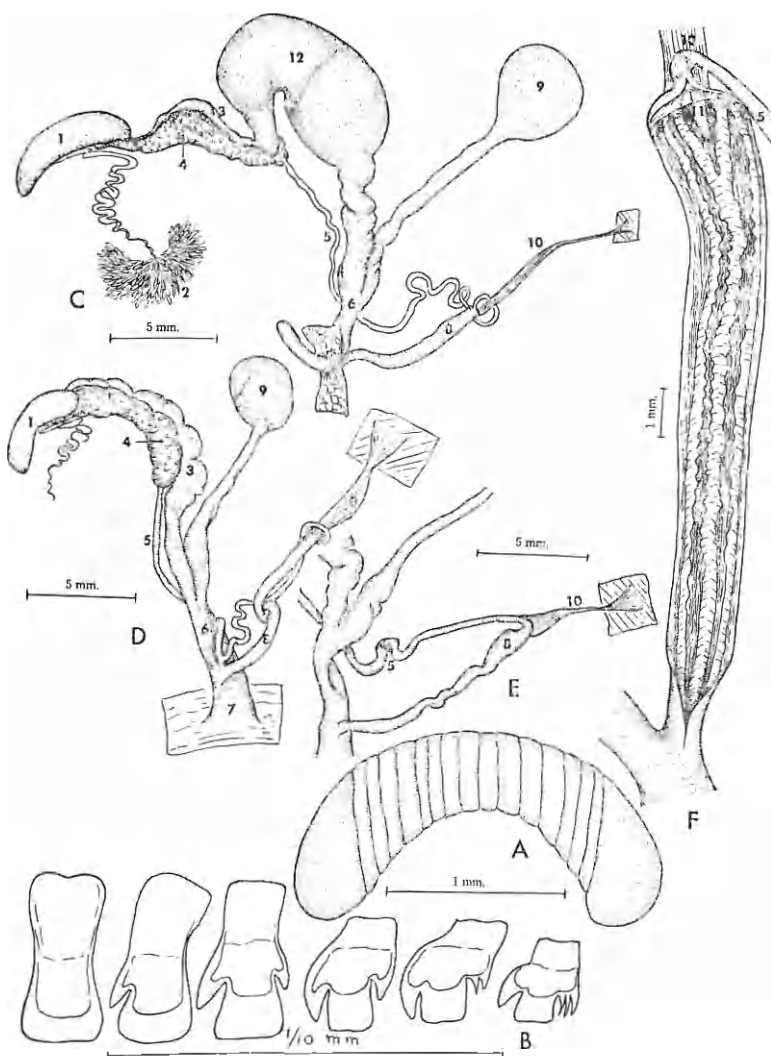


Fig. 7.

Megalacron lufensis (Thiele). A, jaw. B, radular teeth. C, complete reproductive system with two young in the uterus. D, reproductive system in non reproductive stage. E, basal area with penis and vas deferens separated. F, dissected penis. (See figure 1 for labelling of the reproductive system.)

Height	Width	
12 mm.	19 mm.	Maty Island (Thiele).
11 mm.	18 mm.	Hermit Island (Thiele).
11 mm.	19 mm.	Lau Island.
9.5 mm.	15.5 mm.	" "
11.2 mm.	19.5 mm.	Pihan Island.

Remarks: See also under *M. novaegeorgiensis* Cox.

Animal entirely a uniform light ivory; eye stalks ivory at the base, a red-brown at the tips. The jaws, denticles of the radula, and the reproductive system are shown in text figure 7 (a-e). The jaw is lightly and unevenly ribbed; the denticles on the radula are arranged in nearly straight rows which are not offset. In the 4 specimens dissected the spermatheca was proportionately very large, the oviduct and vagina long and the penis very long. Figure 7(c) illustrates a specimen in which the vas deferens and penis are in the normal position. Figure 7(d) illustrates one in which the vas deferens has been moved to one side and the penis has been uncoiled to show the point of entrance of the vas deferens and the point of attachment of the penial retractor muscle.

Specimens examined: NINIGO GROUP: Hermit Island (ANSP; UMK); Pihan Island; Lau Island (both AMNH and MCZ).

Megalacron klaarwateri (Rensch).

Plate 10, fig. 7-12; text fig. 8.

Papuina klaarwateri Rensch, 1931, *Zoologischer Anzeiger*, 95:187, text fig. 2 (Manus Island, Admiralty Islands). [Holotype, Berlin Mus.]

Description: Shell reaching about 20 mm. in greater diameter, depressed-globose, imperforate, rather thin, shiny and minutely sculptured. Color pattern variable, pale yellow or brown below; canary yellow or dark mahogany brown above, or with brown bands on a yellow background, or straw-yellow to light brown bands on a dark brown background. Aperture subcircular with a slightly reflected lip. Columella broadened as a flattened ridge. Whorls four, rather strongly convex and the last one slightly constricted behind the lip.

Height	Width	
12 mm.	19.5 mm.	Tavi Village, Manus Island.
13 mm.	20 mm.	" "
15 mm.	21 mm.	Drabui Village, "

Remarks: There are three rather definite colour forms of this species, the typical form being banded alternately with canary yellow and dark mahogany brown. The base color may be straw yellow to mahogany, though the latter never appears to be quite as dark as the bands, and this is only a result of diffusion. The second form is a bright canary yellow, opaque above the periphery; a duller translucent yellowish below. This third form is a dark mahogany brown with a yellowish brown band at the suture. Below the periphery the brown is less intense and somewhat translucent with faint indications of exceedingly narrow brownish bands. There may be some genetic value to these color forms. The typical striped form and the canary yellow form existed together at all the localities collected by the Whitney South Sea Expedition; the dark brown form occurred with the other two only at a single locality. These forms apparently do not exist as a species complex, but as a single species in which these color elements are segregated. This condition is, of course, well known in many other groups of land shells, namely *Liguus*, *Polymita*, and, of course, other elements of the *Papuinae*.

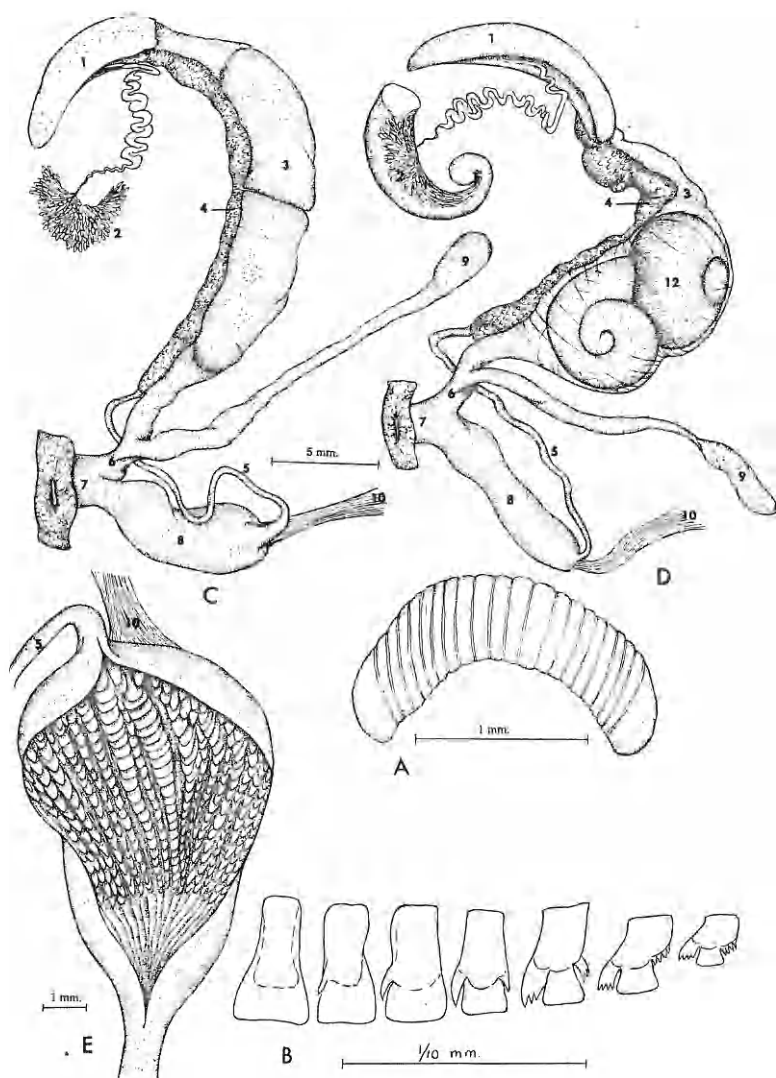


Fig. 8.

Megalacron klaarwateri (Rensch). A, jaw. B, radular teeth. C, complete reproductive system. D, reproductive system with two young in the uterus. E, dissected penis. (See figure 1 for labelling of the reproductive system.)

Head, foot, body, all a uniform light yellowish tan without any markings. Eye stalks dark brown. The jaw, denticles of the radula and the reproductive system are illustrated in text figure 8 (a-e). The jaw (a) is finely but definitely ribbed, and the denticles on the radula (b) are arranged in straight rows. Six specimens were dissected, of which three had two large, well-developed young in the uterus (c), the shells even showing the color pattern of the adult. In two specimens the uterus was divided into two distinct parts (d) and one had two eggs in the uterus. The interior of the penis (e) had numerous rows of fleshy pilasters which extended about three-quarters the length, the basal portion being thin walled.

Specimens examined: MANUS ISLAND: Tavi; Petaiya; Drabui; Malai (all AMNH and MCZ); Bundralis (ANSP); Lorengau (MCZ); Kwaliap, 9 mi. inland; Buyang, 8 mi. inland at 1000 ft.; Tingan, 6 mi. inland at 800 ft.; Pundran, 5 mi. inland (all BPBM).

Genus *RHYTIDONCONCHA* Rensch.

Rhytidoconcha Rensch, 1933, *Zool. Anzeiger*, 102:313 (type species, *Papuina inquirenda* Rensch, original designation).

Shells subglobose, flat white in color with one species *R. inquirenda* having minute black spots. Sculpture rather coarse with irregular incised lines and much broader and irregular raised areas.

Species in this genus are characterized by having the denticles on the radula arranged in nearly straight rows which are not offset with the rows above and below. The spermatheca with a short duct, elliptical in outline and only slightly greater in diameter than the spermathecal duct.

Rhytidoconcha inquirenda (Rensch).

Plate 10, fig. 16; Plate 11, fig. 7-9.

Papuina inquirenda Rensch, 1929, *Zool. Anzeiger*, 85:49, text fig. 1 (St. Matthias [Mussau], Bismarck Archipelago). [Holotype, Berlin Mus.; paratype, Mus. Comp. Zool. no. 83863.]

Description: Shell globose, reaching $12\frac{1}{2}$ mm. in width, imperforate and sculptured. Color white with numerous irregular and very small black dots with much smaller white dots in the centre. The black dot is translucent and the central white one opaque. Whorls 3, convex and with a rounded periphery. Suture well defined and indented. Spire slightly elevated and produced at an angle of 90° . Aperture subcircular and cast at an angle of about 45° from the base. Parietal wall thinly glazed. Outer lip narrow, slightly reflected and with a slight restriction or depressed area just behind the lip. Columella short, rounded toward the base of the shell and flattened. Protoconch consisting of $1\frac{1}{2}$ whorls and sculptured with numerous, very fine spiral threads. Sculpture of the second whorl consisting of the same fine threads. The body whorl is sculptured with numerous, irregular, incised lines mainly in spiral arrangement. Periostracum yellowish and deciduous.

Height	Width	
10 mm.	12.5 mm.	Paratype.

Remarks: There are but two species known in this genus. This species differs materially from *R. confirmata* (Rensch) of Manus Island by being smaller, having a more circular aperture and in having the translucent black dots.

The anatomy of the reproductive system of *R. inquirenda* was figured by Rensch (1933, p. 314).

Specimens examined: MUSSAU: (MCZ); E. of Malakata (UMK).

Rhytidoconcha confirmata (Rensch).

Plate 10, fig. 15; text fig. 9.

Papuina (*Rhytidoconcha*) *inquirenda confirmata* Rensch, 1933, *Zool. Anzeiger*, 102:315 (Iriu, Manus Island, Bismarck Archipelago). [Holotype, Basel Mus.; paratype, Berlin Mus.]

Description: Shell subglobose, reaching $16\frac{1}{2}$ mm. in width, imperforate and sculptured. Color a flat white. Whorls 4, convex and rounded at the periphery. Suture well defined and indented. Spire elevated and produced at an angle of about 85° . Aperture subcircular and cast at an

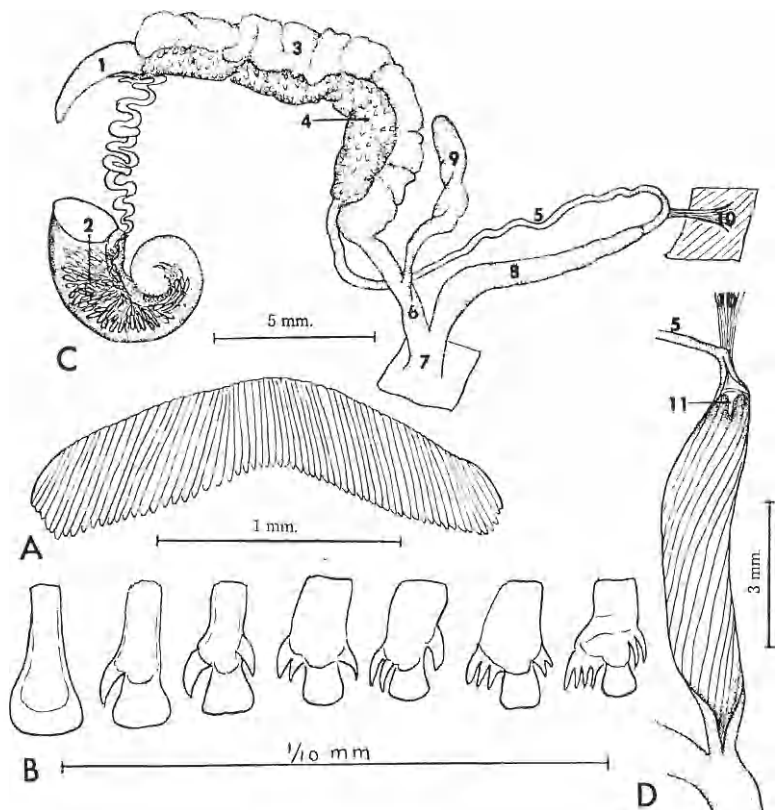


Fig. 9.

Rhytidoconcha confirmata (Rensch). A, jaw. B, radular teeth. C, complete reproductive system. D, dissected penis. (See figure 1 for labelling of the reproductive system.)

angle of 40° from the base. Parietal wall not glazed. Outer lip rather narrow, reflected and with a depression behind. Columella short, round toward the base of the shell and flattened. Protoconch consisting of a single whorl and sculptured with very fine spiral threads which continue over the next two whorls. Body whorl sculptured with numerous irregular, coarse, interlacing incised lines. In transmitted light the incised lines are translucent and the area between the lines are opaque, giving the shell an irregularly corrugated appearance. Periostracum yellowish and deciduous.

Height	Width	
16 mm.	16.5 mm.	Drabui Village, Manus Island.
14 mm.	16 mm.	" "
14 mm.	16.5 mm.	" "
13.5 mm.	15 mm.	Malai Village, " "
13.5 mm.	16.5 mm.	" "
12 mm.	12.5 mm.	" "

Remarks: See remarks under *R. inquirenda* Rensch.

The reproductive anatomy is shown in text figure 9. Five specimens were dissected. The spermatheca is long and oval in outline, only slightly greater in diameter than the short spermathecal duct. The penis is long and slender with a thin wall and low, weak pilasters, a small penis papilla and small epiphallus.

Specimens examined: MANUS ID.: Drabui; Lorengau; Malai; Tavi (AMNH; MCZ).

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- Fig. 1: *Megalacron lambel* (Pfeiffer). Admiralty Islands. Holotype, BM(NH) Cuming Colln. (nat. size).
- Fig. 2-3: *Megalacron tabarensis anirensis* (Rensch). Anir Island, S.E. of New Ireland, Bismarck Archipelago. Holotype, SMF 7580 (nat. size).
- Fig. 4: *Megalacron lambel vuatomensis* (Rensch). Vuatom Island, Neu Pommern Island [New Britain, Bismarck Archipelago]. Paratype, Basel Mus. 3943a (1.3 x).
- Fig. 5-6: *Megalacron tabarensis mahurensis* (Rensch). Mahur Island, Lihir Group, Bismarck Archipelago. Holotype, SMF 7578 (nat. size).
- Fig. 7: *Megalacron alfredi* (Cox). Solomon Islands. Holotype, Australian Mus. C62688 (1.5 x).
- Fig. 8: *Papuina lambel matthiae* Boettger [= *Megalacron spadicea dunckeri* (Leschke)]. Small island near St. Matthias [Mussau Island, Bismarck Archipelago]. Lectotype, SMF 5939 (nat. size).
- Fig. 9-10: *Megalacron novaeguineensis* (Cox). New Georgia, Solomon Islands [Admiralty Islands, Bismarck Archipelago]. Holotype, Australian Mus. C62676 (1.5 x).
- Fig. 11: *Helix* (*Geotrachus*) *moseleyi* Smith [= *Megalacron novaeguineensis* (Cox)]. Wild Island, Admiralty Islands [about 5 miles N. of Moseley Point, Manus Island] Holotype, BM(NH) 84.6.12.580 (2 x).
- Fig. 12: *Papuina phaeostoma raremaculata* Rolle [= *Megalacron phaeostoma* (v. Martens)]. Kung Island, near New Hanover, Bismarck Archipelago. Lectotype, SMF 8653 (nat. size).
- Fig. 13: *Megalacron spadicea* (Fulton). New Mecklenburg [New Ireland], Bismarck Archipelago. Holotype, BM(NH) 1902.5.28.34 (nat. size).
- Fig. 14-15: *Papuina phaeostoma fulgurata* Rolle [= *Megalacron phaeostoma* (v. Martens)]. Kung Island, near New Hanover, Bismarck Archipelago. Lectotype, SMF 8652 (nat. size).
- Fig. 16-17: *Papuina phaeostoma densepicta* Rolle [= *Megalacron phaeostoma* (v. Martens)]. Kung Island, near New Hanover, Bismarck Archipelago. Lectotype, SMF 8654 (nat. size).

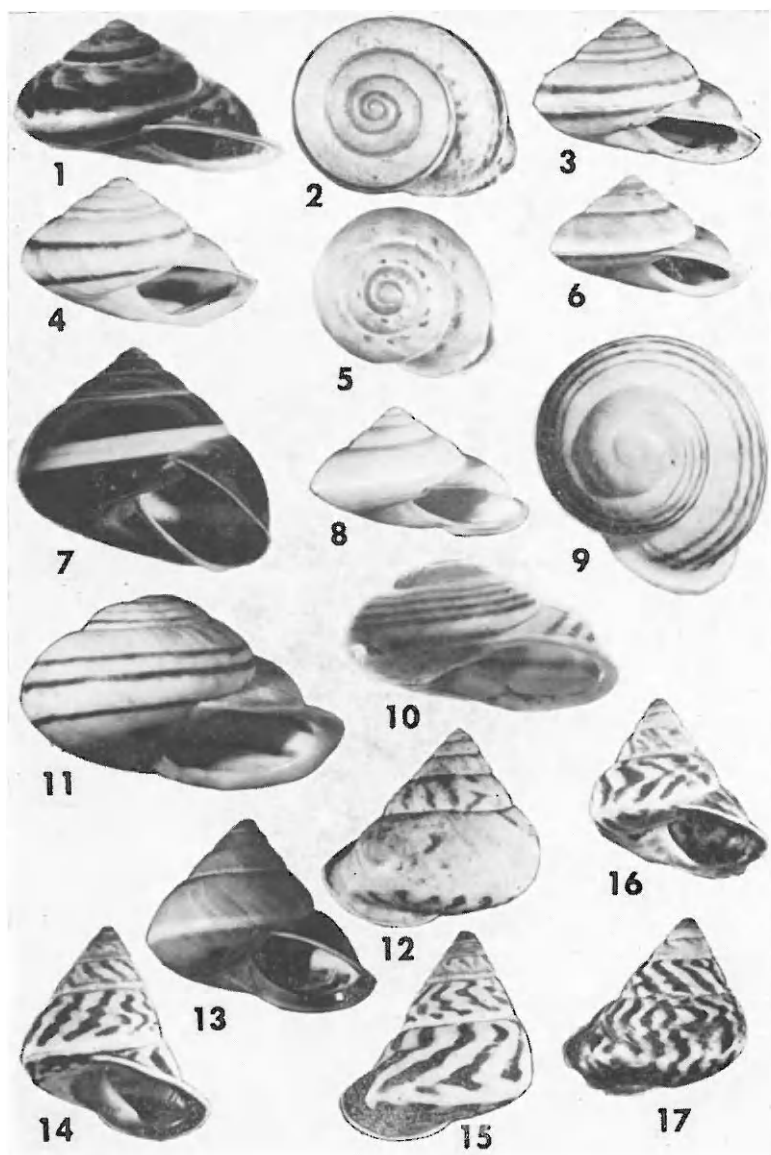


PLATE 8

- Fig. 1: *Megalacron lambei novohibernica* (M. Smith). [Kavieng], New Ireland [Bismarck Archipelago]. Holotype, Florida State Mus. J2451 (1.2 x).
- Fig. 2: *Megalacron tabarensis* (Rensch). Tabar Island, New Ireland, Bismarck Archipelago. Paratype, MCZ 59848 (1.2 x).
- Fig. 3-4: *Megalacron tabarensis warrenae* Clench and Turner. Boang Island, Tanga Group, Bismarck Archipelago. Fig. 3, Holotype, AMNH 111300; fig. 4, Paratype, MCZ 181333 (1.2 x).
- Fig. 5-6: *Megalacron spadicea dunckeri* (Leschke). Mussau Island, St. Matthias Group, Bismarck Archipelago (1.2 x).
- Fig. 7: *Papuina humilis* Fulton [= *Megalacron spadicea* (Fulton)]. Nusa, Neu Mecklenburg [New Ireland], Bismarck Archipelago. Holotype, BM(NH) 1902.5.28.36 (1.4 x).
- Fig. 8: *Megalacron juttingae* Clench and Turner. Kalili Bay, New Ireland, Bismarck Archipelago. Holotype, Univ. Mus. Kobenhavn, Denmark (1.2 x).
- Fig. 9: *Megalacron coniformis* (Férussac). New Mecklenburg [New Ireland], Bismarck Archipelago. UM 76272 (1.2 x).
- Fig. 10: *Megalacron bequaerti* Clench and Turner. New Ireland, Bismarck Archipelago. MCZ 39392 (1.1 x).
- Fig. 11-12: *Megalacron phaeostoma* (v. Martens). Kung Island, New Hanover Island, Bismarck Archipelago. MCZ 157456 (1.1 x).
- Fig. 13: *Megalacron phaeostoma mediensis* (Rensch). Medina, New Ireland, Bismarck Archipelago. Paratype, MCZ 156954 (1.2 x).
- Fig. 14: *Papuina phaeostoma kandanensis* Rensch [= *Megalacron phaeostoma mediensis* (Rensch)]. Kandan, New Ireland, Bismarck Archipelago. Paratype, MCZ 59849 (1.2 x).
- Fig. 15: *Papuina phaeostoma lamassongensis* Rensch [= *Megalacron phaeostoma mediensis* (Rensch)]. Fatmilak, New Ireland, Bismarck Archipelago. Paratype, MCZ 156951 (1.2 x).

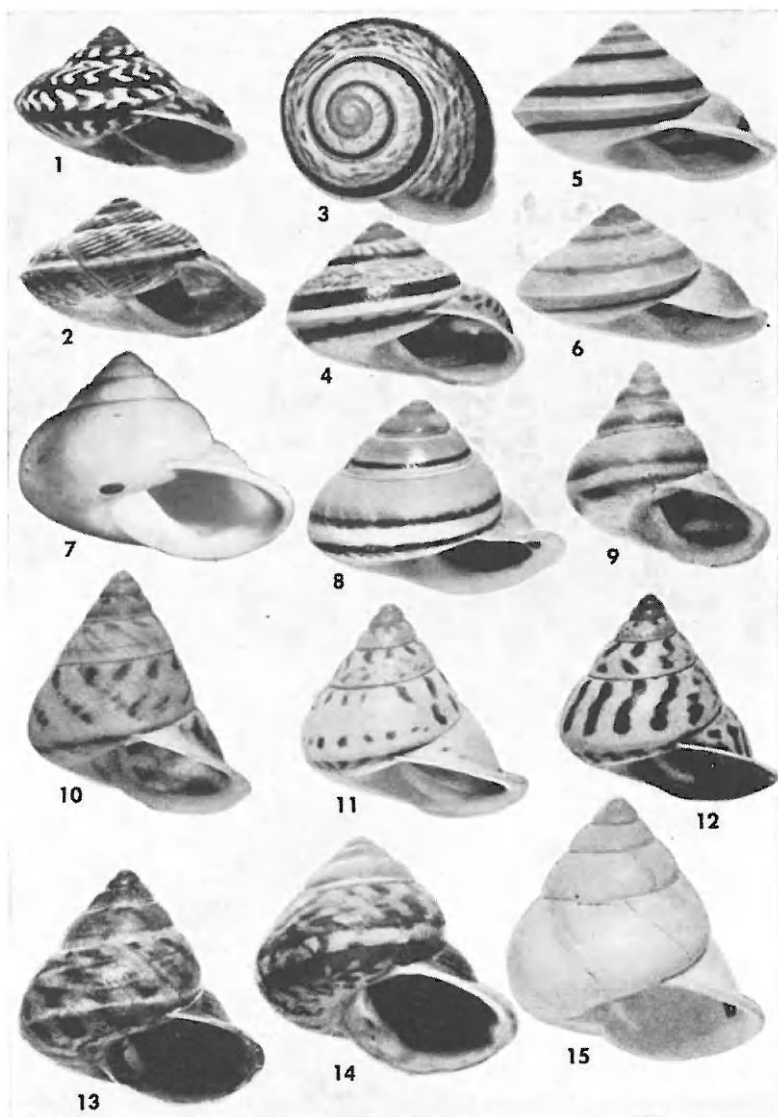


PLATE 9

- Fig. 1-2: *Megalacron iufensis* (Thiele). Nintgo Group, Bismarck Archipelago. MCZ 181335 (1.7 x).
- Fig. 3: *Megalacron periwonensis* (Dell). Near Periwon, Nissan Island, Bismarck Archipelago. Paratype, MCZ 190125 (1.3 x).
- Fig. 4: *Megalacron novaeseorgiensis creta* (Rensch). Französischen Inseln [Viti Islands], N. of New Britain, Bismarck Archipelago. Paratype, MCZ 83856 (1.2 x).
- Fig. 5: *Megalacron densestriata* (Fulton). Neu Mecklenburg [New Ireland], Bismarck Archipelago. Holotype, BM(NH) 1902.5.28.24 (1.3 x).
- Fig. 6: *Helix barnaclei* E. A. Smith [= *Megalacron alfredi* (Cox)]. Hawaii, Sandwich Islands [Solomon Islands]. Lectotype, BM(NH) 77.7.14.1 (1.2 x).
- Fig. 7: *Megalacron kjaarwateri* (Rensch). Manus Island, Admiralty Islands. Holotype, Berlin Mus. (1.8 x).
- Fig. 8-12: *Megalacron kjaarwateri* (Rensch). Tavi Village, Manus Island, Admiralty Islands. Series to show variation in banding and color. MCZ 181370 (1.7 x).
- Fig. 13: *Megalacron boyerli* (Fischer and Bernardi). Woodlark Id., New Guinea. MCZ 157313 (1.3 x).
- Fig. 14: *Megalacron melanesia* Clench and Turner. Waterfall, Lorengau, Manus Id., Admiralty Islands. Holotype, UMK (1.3 x).
- Fig. 15: *Rhytidoconcha confirmata* (Rensch). Iriu, Manus Island, Bismarck Archipelago. MCZ 181024 (1.6 x).
- Fig. 16: *Rhytidoconcha inquirenda* (Rensch). St. Matthias [Mussau], Bismarck Archipelago. Paratype, MCZ 83863 (1.7 x).

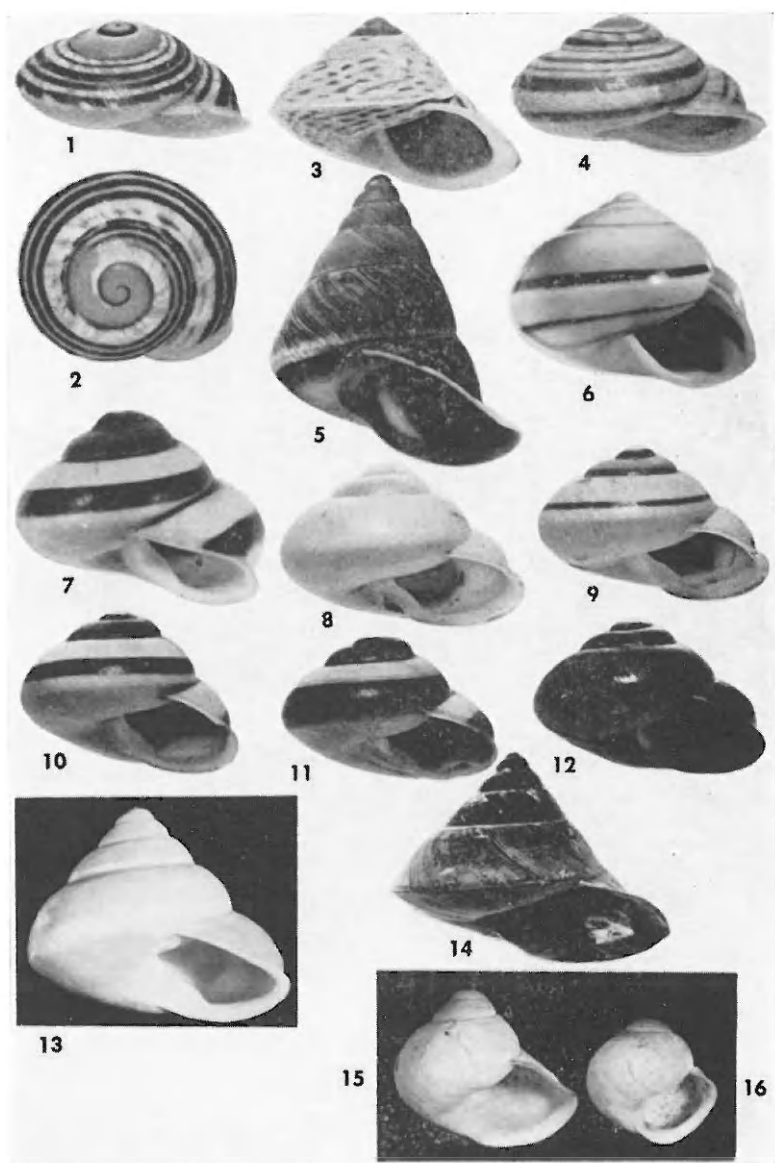


PLATE 10

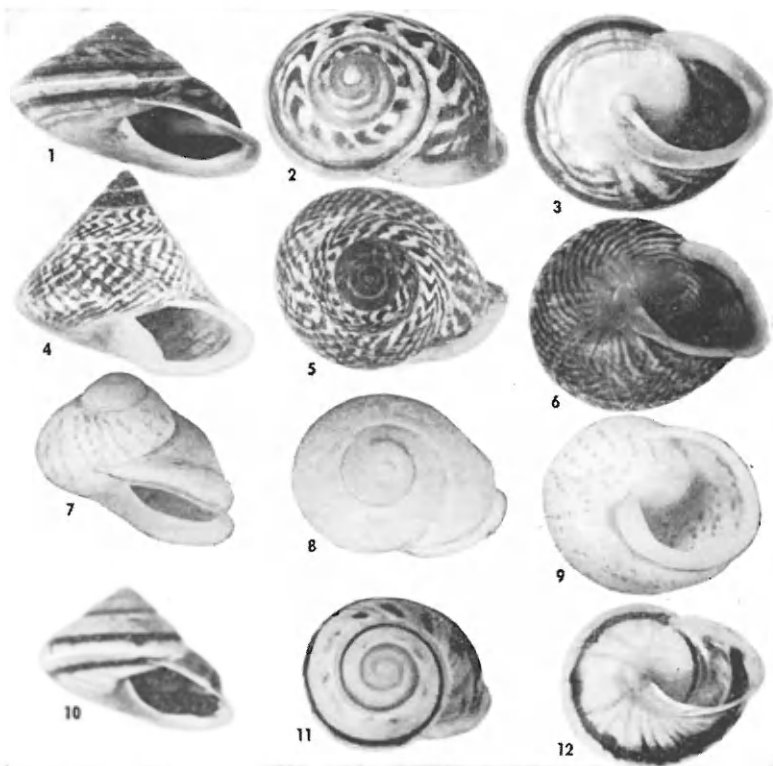


PLATE 11

Fig. 1-3: *Megalacron tabarensis lihirensis* (Rensch). Lihir Island, Lihir Group, Bismarck Archipelago. Holotype, Berlin Mus. (1.2 x).

Fig. 4-6: *Megalacron admiralitatis* (Rensch). Manus Island, Admiralty Islands. Holotype, Berlin Mus. (1.2 x).

Fig. 7-9: *Rhytidoconcha inquirenda* (Rensch). St. Matthias [Mussau Id.], Bismarck Archipelago. Holotype, Berlin Mus. (1.8 x).

Fig. 10-12: *Megalacron lambei vuatomensis* (Rensch). Vuatom Island, Neu Pommern [New Britain], Bismarck Archipelago. Holotype, Berlin Mus. (1.1 x).

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