

The Cerithiopsidae (Gastropoda) of Reunion Island (Indian Ocean)

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KEYWORDS. Cerithiopsidae, Reunion Island, Indian Ocean.

MOTS CLES. Cerithiopsidae, Réunion, Océan Indien.

ABSTRACT. The authors have collected 83 species of Cerithiopsidae on Reunion Island, Indian Ocean. After a review of literature, and after having examined material in the Museum collections in Berlin, Cardiff, London, Manchester and Paris, 16 species were recognized as known species, 23 were left aside on account of insufficient material.

- 44 species are described as new.

- 2 new genera are proposed: *Belonimorphis* (type species *Belonimorphis belonimorphis*); *Koilofera* (type species *Koilofera koilofera*).

- New synonymies: *Cerithiopsis aeolomitres* Melvill & Standen, 1896 = *Cerithiopsis (Horologica) balteata* Watson, 1886.

- New name: *Cerithiopsis (Mendax) melvilli* nom. nov. = *Cerithiopsis aurantiaca* Melvill & Standen, 1896, preoccupied.

RESUME. Les auteurs ont pu rassembler des spécimens de Cerithiopsidae de la Réunion, appartenant à 83 espèces. Après une revue de la littérature et comparaison avec le matériel des Muséums de Berlin, Cardiff, Londres, Manchester et Paris, 16 espèces ont été répertoriées comme déjà connues, et 23 ont été laissées en dehors de l'étude pour cause de matériel encore insuffisant.

- 44 espèces sont décrites comme nouvelles

- 2 nouveaux genres sont proposés: *Belonimorphis* (espèce type *Belonimorphis belonimorphis*); *Koilofera* (espèce type *Koilofera koilofera*).

Synonymes nouveaux: *Cerithiopsis aeolomitres* Melvill & Standen, 1896 = *Cerithiopsis (Horologica) balteata* Watson, 1886.

- Nouvelle dénomination: *Cerithiopsis (Mendax) melvilli* nom. nov. = *Cerithiopsis aurantiaca* Melvill & Standen, 1896, preoccupé.

INTRODUCTION

The family Cerithiopsidae A. & H. Adams, 1854 (type genus *Cerithiopsis* Forbes & Hanley, 1850) was established for turreted shells, small or very small, with a conical elevated and narrow spire, or fusiform or pyriform, the teleoconch whorls sculptured with spiral cords and often with axial ribs, their intersections nodulose; aperture oval with a short anterior canal; protoconch variable, either short or more often elevated and very fragile, either smooth or finely sculptured.

Since the publication of The Cerithiopsidae of New Zealand by B.A. Marshall (1978), a growing importance has been given to the features of protoconch and radula among the classification characters. A. Nutzel (1992) proposed to give a family

rank to the Eumetulinae of preceeding authors, considering thus two families among the Cerithiopsidae, namely the Eumetulidae and the Cerithiopsidae. But none of the species collected in Reunion, except one, was ever found alive; hence, radulae were not studied, and we could not follow the taxonomic concepts based on their characters. So, following Marshall, we will consider a single family, the Cerithiopsidae sensu lato.

The Cerithiopsidae on Reunion

The earliest catalogues of molluscs in Mascarene Islands (Bernardin de Saint-Pierre in 1773, d'Argenville in 1780, Sganzini in 1843) do not include any Cerithiopsidae.

Nor did Deshayes (1863) cite any in his "Catalogue des Mollusques de la Réunion".

Lamy (1909) described *Cerithiopsis blandi* Vignal, after a single specimen from Madagascar, and several specimens from Reunion, Saint-Pierre, all of them syntypes. Protoconchs of the species remained unknown. 2 boxes labelled "syntypes" are registered in the MNHN typothèque: all specimens except 2 match the figure of Lamy, and in spite of the lack of protoconchs, can be certainly identified as *Horologica turrigera* (Watson, 1886), of which *Cerithiopsis blandi* is thus a junior synonym. Furthermore, the boxes labelled *C. blandi* contain 2 other different specimens: one of them, deprived of its protoconch, matches the teleoconch of our *Mendax penneyi*, n.sp., but could nevertheless be *Cerithiopsis hedista* Melvill & Standen, 1896; the other specimen, very worn and without protoconch, cannot be identified with certainty, but resembles our new species *Joculator keratochroma*.

Descriptions of the marine fauna in the neighbouring island Mauritius are more numerous: although neither Lienard Elize (1877) nor von Martens (1880) quote any Cerithiopsidae. Several samples from Mauritius are present in the Melvill-Tomlin collection, namely *Cerithiopsis adelpha*, *C. aurantiaca*, *C. catenaria*, *C. eutrapela*, *C. fosterae*, *C. mathildaeformis*. Viader in his Revised Catalogue of species from Mauritius (1937), quoted 6 species of Cerithiopsidae, namely: *Cerithiopsis catenaria* Melvill & Standen, 1896, *C. fosterae* Melvill & Standen, 1896, *C. mathildaeformis* Melvill, 1907 (= *Metaxa*, Triphoridae), *C. pulvis* (Issel, 1869), *C. subreticulata* (Dunker, 1861) and *Seila alfredensis* Bartsch, 1915.

During those last 40 years, we have collected in Reunion specimens belonging to 83 species of Cerithiopsidae. They consist mostly in specimens found dead in hand-dredged sand from depths accessible by scuba diving, that is from 10 to 70 m. Many specimens lack their protoconch, in which case only those with a particular coloration could be identified. Among these 83 species, 16 could be identified as known species; 44 are new species and are described; for 23 species, material was not sufficient to allow identification or an original description. The latter will not be studied in this paper. Most of species seem to be rare, with sometimes only a few specimens collected. The commonest species *Horologica turrigera* (Watson, 1886) was the only species to be found alive. In spite of our research, we have not found Cerithiopsidae specimens on or in sponges.

Assigning our species to genera.

The earlier descriptions have most often been based on specimens lacking a protoconch, and generic characters relate only to the teleoconch. Thus comparison and identification with earlier type material, figures, and descriptions, are difficult.

However, in more recent studies, a growing importance has been given to protoconch characters, primarily its smooth (for genera *Cerithiopsis*, *Joculator*, *Horologica*) or sculptured appearance (genera *Mendax*, *Dizoniopsis*, *Prolixodens*). Examination of the protoconchs at high magnification and SEM, may show other characters, such as granulose or strongly mamillated patterns, small and low reliefs of various forms, or small and short axial riblets. When more material is available, these characters may be seen to be of generic significance, but in the present paper, we will consider them as minor characters.

Among the species with obviously beaded spiral cords on the teleoconch, species with a smooth protoconch are easily referred to genera.

Cerithiopsis Forbes & Hanley, 1850 (Type species: *Cerithiopsis tubercularis* (Montagu, 1803) from Europe), includes species with a high teleoconch, with numerous whorls, not constricted at base, and with a protoconch made of 3 to 6 smooth whorls that is without cords or ribs, sometimes granulose, especially on the first whorl. 15 of our species may be attributed to this genus sensu lato, among which 2 are known species, and 10 are new ones. The lack of radulae on our specimens does not allow us to refer them to allied genera based on radular characters.

Joculator Hedley, 1909 (type species: *Cerithiopsis ridicula* Watson, 1886, from Queensland) includes small or very small species, bulbous or ovate in shape, more or less constricted at base, bearing 3 beaded spiral cords from the earliest whorls of the teleoconch, with an elevated smooth or punctate protoconch, but without any cords or ribs. 32 of our species are assigned to this genus, among which 5 are known species and 16 are new ones.

Horologica Laseron, 1956 (Type species *Horologica bicolor* Laseron, 1956, from Queensland) was established for ovate species constricted at base like *Joculator*, with a smooth or punctate protoconch, but with only 2 beaded spiral cords on teleoconch whorls. Authors have considered this genus as poorly separated from *Joculator*, some species with 2 beaded spiral cords on earlier whorls having 3 of them on last whorl. However following Marshall, we will consider species showing this character as *Horologica*. 16 of our species are assigned to this genus, among which 7 are known species, and 4 are new ones.

Our species with beaded spiral cords on teleoconch, and with a ribbed protoconch, are not so easily assigned to genera. These ribbed protoconchs may be classified into 4 different types: Some of them show axial ribs extending from suture to suture, with smooth or punctate intervals (Type 1); other ones have the same axial ribs and intervals, with a narrow row of small axial riblets in suture (Type 2); other ones show axial ribs extending from suture to suture, and finer spiral cords in their intervals (Type 3) and lastly, other

ones bear axial ribs limited to the lowest two thirds of whorls, the upper third being smooth or punctate and appearing more or less concave (Type 4).

Dizoniopsis Sacco, 1895 (type species *Cerithium bilineatum* Hörnes, 1855, type locality the Tertiary formations of Piemont) was created for fossil shells with only 2 beaded spiral cords on teleoconch whorls, but the original description did not mention protoconch, and the figure does not show it. Some authors have assigned to this genus shells with smooth protoconchs (Gougerot & Le Renard). But the genus was redefined by Nordsieck, (1968), the type of the genus having, according to him, a protoconch with a smooth first whorl, and following whorls with axial riblets extending from suture to suture. This genus was used by Glibert (1973) for shells with pupoid shape, with 2 beaded cords on teleoconch whorls, and protoconchs with axial ribs. We will follow these authors, and consider as *Dizoniopsis* sensu stricto, species defined as above. We provisionally assign to the genus sensu lato, shells with 2 beaded cords on the teleoconch, and a ribbed protoconch of type 3 (with spiral cords in intervals) and type 4 (axial ribs limited to the lower 2/3 of whorls). A total of 3 of our new species are assigned to the genus *Mendax*, Finlay, 1927 (Type species *Cerithiopsis trizonalis* Odhner, 1924, from New Zealand). Marshall (1978) restricted the genus to species with a short paucispiral protoconch, weakly delimited from teleoconch, with a smooth first whorl, following whorls with axial ribs extending from suture to suture, and a more or less high teleoconch, more or less constricted at the base, with 3 beaded cords per whorl. We assign to the genus 4 of our new species, though their protoconchs are rather high. We provisionally assign to the genus one more species with a ribbed protoconch of type 3 (spiral cords in intervals between ribs).

Prolixodens Marshall, 1978 (type species *Cerithiopsis infracolor* Laseron, 1951, type locality Long Reef, NSW, Australia) was established for narrow and slender shells with straight sides, a ribbed protoconch of type 4 (axial ribs limited to the lower 2/3 of whorls), and 3 beaded spiral cords on teleoconch whorls. 2 of our species are assigned to this genus, as new species. In due course, species with protoconch of type 3, or species with protoconch of type 4, may be thought to deserve new genera, based on protoconch characters only, and including species with 2 or 3 beaded cords on the teleoconch whorls.

Two of our species with beaded spiral cords show very unusual characters.

One of them shows 2 beaded spiral cords per teleoconch whorl, and a protoconch with a flat summit and 3 whorls bearing a strong rounded spiral pad at their lower part, the median and upper parts of whorls being concave: this protoconch sculpture may recall protoconchs illustrated by Marshall (1973) in the genus *Seila*, with a quite different teleoconch. It is nearer to the protoconch of *Inella spina* Marshall,

1983, which is sinistral. For this species, we propose a new genus, *Koilofera* (from Greek, meaning bearing a concavity); type species: *Koilofera koilofera*, n.sp.

The second species is a very high and slender shell, with teleoconch sides slightly convex and a reticulated more or less strongly beaded sculpture, and with a strongly elevated protoconch of 3.5 whorls bearing 2 saillant equal and well separated spiral keels, with smooth intervals. We could not find such protoconchs in former descriptions of Cerithiopsidae. For this shell, we propose the new genus *Belonimorphis* (from Greek, meaning needle-shaped): type species: *Belonimorphis belonimorphis* n.sp.

Lastly, 4 of our species (2 of which as new species) are assigned to the genus *Seila* A. Adams, 1861 (Type species: *Triphoris dextroversus* Adams & Reeve, 1860, from China Seas). This genus was established for species with high conical or slightly convex teleoconch, with smooth and unbeaded spiral cords, very close-set fine axial threads in the intervals between spiral cords and a variable protoconch.

Abbreviations used

MM : Manchester Museum.

MNHN : Museum national d'Histoire naturelle, Paris.

MNK: Museum für Naturkunde, Berlin.

NHM: Natural History Museum, London.

NMW: National Museum of Wales, Cardiff.

SEM: Scanning Electron Microscope.

SYSTEMATICS

Genus *Cerithiopsis* Forbes & Hanley, 1850

Type species: *Cerithiopsis tubercularis* (Montagu, 1803), Europe: elongate shell, not constricted at base, with 3 beaded spiral cords per teleoconch whorl, protoconch smooth or punctate, without any axial rib or spiral cord, except sometimes for a spiral carina on last half-whorl.

Cerithiopsis eutrapela Melvill & Standen, 1896.

Plate 1, A; colour plate I, Fig. 1)

Material examined. 1 spmn MNHN; 30 spmns with complete protoconch, coll. M.Jay; 11 spmns coll. J.Drivas.

Description. Shell conical, elevated, and slightly oval, somewhat wider than the related species; angle at the summit of teleoconch 35°. Protoconch strong and high of 3.5 convex smooth whorls, finely punctate under SEM, with very fine close-set axial threads in suture; its limit from teleoconch clear-cut and oblique, its last 1/4 whorl with a median spiral carina. Teleoconch of 8 or 9 convex whorls, bearing 3 beaded spiral cords, the upper one slightly weaker. One weak spiral thread between the cords, on the 2 last whorls.

Axial ribs, weaker than cords, crossing them at right angles, with one rounded bead at each intersection, beads numbering 23-24 per whorl. A fourth weaker and more finely beaded spiral cord emerging from suture at base of last whorl. Base smooth. Aperture circular. Colour creamy-white, the earlier whorls more neatly white, protoconch brown.

Size: maximum total height 6.5 mm; width at base 2 mm; height of protoconch 0.42 mm; width of protoconch at base 0.28 mm.

Locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Remarks. Our specimens were compared and found identical to the holotype of Melvill & Standen, in MM: a single specimen without protoconch; and to the syntypes in NMW (lot Nr Z.1955.158.02262) from Lifu, Loyalty Isl. They resemble also another lot of the Melvill-Tomlin collection, in NMW (lot Nr Z.1955.158.02268) from Mauritius.

***Cerithiopsis fosterae* Melvill & Standen, 1896.**

Plate 1, B; colour plate I, Fig. 2

Material examined. 1 spmn MNHN; 13 spmns with complete protoconch coll. M. Jay; 40 spmns with broken protoconch coll. M. Jay; 11 spmns coll. J. Drivas.

Description. Shell elevated and conical, very elongate and slender, summit angle 22°. Protoconch prolonging the general shape of teleoconch, comprising 5 convex smooth whorls, with under SEM some very fine axial threads above suture on first whorl, and a weak spiral cord in suture between the 4th and 5th whorls; limit from teleoconch oblique and well marked, the last 1/4 whorl bearing a median spiral carina, more or less visible. Teleoconch of 10 strongly convex whorls. Suture deeply impressed. 3 beaded spiral cords per whorl, the uppermost one somewhat weaker and slightly constricted, but visible from first whorl. Axial ribs weaker than cords, crossing them and joining the beads, obliquely in the first interval, axially in second one, and extending from upper to lower suture, but discontinuous from one whorl to another. Axial ribs and beads numbering 26 to 28 per whorl. A fourth spiral cord, weaker and smooth, emerging from suture at base of last whorl. One more weak and smooth spiral cord on base. Aperture rounded. Colour white, suture and upper beaded cord very pale brown in fresh specimens, but this colour fades rather fast. Protoconch white.

Size: maximum total height 6.1 mm; width at base 1.4 mm; height of protoconch 0.56 mm; maximum width of protoconch 0.30 mm.

Locality. Found dead in hand-dredged sand at 30-55 m, off Saint-Gilles-les-Bains.

Remarks. Our specimens appear identical to the holotype of *Cerithiopsis fosterae* Melvill & Standen, 1896, type locality Loyalty Islands, in MM: a single specimen that matches the figure of Melvill & Standen, with a protoconch broken at summit and 3 whorls left. They are identical also to the syntypes of Melvill & Standen in NMW (lot Nr Z.1955.158.00205) five specimens from Lifu: only one specimen has a protoconch of 3 whorls, with broken summit. Furthermore our specimens are identical to specimens in two other lots of the Melvill-Tomlin collection in NMW, from Mauritius, of which none has a complete protoconch. The original description of Melvill & Standen described a protoconch of 3 whorls instead of 5, without mentioning the broken summit, and described 2 beaded spiral cords on teleoconch whorls; the third and upper cord, weaker and constricted, not mentioned in the original description, is nevertheless visible on Melvill & Standen's figure, and on the types and syntypes.

***Cerithiopsis boucheti* n.sp.**

Plate 1, C; colour plate I, Fig. 3

Material examined. 2 spmns MNHN; 37 spmns coll. M. Jay, all with complete protoconch; 6 spmns coll. J. Drivas.

Description. Shell conical, elevated, very slightly oval. Protoconch nearly cylindrical, of 3 strongly convex whorls, the earlier one rounded, the following two equal, their diameter smaller than the first whorl of teleoconch; whorls looking smooth, but finely punctate under microscope; mamillated with close-set hemispherical tubercles under SEM; last whorl well separated from teleoconch by an oblique line with change of colours, but the 3 spiral cords of teleoconch have appeared and are weakly visible on the last 1/4 whorl of protoconch. Teleoconch of 7 slightly convex whorls, with 3 beaded spiral cords per whorl, equal in importance on last whorl, the upper cord a little weaker and retracted on earlier whorls. Very fine axial riblets crossing the cords at right angles, with a rounded bead at each intersection, beads numbering 22-23 per whorl. Very close-set fine axial striae visible in the intervals between cords, under strong enlargement. A fourth finer and more weakly beaded spiral cord emerging from suture at base of last whorl; beads becoming weaker, and axial riblets more neatly visible on last part of last whorl. One more weak smooth cord on base. Aperture circular. Colour plain glossy brown, protoconch white.

Size: holotype total height 4.5 mm, width at base 1.3 mm; height of protoconch 0.49 mm; width of protoconch at base 0.36 mm.

Type locality. Saint-Gilles-les-Bains, in hand dredged sand at 10-20 m, between Hermitage and Saint-Paul Bay.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 15 coll. M. Jay; paratypes 16 to 18 coll. J. Drivas.

Etymology. Dedicated to Philippe Bouchet, curator of the Mollusca section in MNHN.

Remarks. Eight of our species look alike by their high teleoconch, with 3 spiral cords, the upper one weaker and retracted to penultimate whorl, and by their colour more or less golden brown. They are undistinguishable on teleoconch characters only, in spite of slight differences in their width, and differ mostly by their protoconch: 5 of them are *Cerithiopsis*, with smooth or punctate protoconchs. *C. hadfieldi* n.sp. has a conical protoconch of 5 whorls, and the widest teleoconch. *C. boucheti* n.sp. has a more cylindrical protoconch of 3 whorls; *C. pickeringae* n.sp. has a conical protoconch of 4 whorls with rounded apex. *C. nutzeli* n.sp. is a shorter shell with a protoconch of only 2 whorls. *Cerithiopsis seddonae* n.sp. differs from other ones by its wider protoconch of 3.5 whorls, by its shorter teleoconch, and by its upper cord more retracted.

Three other species may be confused with the five preceding ones but have protoconchs with axial ribs: well visible for *Mendax metivieri* n.sp. and *Mendax ribesae* n.sp.; for *Mendax mascarenensis* n.sp. axial riblets on protoconch are low and have to be searched under oblique light.

Moreover, these species resemble the species labelled *Cerithiopsis brunnea* Thiele from SW Australia (MNK lot Nr 67484), which has only the last smooth whorl of its broken protoconch left, but the teleoconch of which bears larger and less numerous beads (18 per whorl instead of 22). *C. exquisita* Sowerby, 1897 (Natal, South Africa) differs from our species in that its teleoconch whorls are more convex, and its upper cord more retracted. The *Joculator* species with the same colour are much smaller and constricted at base.

***Cerithiopsis hadfieldi* n.sp.**

Plate 1, D; colour plate I, Fig. 4

Material examined. 2 spmns MNHN, 17 spmns coll. M. Jay, (13 with complete protoconch).

Description. Shell conical, high, slightly fusiform, summit angle of teleoconch 30°. Protoconch prominent and obviously conical, of 5 smooth convex whorls, appearing punctate under microscope; apex rounded, suture wide bearing fine riblets, axial or slightly oblique, stronger and more widely-spaced than on other protoconchs of the same type and numbering about 20 per whorl; suture slightly darker than protoconch whorls; limit from teleoconch clear-cut and oblique. Teleoconch of 8 convex whorls, bearing 3 beaded spiral cords per whorl, the uppermost one a little weaker and constricted but visible from the first whorl. Axial ribs, weaker than cords, crossing them at right angles, with a bead at each intersection; beads more or less strong and rounded numbering 23-24 per

whorl. Intervals between cords very finely axially striated. A fourth smooth cord emerging from suture at base of last whorl. Base excavated, smooth; last whorl and aperture expanded on some specimens. Aperture circular. Colour more or less dark brown, protoconch white.

Size: maximum total height 5.6 mm; maximum width 1.4 mm; height of protoconch 0.82 mm; width of protoconch at base 0.32 mm.

Type locality. Found dead in hand-dredged sand at 45 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 7 coll. M. Jay.

Etymology. Dedicated to the Rev. James Hadfield, who collected the first specimens of that species in Lifu.

Remarks. Our specimens were compared and found similar to the syntypes of *Cerithiopsis catenaria* Melvill & Standen, 1896, in NMW, (lot Nr Z.1955.158.00193): 3 specimens from Lifu, one of them with protoconch. They are identical also to the specimens of another lot in the Melvill-Tomlin collection in NMW (lot Z.1955.158.02263) from Mauritius. However, the holotype of the species in MM collection (Lot EE 3714) differs from the NMW syntypes by its protoconch, only 1/4 of last whorl of which remains, bearing 4 strong and rounded axial ribs; and also in its teleoconch possessing elevated and narrow spiral cords, darker than ground, and beads a little more numerous: this specimen, using our criteria, should be assigned to the genus *Mendax*. The specimens labelled syntypes in NMW thus belong to another and undescribed species, together with our specimens from Reunion; for it, we propose the name *Cerithiopsis hadfieldi*.

***Cerithiopsis iochrous* n.sp.**

Plate 1, E; colour plate I, Fig. 5

Material examined. 2 spmns MNHN, 10 spmns coll. M. Jay, (5 spmns with complete protoconch); 2 spmns coll. J. Drivas.

Description. Shell very high and slender with nearly straight sides, summit angle 20°-22°. Protoconch prolonging the general outline of teleoconch, comprising 5 convex whorls, smooth under SEM, without axial threads, but with a weak spiral cord in suture between the 4th and 5th whorls; its limit from teleoconch clear-cut and oblique, the last 1/4 whorl bearing a spiral carina beginning the sculpture of teleoconch. Teleoconch of 11 to 14 whorls, bearing 3 beaded spiral cords per whorl, high and narrow, the uppermost one weaker and constricted. Axial ribs a little weaker than the cords, numbering 21-22 on last whorl; ribs slightly oblique in the first interval between

cords, and axial in second one, and extending from upper to lower sutures, but not from one whorl to another. A small bead at each intersection. One fine spiral thread between the cords on last whorl. A fourth spiral cord emerging from suture at base of last whorl. One additional weak smooth spiral cord on base. Aperture circular. Colour uniform pale violet, a little darker on earlier whorls, protoconch white. This colour fades more or less swiftly. Size: holotype height 5.5 mm, width at base 1.2 mm; height of protoconch 0.56 mm, maximum width of protoconch 0.33 mm.

Type Locality. Saint-Gilles-les-Bains, found dead in hand dredged sand at 10-20 m.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 6 coll. M. Jay, paratypes 7 and 8 coll. J. Drivas.

Etymology. Named on account of its colour, from Greek meaning violet.

Remarks. This species is very near to *Cerithiopsis fosterae* Melvill & Standen, 1896, and differs from it only in its colour and lack of fine axial threads on the protoconch. It could perhaps be a colour variation of this last species. One juvenile specimen among the syntypes of *C. fosterae* in NMW has this colour and belongs to this species.

***Cerithiopsis jousseaumei* n.sp.**

Plate 1, F; colour plate I, Fig. 6

Material examined. 2 spmns MNHN, 86 spmns coll. M. Jay, (21 with complete protoconch) 10 spmns coll. J. Drivas.

Description. Conical, high and slender shell, with nearly straight sides, summit angle of teleoconch 20°. Protoconch of 4.5 convex whorls, with a weak and narrow spiral thread in suture, its last whorl with progressive development of adult sculpture, but limit from teleoconch marked by clear-cut oblique change of colour. Teleoconch of 10 to 12 whorls bearing 3 subequal beaded spiral cords per whorl; axial ribs weaker than cords, crossing them at right angles, with a rounded bead at each intersection; beads appearing close-set, and numbering 25 per whorl. The beads of the uppermost spiral cord slightly stronger than others. A fourth weaker and finely beaded cord emerging from suture at base of last whorl. Another smooth very weak cord on base. Aperture quadrangular with rounded angles. Colour golden brown, glossy on fresh specimens, becoming paler with age; protoconch paler, base a little darker.

Size: holotype total height 6 mm, width at base 1.5 mm; height of protoconch 0.35 mm; width of protoconch at base 0.25 mm.

Type locality. Saint-Gilles-les-Bains, found dead in hand-dredged sand at 10-30 m, off Boucan-Canot beach.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 10 coll. M. Jay; paratypes 11 to 14 coll. J. Drivas.

Etymology. Dedicated to F. Jousseau, who described new species of Cerithiopsidae from Red sea and Mascarenes Isl..

Remarks. This species differs from other Reunion species in its 3 rows of subequal beads, its more numerous and close-set beads, and its poorly marked suture. *Cerithiopsis orientalis* Preston, 1905 (type locality Ceylon) has a wider and deeper suture, and is paler in colour. *Cerithiopsis infracolor* Laseron, 1951 (type locality Long Reef, NSW, Australia) has a similar shape, size and colour, but is easily distinguished from it by its costate protoconch.

***Cerithiopsis lamyi* n. sp.**

Plate 2, A; colour plate I, Fig. 7

Material examined. 2 spmns MNHN, 6 spmns coll. M. Jay (5 with complete protoconch).

Description. Shell conical, high, very narrow and slender, base not constricted, summit with a wide protoconch more shortly conical than the general outline of the shell. Large conical protoconch of 5 smooth whorls, more convex at their lower part, resembling a pagoda's roof, with a wide suture; last whorl equal in diameter to first whorl of teleoconch, the limit between both marked by the sudden appearance of the 3 adult cords and change of colour, along a vertical line; earlier whorls tapering to narrow rounded apex. Teleoconch of 8 whorls, suture wide and deeply impressed; 3 spiral cords per whorl, subequal, crossed at right angles by well developed axial riblets, with one rounded bead at each intersection; beads rather small, numbering 17 per whorl. A fourth spiral cord, weaker and finely beaded, emerging from suture at base of last whorl. A fifth smooth cord on base. Aperture circular. Colour horn or dark cream, protoconch a little paler. Size: holotype total height 1.5 mm, width at base 0.5 mm; height of protoconch 0.40 mm; width of protoconch at base 0.32 mm.

Type Locality. Found dead in hand-dredged sand at 30m, off Souris-Chaude, Trois-Bassins.

Type material. Holotype and paratype 1 in MNHN; paratype 2 to 5 Coll. M. Jay.

Etymology. Dedicated to Edouard Lamy, French conchologist.

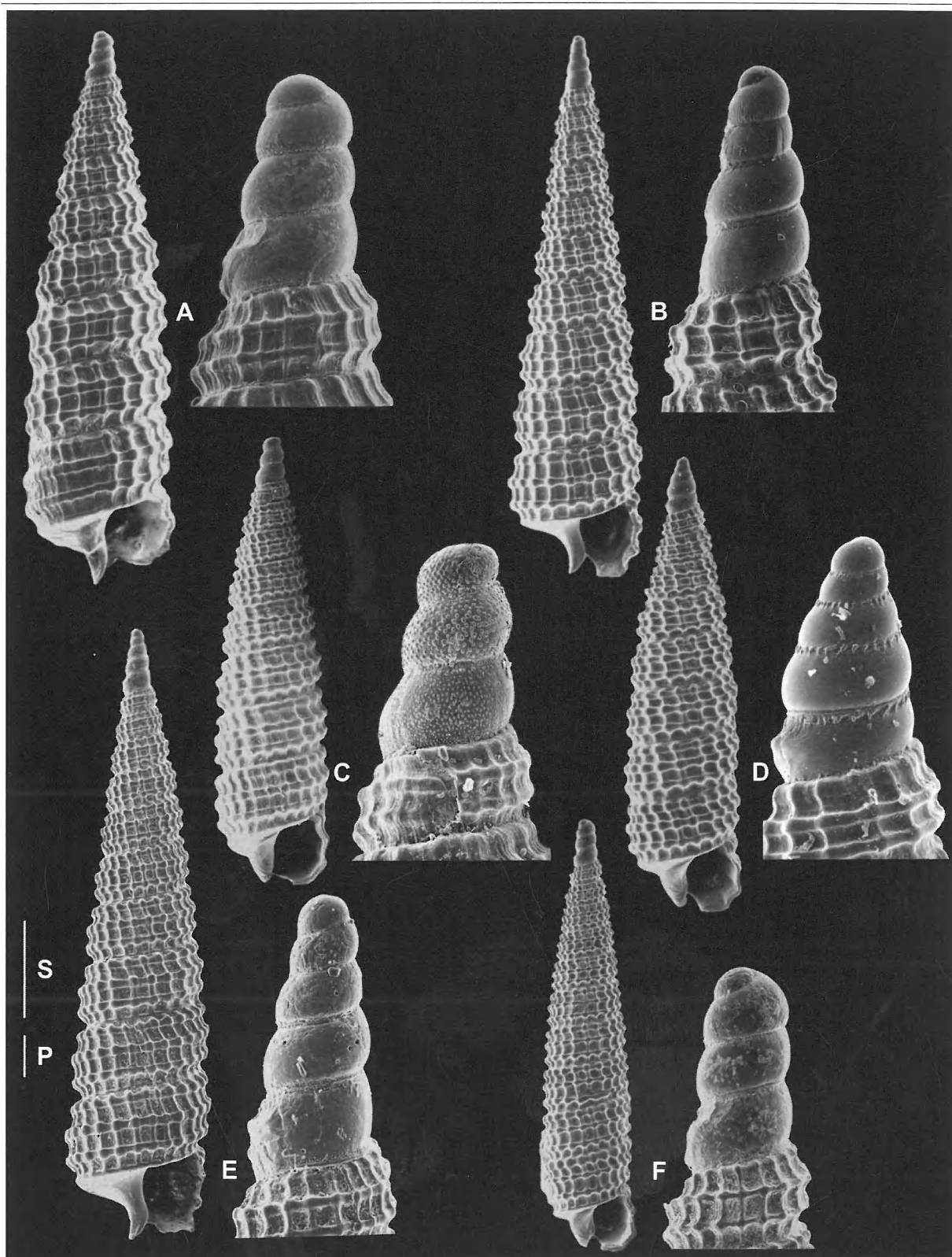


PLATE 1. Fig. A. *Cerithiopsis eutrapela* Melvill & Standen, 1896; Off Saint Gilles les Bains, 10-20 m; height 6.5; MNHN. Fig. B. *C. fosterae* Melvill & Standen, 1896; Off Saint Gilles les Bains, 30-55m; height 6.1 mm; MNHN. Fig. C. *C. boucheti* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 4.5 mm; MNHN. Fig. D. *C. hadfieldi* n.sp. Off Saint Gilles les Bains, 45 m; holotype, height 5.6mm; MNHN. Fig. E. *C. iochrous* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 5.5 mm; MNHN. Fig. F. *C. jousseamei* n.sp. Off Saint Gilles les Bains, 10-30 m; holotype, 2,6 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 μ m.

Remarks. The protoconch of this species resembles in its size and its shape, *Joculator granata* Kay, 1979 and *Cerithiopsis vaurisi* n.sp., but it does not bear the small sutural axial riblets visible on those 2 species. Furthermore, our new species differs from *Joculator granata* by its more slender shape not constricted at base and differs from *Cerithiopsis vaurisi* which has the same shape, by its obviously paler colour.

***Cerithiopsis nutzeli* n.sp.**

Plate 2, B; colour plate I, Fig. 8

Material examined. 2 spmns MNHN, 24 spmns coll. M. Jay, all with complete protoconch.

Description. Shell high, fusiform, topped by the wide and cylindrical protoconch. Protoconch of 2.5 convex whorls, with a large rounded apex, appearing smooth but finely punctate under microscope, and under SEM, mamillated with small hemispherical close-set tubercles; limit from teleoconch along an oblique line marked by change of colour, but adult sculpture begins 1/4 whorl earlier by the progressive development of 2 beaded spiral carinas, continuing the 2 lower cords of teleoconch. Teleoconch of 6 whorls, 3 beaded spiral cords per whorl, subequal on last whorl, but upper cord weaker and retracted on earlier whorls. Weaker axial ribs crossing the cords at right angles, with a rather small bead at each intersection; beads numbering 24 on last whorl. Intervals occupied by very fine axial striae visible only under microscope. A fourth spiral cord emerging from suture at base of last whorl, as strong as other ones, but unbeaded. Base smooth. Aperture rounded. Colour plain orange-brown, protoconch white.

Size : holotype total height 3.4 mm, maximum width 1 mm; height of protoconch 0.46 mm; width of protoconch at base 0.29 mm.

Type locality. Saint-Gilles-les-Bains, between Hermitage and Saint-Paul Bay, found dead in hand-dredged sand at 15-30 m.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 12 coll. M. Jay.

Etymology. Dedicated to Alexander Nutzel (Berlin) for his work on the family.

Remarks. This species differs from other allied *Cerithiopsis* of Reunion, in its smaller size and its 2.5 whorled protoconch. It differs from *Joculator* species of the same colour, in its larger size and unconstricted base.

***Cerithiopsis pickeringae* n. sp.**

Plate 2, C; colour plate I, Fig. 9

Material examined. 2 spmns MNHN, 28 spmns coll. M. Jay, all with complete protoconch.

Description. Shell conical, high, slightly fusiform, protoconch extending the general outline of teleoconch. Protoconch of 4 convex whorls, regularly tapering towards the rounded apex, whorls smooth with fine granulations appearing under microscope and SEM, and very fine axial riblets in suture, hardly visible under SEM; limit from teleoconch oblique and clear cut, with change of colour and beginning of teleoconch sculpture. Teleoconch of 8 whorls, 3 beaded spiral cords per whorl, equal on last whorl, but the upper one weaker and retracted on earlier whorls. Weaker axial ribs in their intervals, crossing them at right angles, with a rounded bead at each intersection, beads numbering 26-27 on last whorl. A fourth spiral cord emerging from suture at base of last whorl, weaker than other ones, retracted and unbeaded. Beads becoming smaller at the end of last whorl. Base excavated, smooth. Aperture rounded. Colour dark golden brown, protoconch white.

Size: holotype total height 3.9 mm, maximum width 1.1 mm; height of protoconch 0.48 mm; width of protoconch at base 0.27 mm.

Type locality. Saint-Gilles-les-Bains, found dead in hand-dredged sand at 20-30 m.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 10 coll. M. Jay.

Etymology. Dedicated to Mrs Joan Pickering, curator of Mollusca section in the BM.

Remarks. This species resembles *Cerithiopsis boucheti* n.sp. but differs from it in its smaller size, and its more conical protoconch of 4 whorls instead of 3. Other characters have been discussed under *C. boucheti*.

***Cerithiopsis seddonae* n.sp.**

Plate 2, F; colour I, Fig. 10

Material examined. 2 spmns MNHN, 20 spmns coll. M. Jay, all with complete protoconch.

Description. Shell fusiform, rather elongate, base not constricted. Protoconch prominent, rather wide, with rounded apex, consisting in 3.5 convex whorls, appearing smooth to the naked eye, finely granulose under optical microscope, and mamillated with rounded close-set tubercles under SEM; lower limit oblique and clear-cut, marked by change of colour, while on last whorl 2 cords progressively develop, beginning the sculpture of teleoconch. Teleoconch of 5 slightly convex whorls, with 3 spiral cords per whorl, crossed by finer axial ribs, with a rounded bead at each intersection; beads numbering 20 to 22 on penultimate whorl; beads of the upper cord a little weaker than others and constricted, including last whorl. Beads always small, widely spaced, the reticulated sculpture being more obvious than for other species. A fourth

spiral cord emerging from suture at base of last whorl, smooth, and underlining angle with base. A further smooth cord at mid-height on base. Aperture circular. Colour pale brown, protoconch paler or whitish. Size: holotype total height 2.2 mm; width at base 0.8 mm; height of protoconch 0.60 mm; width of protoconch at base 0.29 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 6 coll. M. Jay.

Etymology. Dedicated to Dr. Mary Seddon, curator of Mollusca section in NMW.

Remarks. This species differs from *Cerithiopsis boucheti* n.sp. in its smaller size (2.2 mm instead of 4.5 mm), and its wider protoconch (3.5 whorls instead of 3). It differs from *Cerithiopsis pickeringae* n. sp. in its smaller size (2.2 mm instead of 3.9 mm) and wider protoconch. From *Cerithiopsis nutzeli* n. sp. it differs in its higher protoconch (3.5 whorls instead of 2.5); and from *Joculator* species of the same colour, it differs in not having a constricted base.

***Cerithiopsis vaurisi* n.sp.**

Plate 2, E; colour plate 1, Fig. 11

Material examined. 2 spmns MNHN, 38 spmns coll. M. Jay, 37 with complete protoconch.

Description. Shell conical, slender and high with straight sides, protoconch more shortly conical than general outline of teleoconch, giving its apex a characteristic appearance. Protoconch strongly conical of 5 whorls, last whorl as wide as first whorl of teleoconch, their limit nearly axial marked by development of adult sculpture; earlier whorls tapering swiftly and regularly to the rounded and narrow apex; whorls with flat sides, smooth, with a very narrow spiral row of fine axial riblets in suture and immediately under it, visible under optical microscope and SEM; these riblets somewhat stronger than on other species with the same type of protoconch, and numbering about 24 on last whorl. Teleoconch up to 8 whorls with flat sides, wide and deeply impressed suture; 3 spiral cords per whorl, crossed at right angles by slightly weaker axial ribs, with a rounded bead at each intersection, more or less large; beads more widely spaced axially than spirally, numbering 25-26 on last whorl. A weaker unbeaded spiral cord emerging from suture at base of last whorl. Base excavated. Colour dark brown, protoconch paler at apex but becoming darker on later whorls. Size: holotype total height 3.6 mm; width at base 0.8 mm; height of protoconch 0.50 mm; width at the base of protoconch 0.34 mm.

Type locality. Found dead in hand-dredged sand at 50-55m, Possession-Bay.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 8 coll. M. Jay.

Etymology. Dedicated to Daniel Vauris, skin diver who collected sand for this study.

Remarks. This species has a protoconch of the same type as *Joculator granata* Kay, 1979, but differs from it in its base unconstricted, and in its more numerous whorls. It is quite near *Cerithiopsis lamyi* n.sp. in outline and shape of the protoconch, but differs from it in the small axial riblets in the protoconch suture (lacking in the *C. lamyi*), and in its darker colour. One other *Joculator* species has a protoconch with ribbed suture (*Joculator myia* n.sp.), but this is easily separated by its constricted base, size and colour.

***Cerithiopsis wayae* n. sp.**

Plate 2, D; colour plate I, Fig. 12

Material examined. 1 spmn MNHN, 2 spmns coll. M. Jay, all with complete protoconch.

Description. Shell with a high spire, slightly fusiform, base not constricted. Protoconch prolonging the outline of teleoconch, made of 3 rather wide convex whorls, smooth under the naked eye, but granulose under optical enlargement, and mamillated by rounded tubercles under SEM; apex widely rounded; lower limit clear-cut oblique marked by change of colour, but 2 spiral cords progressively develop on last 1/4 whorl, beginning adult sculpture. Teleoconch of 7 slightly convex whorls, suture weakly impressed, 3 spiral cords per whorl, rather strong, regularly swelling into small and spirally elongate beads, numbering 26-27 per whorl. Fine axial riblets joining the beads, hardly visible even under microscope. The whole surface covered with very fine lamellose axial threads. A fourth unbeaded spiral cord, emerging from suture at base of last whorl. Base excavated, a weak smooth cord at mid-height. Colour blackish brown, protoconch white.

Size: holotype height 4.1 mm; maximum width 1 mm; height of protoconch 0.51 mm; width of protoconch at base 0.38 mm.

Type locality. Off Souris-Chaude, Trois-Bassins, found dead in hand-dredged sand at 30 m.

Type material. Holotype in MNHN, paratypes 1 and 2 coll. M. Jay.

Etymology. Dedicated to Ms Kathie Way, BM, London.

Remarks. This species differs from other *Cerithiopsis* species in its spirally elongate beads, and well

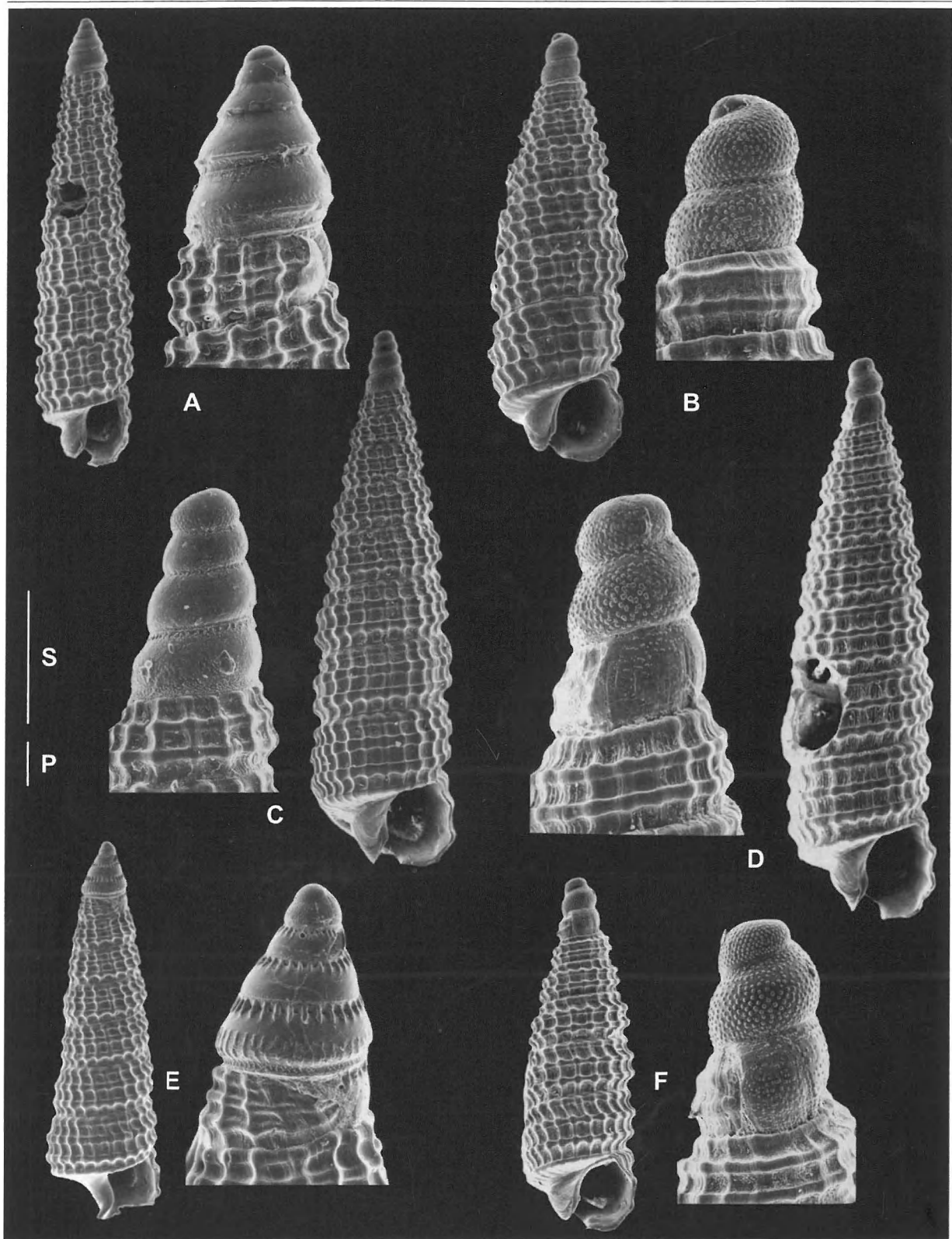


PLATE 2. Fig. A. *Cerithiopsis lamyi* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; holotype, height 1.5 mm; MNHN. Fig. B. *C. nutzeli* n.sp. Off Saint Gilles les Bains, 15-30 m; holotype, height 3.4 mm; coll. M.Jay. Fig. C. *C. pickeringae* n.sp. Off Saint Gilles les Bains, 20-30 m; holotype, height 3.9 mm; MNHN. Fig. D. *C. wayae* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; holotype, height 4.1 mm; MNHN. Fig. E. *C. vaurisi* n.sp. Possession Bay, 55m; holotype, height 3.6 mm; MNHN. Fig. F. *Cerithopsis seddonae* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 2.2 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 µm.

developed lamellose axial threads. The sculpture resembles that of *Belonimorphus belonimorphus* n.sp., but the present species differs in its protoconch and its earlier whorls.

Genus *Joculator* Hedley, 1909

Type species *Cerithiopsis ridicula* Watson, 1886, Queensland: Shell constricted at base; teleoconch whorls with 3 beaded cords; protoconch smooth or punctate, without ribs or cords.

***Joculator albocinctum* (Melvill & Standen, 1896)**

Plate 4, A; colour plate I, Fig. 13

Material examined. 1 spmn MNHN; 30 spmns (13 with complete protoconch) coll. M. Jay; 11 spmns coll. J. Drivas.

Description. Shell fusiform, constricted at base, topped by protoconch. Angle at the summit of teleoconch 40°. Protoconch nearly cylindrical, made of 4 convex whorls, smooth to the naked eye, under SEM with fine granulations on first whorl and fine axial riblets in suture, numbering about 20 on last whorl; apex rounded, limit from teleoconch oblique, marked by change of colour, adult sculpture developing progressively on last whorl. Teleoconch with 3 beaded spiral cords per whorl, and weaker axial ribs, with a bead at each intersection, 19 to 20 beads per whorl; beads of upper cord a little stronger and more rounded than on lower cords. A fourth spiral cord, undulose rather than beaded, emerging from suture at base of last whorl. A fifth smooth cord on base. Aperture oval. The upper beaded cord creamy-white, the remainder of whorls pale brown, the 2 lowest cords appearing as brown lines, darker than the beads. Protoconch white.

Size: maximum height 3 mm; maximum width 1 mm; height of protoconch 0.57 mm; width of protoconch at base 0.33 mm.

Locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Remarks. The teleoconch of our specimens have the same sculpture and same colour pattern as the holotype of *Bittium albocinctum* Melvill & Standen, 1896, (type locality Loyalty Isl.) (MM lot EE 3702); but this type has no trace of the protoconch left, and is larger (4.3 mm without protoconch instead of 2.4 mm for the teleoconch of our larger specimen). On account of the characteristic pattern of the teleoconch, and in spite of the difference in sizes, we propose this identification, specimens from Reunion being considered as a dwarf variety.

***Joculator granata* Kay, 1979.**

Plate 4, D; colour plate I, Fig. 14

Material examined. 1 spmn MNHN; 15 spmns (9 with complete protoconch) coll. M. Jay;

Description. Shell fusiform, nearly cylindrical in the middle, and slightly constricted at base. Protoconch conical of 5 slightly convex whorls, smooth except for a very narrow spiral row of very fine, short axial riblets inside suture, projecting over the very uppermost part of whorls, visible under optical microscope and SEM, 22 riblets on last whorl; last whorl as wide as the earlier whorl of teleoconch, the limit between them obliquely marked by the development of adult sculpture; earlier whorls tapering swiftly to the narrow rounded apex. Teleoconch of 6 whorls, with 3 spiral cords per whorl, crossed at right angles by weaker axial ribs, with a rounded bead at each intersection; beads numbering 24 or 25 on last whorl; the upper beaded cord a little weaker than the other ones. A fourth beaded spiral cord emerging from suture at base of last whorl. Aperture circular. Rare specimens with one more whorl, wider and distorted, but always constricted at base. Plain pale brown in colour, protoconch paler.

Size: total height ranging from 2.3 mm to 2.9 mm; maximum width from 0.7 to 0.9 mm; height of protoconch 0.41 mm; width of protoconch at last whorl 0.31 mm.

Locality. Found dead in hand-dredged sand at 10-20 m off Saint-Gilles-les-Bains.

Remarks. Our specimens match the description and figure given by A. Kay, 1979 (*Joculator granata*, type locality Hawaii) specifically the suture of the protoconch, which A. Kay described as "crimped", this character given as distinctive from the related species. 3 species of *Joculator* among our material have such protoconchs: *Joculator myia* n.sp. differs from *J. granata* in its smaller size and in its 4.5 teleoconch whorls instead of 6; *Joculator skolix* n.sp. differs from it in its protoconch shape, size, and colour; *Joculator albocinctum* (Melvill & Standen, 1896) differs in the particular colour pattern of the teleoconch. *Cerithiopsis* species with such protoconchs (*Cerithiopsis vaurisi* n.sp., *Cerithiopsis pickeringae* n.sp., *Cerithiopsis hadfieldi* n.sp.) differ from it in having a higher teleoconch, not constricted at the base.

***Joculator minima* Laseron, 1955.**

Plate 3, B; colour plate I, Fig. 15

Material examined. 1 spmn MNHN; 12 spmns (6 with complete protoconch) coll. M. Jay; 3 spmns coll. J. Drivas.

Description. Shell pupiform with constricted base and summit topped by a high conical pointed protoconch. Protoconch of 5.5 slightly convex smooth whorls, under SEM with a very fine spiral thread just above suture; last whorl rather large, equal to first whorl of teleoconch. Teleoconch of 5 whorls, with 3 spiral cords per whorl, crossed at right angles by axial ribs a little weaker than the cords, with a rounded bead at each intersection; beads numbering 19-20 on last whorl. Beads of upper cord somewhat larger than those of lower cords. A fourth beaded cord emerging from suture at base of last whorl; base smooth and concave, with 3 spiral threads on anterior canal. Aperture circular. Colour pale brown to cream, protoconch of the same colour. A few specimens with one more distorted whorl, wider but constricted at base.

Size: maximum height 2.3 mm, maximum width 1 mm; height of protoconch 0.45 mm; width of protoconch at base 0.30 mm.

Locality. Found dead in hand dredged sand at 10-20m, off Saint-Gilles-les-Bains.

Remarks. Our specimens match exactly the description and figure given by Laseron (*Joculator minima* Laseron, 1955, type locality Hope Isl.). This species is distinguished by the width of the protoconch, especially its last whorl, occasionally wider on our specimens than in Laseron's figure.

***Joculator minutissima* (Thiele, 1925).**

Plate 3, C; colour plate I, Fig. 16

Material examined. 1 spmn MNHN; 26 spmns (4 with complete protoconch) coll. M. Jay; 3 spmns coll. J. Drivas.

Description. Shell pupiform and very short, wide compared to its height, its summit topped by a prominent cylindrical but short protoconch. Protoconch of 2.25 smooth whorls, the first one rounded, the second one weakly convex. Teleoconch of 3 whorls, with 3 subequal spiral cords, crossed at right angles by weaker axial ribs, with a rounded bead at each intersection; beads numbering 18 on penultimate whorl. Colour plain brown, protoconch paler.

Size: maximum height 1.5 mm; maximum width 0.6 mm; height of protoconch 0.25 mm; width of protoconch at base 0.21 mm.

Locality. Found dead in hand-dredged sand at 10-54 m, off Saint-Gilles-les-Bains and Possession-Bay.

Remarks. Our specimens were compared with the holotype of *Cerithiopsis minutissima* Thiele, 1925, type locality Nias Isl. in MNK (Lot Nr 102724) and found identical.

***Joculator pulvis* (Issel, 1869)**

Plate 3, F; colour plate I, Fig. 17

Material examined. 1 spmn MNHN, 7 spmns (2 with complete protoconch) coll. M. Jay. 7 spmns coll. J. Drivas.

Description. Shell pupiform, tapering towards apex, with base strongly constricted. Protoconch prominent, almost cylindrical, made of 3.5 convex smooth whorls with rounded apex, and under microscope a spiral row of fine granules just above lower suture. Teleoconch of 6 whorls, with 3 subequal spiral cords, and distinct axial ribs, equal to the cords, crossing them at right angles, with a small rounded bead at each intersection; beads widely spaced, numbering 16 or 17 on penultimate whorl. A fourth spiral cord emerging from suture, weaker and finely beaded, at base of last whorl. Base with a fifth smooth cord. The upper cord and its beads reddish brown, ground and the 2 other cords very pale brown. Protoconch white.

Size: maximum height 2.9 mm; maximum width 1.2 mm; height of protoconch 0.46 mm; width of protoconch at base 0.35 mm. Some variability in size exists between specimens.

Locality. Found dead in hand-dredged sand at 10-20 m off Saint-Gilles-les-Bains.

Remarks. Our specimens were compared and found identical to the specimen stored in the MNHN typothèque, and labelled *Cerithium* (*Cerithiopsis*?) *pulvis*, type locality Suez roadstead. Specimens match Savigny's figure (Bouchet & Danrigal, 1982). This species resembles *Joculator eudeli* n.sp. which has the same colour pattern, but differs in its greater width, its base bearing one smooth spiral cord instead of 2, the colour of the upper cord being more reddish and less blackish, and the fact that this colour does not reach the suture. The species may be compared with *Cerithiopsis insignis* E.A.Smith, 1906, from Port Shepstone, South Africa, but differs from it in having 6 teleoconch whorls instead of 8, its 3.5 whorled protoconch instead of 4.5, and in its size (2.9 x 1.2 instead of 3.25 mm x 1mm) (see discussion below with *Dizoniopsis herberti* n.sp.). The other pupiform species with a similar colour pattern have only 2 spiral beaded cords, except on last whorl; *Horologica bicolor* Laseron, 1956 and *Horologica semipicta* Gould, 1861, are smaller; *Dizoniopsis herberti* n.sp. with its 2 spiral cords per whorl, and a third cord on the last whorl, is easily separated by its axially costate protoconch.

***Joculator christiaensi* n.sp.**

Plate 3, E; colour plate I, Fig. 18

Material examined. 1 spmn MNHN; 18 spmns (1 with complete protoconch) coll. M. Jay; 2 spmns coll. J. Drivas.

Description. Shell pupiform, strongly swollen at middle, strongly constricted at base, and topped by a stick-shaped protoconch. Protoconch cylindrical and narrow, of 3 slightly convex smooth whorls, with a rounded apex, limited from teleoconch by an oblique line marking change of colour, and appearance of adult sculpture. Teleoconch of 4 whorls, flat-sided, with 3 spiral cords per whorl, and finer axial ribs crossing them at right angles; one rounded bead at each intersection, beads numbering 16 per whorl. On the 2 middle whorls, beads of the upper row are stronger. A fourth weaker cord, finely beaded, emerging from suture at base of last whorl. On last whorl, beads becoming smaller towards the outer lip of aperture. A fifth smooth cord on base. Aperture small, roundly quadrate. Colour dark brown, the upper cord and its beads, and the whole first whorl and protoconch whitish.

Size: holotype total height 1.7 mm; maximum width 0.6 mm height of protoconch 0.34 mm; width of protoconch at base 0.24 mm. Paratype height 1.9 mm; maximum width 1 mm.

Type locality. Found dead in hand-dredged sand at 55 m, Saint-Gilles-les-Bains, between harbour and Boucan-Canot beach.

Type material. Holotype in MNHN, paratype 1 coll. M. Jay.

Etymology. Dedicated to J. Christiaens (Belgium).

Remarks. This species is characterized by its swollen shape, with its prominent narrow protoconch, which resembles that of *Joculator minutissima* (Thiele, 1925) from which it differs in its larger size, stronger beads, and distinct colour pattern. The nearest species is *Joculator ovata* Laseron, 1956, from NE Australia (Hope Isl.), the illustrated type of which has a broken protoconch with only 1.5 whorls left, but has a colour pattern and general outline, including the last whorl of protoconch, similar to the present species. However, *J. christiensi* n.sp. differs from it in having a teleoconch of 4 whorls on all specimens instead of 5, and 16 beads per whorl instead of 14. *Joculator albordina* Laseron, 1956, (type locality Michaelmas Cay, NE Australia), which has a comparable colour pattern is larger in size, with teleoconch of 6 whorls instead of 4 in mature specimens, and 20 beads per whorl instead of 16.

***Joculator eudeli* n.sp.**

Plate 3, D; colour plate I, Fig. 19

Material examined. 2 spmns MNHN; 41 spmns (3 with complete protoconch) coll. M. Jay.

Description. Shell very small, pupiform, with a nearly cylindrical protoconch, base strongly constricted. Protoconch of 3.5 whorls, slightly

convex and smooth, with a fine granulation under optical microscope, distinct under SEM on the lower half of first whorl; limit from teleoconch oblique, marked by change of colour, adult sculpture arising progressively one half whorl earlier. Teleoconch of 5 whorls, suture wide and deeply impressed. 3 spiral cords per whorl, subequal, crossed at right angles by equal axial ribs, with a strong rounded bead at each intersection; beads close-set, numbering 20-21 per whorl. A fourth beaded spiral cord, equal to the other ones, emerging from suture at base of last whorl. 2 more spiral cords on base, weaker and smooth, followed by 2 fine threads on anterior part. Aperture quadrangular. Colour beige or fawn on fresh specimens, suture and upper cord blackish-brown with reddish gleam; fourth cord on last whorl and base blackish-brown.

Size: holotype height 1.9 mm; maximum width 0.8 mm; height of protoconch 0.40 mm; width of protoconch at base 0.27 mm.

Type locality. Found dead in hand-dredged sand at 30 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 6 coll. M. Jay.

Etymology. Dedicated to Emile Eudel, merchant ship captain in the last century, who was one of the earlier collectors of Reunion fauna.

Remarks. This species resembles *Joculator pulvis* (Issel, 1869), but differs in its smaller size, the 2 smooth spiral cords on base instead of 1, the blackish-brown colour of the upper cord instead of reddish-brown, and in its suture being tinted by this same colour. It differs from *Cerithiopsis (Joculator) insignis* E.A.Smith, 1906, as discussed above with *Joculator pulvis*. Other pupiform species with similar colour pattern (*Horologica bicolor* Laseron, 1956, *Horologica semipicta* Gould, 1861, and *Dizoniopsis herberti* n.sp.) have only 2 spiral beaded cords per whorl, a third cord only on last whorl; *Dizoniopsis herberti* n.sp. is easily distinguished by its axially ribbed protoconch.

***Joculator fischeri* n.sp.**

Plate 3, A; colour plate I, Fig. 20

Material examined 2 spmns MNHN; 8 spmns (4 with complete protoconch) coll. M. Jay.

Description. Shell fusiform, with a nearly cylindrical protoconch, base constricted. Protoconch of 3.5 smooth convex whorls, with rounded apex, its limit from teleoconch oblique marked by change of colour and appearance of adult sculpture. Teleoconch of 7 whorls, 3 beaded spiral cords per whorl; axial ribs distinct, equal to cords, crossing them at right angles, with a rounded bead at each intersection; beads rather

small, appearing widely spaced, and numbering 19-20 on last whorl; the middle cord reduced to a fine thread on first whorl, obviously weaker than the other ones on following whorls, and still a little weaker on last whorl, the upper cord a little stronger than the lower one. A fourth beaded spiral cord, weaker, emerging from suture at base of last whorl. Base excavated with a weak smooth cord at mid-height. Aperture circular. Colour glossy brown, the upper cord a little darker, protoconch paler.

Size: holotype total height 2.3 mm, maximum width 0.8 mm; height of protoconch 0.35 mm; width of protoconch 0.23 mm.

Type locality. Found dead in hand-dredged sand at 30 m off Souris-Chaude, Trois-Bassins.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 5 coll. M. Jay.

Etymology. Dedicated to Pr.P.H. Fischer, late professor in zoology at Saigon.

Remarks. This species is smaller than *Joculator keratochroma* n.sp. and *Joculator lozoueti* n.sp. It differs from other species of brown *Joculator* of the same size, namely *J. myia* n.sp., *J. mygaki* n.sp., *J. phtyr* n.sp., *J. psyllos* n.sp. and *J. thielei* n.sp. in its weaker middle cord and stronger upper cord.

***Joculator keratochroma* n.sp.**

Plate 3, G; colour plate I, Fig. 21

Material examined. 2 spmns MNHN; 27 spmns (1 with complete protoconch) coll. M. Jay; 9 spmns (1 with complete protoconch) coll. J. Drivas.

Description. Shell pupiform with strongly constricted base and prominent protoconch. Protoconch high, slightly conical with wide and rounded apex, and 4 convex smooth whorls; the last whorl a little narrower in diameter than the first whorl of teleoconch; its limit from teleoconch oblique, marked by change of sculpture. Teleoconch of 7 slightly convex whorls, suture shallow, penultimate and last whorl constricted. 3 spiral cords per whorl, subequal, crossed at right angles by rounded axial ribs, weaker than cords. A rounded bead at each intersection, beads numbering 17 or 18 per whorl. A fourth beaded spiral cord emerging from suture at base of last whorl. Last whorl strongly constricted with 4 spiral cords, their beads becoming much weaker towards aperture. 2 more cords, fine and smooth, on base. Aperture circular. Colour plain horny-brown, or dark cream, identical on all specimens.

Size: holotype total height 2.5 mm; maximum width 1 mm; height of protoconch 0.30 mm; maximum width of protoconch 0.26 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratype 2 and 3 coll. M. Jay; paratype 4 coll. J. Drivas.

Etymology. Named after its colour, from Greek *kera*, meaning horn.

Remarks. This species differs from *Joculator melanoraphis* n.sp. which has a comparable shape, in its plain coloration and its slightly higher protoconch (4 whorls instead of 3.5); it differs from *J. ridicula* (Watson, 1886) in its larger size (2.5 mm instead of 1.4 mm) and in having 7 teleoconch whorls instead of 3; it differs from *J. tribulationis* (Hedley, 1909) in its slightly larger size (2.5 mm instead of 2.1 mm), its 4 protoconch whorls instead of 3 and in its 6 teleoconch whorls instead of 5; *J. minima* Laseron, 1955, *J. minutissima*, (Thiele, 1925), *J. thielei* n.sp. are much smaller and have different protoconchs. *Cerithiopsis (Joculator) pupula* Dunker (MNK lot Nr 6824) is more ventricose.

***Joculator laseroni* n.sp.**

Plate 5, A; colour plate I, Fig. 22

Material examined. 2 spmns MNHN; 18 spmns (3 with complete protoconch) coll. M. Jay.

Description. Shell small, fusiform with constricted base. Protoconch rather cylindrical with rounded apex, comprising 3 convex smooth whorls, its limit from teleoconch very oblique, marked by change of colour and sculpture. Teleoconch of 5 whorls, suture poorly visible, 3 spiral cords per whorl, crossed at right angles by slightly weaker axial ribs, with a large rounded bead at each intersection; spiral cords subequal, beads numbering 16 per whorl, and appearing close-set. A fourth beaded spiral cord emerging from suture at base of last whorl. A fifth weak and unbeaded cord on base. Aperture circular. Colour deep brown, the beads a little paler than ground; protoconch white.

Size: holotype total height 2.3 mm, maximum width 0.9 mm; height of protoconch 0.26 mm; width of protoconch at base 0.22 mm.

Type locality. Found dead in hand-dredged sand at 30 m, off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 4 coll. M. Jay.

Etymology. Dedicated to C.F. Laseron, on account of its resemblance to *Joculator subula* described by him.

Remarks. This species matches the description of *Joculator subula* Laseron 1956, (Bowen, Queensland) except for its 3 protoconch whorls instead of 5.5

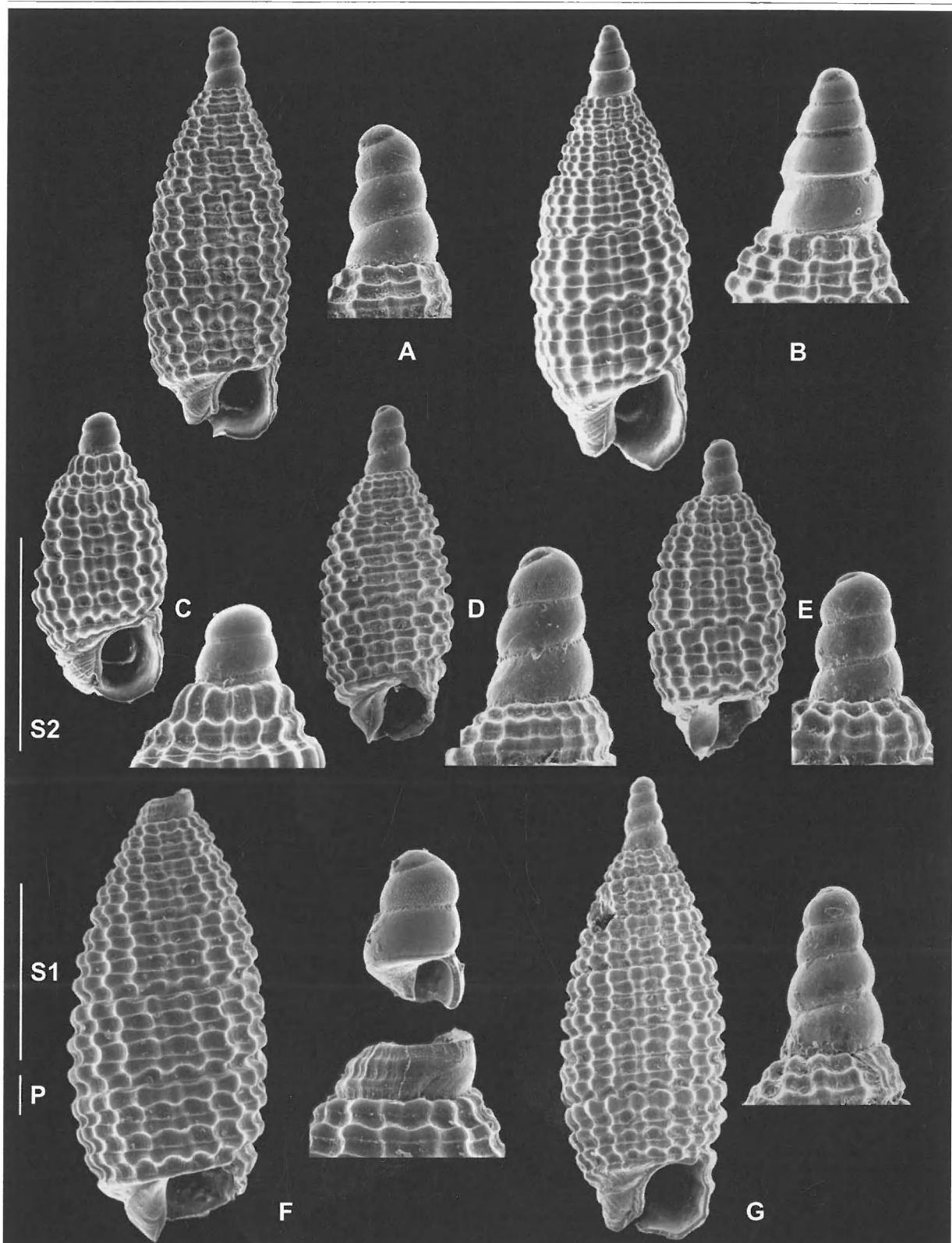


PLATE 3. Fig. A. *Joculator fischeri* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; holotype, height 2.3 mm; MNHN. Fig. B. *J. minima* Laceron, 1955. Off Saint Gilles les Bains, 10-20 m; height 2.3 mm; MNHN. Fig. C. *J. minutissima* (Thiele, 1925). Off Saint Gilles les Bains and Possession Bay 10-54 m; height 1.5 mm; MNHN. Fig. D. *J. eudeli* n.sp. Off Saint Gilles les Bains, 30 m; holotype, height 1.9 mm; MNHN. Fig. E. *J. christiaensi* n.sp. Off Saint Gilles les Bains, 55 m; holotype, height 1.7 mm; MNHN. Fig. F. *J. pulvis* (Issel, 1869). Off Saint Gilles les Bains, 10-20 m; height 2.9 mm; MNHN. Fig. G. *J. keratochroma* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 2.5 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 μ m.

whorls on *J. subula*. It differs from *Joculator salvati* n.sp., which has the same shape and colour, in its smaller size (2.3 mm against 3.6), in its protoconch (3 whorls against 2.25) and its plain colour.

***Joculator lozoueti* n.sp.**

Plate 4, B; colour plate I, Fig. 23

Material examined. 2 spmns MNHN; 53 spmns (2 with complete protoconch) coll. M. Jay; 10 spmns coll. J. Drivas.

Description. Shell pupiform with strongly constricted base and prominent protoconch. Protoconch cylindrical, made of 2.5 convex whorls, smooth and translucent, with very rounded apex, its limit from teleoconch very oblique, marked by change of colour and sculpture. Teleoconch of 7 slightly convex whorls with shallow suture. 3 spiral cords per whorl, subequal, crossed at right angles by weak axial ribs. A strong rounded bead at each intersection, beads very close-set and numbering 17 or 18 per whorl. A fourth spiral cord emerging from suture on base of last whorl. On the 4 cords of last whorl, towards aperture, beads becoming weaker and axially elongate, the lowest cord unbeaded. A fifth fine smooth cord on base. Aperture oval. Colour plain dark brown, protoconch white.

Size: holotype total height 3.2 mm; maximum width 1.3 mm; height of protoconch 0.42 mm; maximum width of protoconch 0.34 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 and 3 coll. M. Jay; paratypes 4 and 5 coll. J. Drivas.

Etymology. Dedicated to Mr. Lozouet, MNHN Paris.

Remarks. This species differs from *Joculator keratochroma* n.sp. in its slightly higher size, shorter protoconch (2.5 whorls instead of 4), and darker colour. It differs from *J. melanoraphis* n.sp. in its shorter protoconch (2.5 whorls instead of 3.5), and plain coloration; it differs from *J. subula* Laseron, 1856 in its larger size, less blackish colour, and shorter protoconch (2.5 whorls against 5.5); it differs from *J. continens* Laseron, 1856 (Bowen, Queensland) in the above characters and its slightly shorter and wider protoconch; it differs from *J. melania* Laseron, 1856 (Bowen, Queensland) in its shorter protoconch (2.5 whorls instead of 4.5).

***Joculator megacephala* n. sp.**

Plate 5, B; colour plate I, Fig. 24

Material examined. 2 spmns MNHN; 20 spmns (13 with complete protoconch) coll. M. Jay.

Description. Shell very small and pupiform, strongly constricted at base, with a prominent rather large protoconch. Protoconch conical of 5.5 convex smooth whorls, forming by itself about 1/3 of the total height of the shell, with narrow and rounded apex, its last whorl of large diameter compared with teleoconch, its lower limit along an oblique line marked by change of sculpture and colour; the specimen photographed under SEM shows a worn surface. Teleoconch of 4 whorls with 3 spiral cords per whorl, crossed at right angles by slightly weaker axial ribs, with a rounded bead at each intersection; 20 beads per whorl. A fourth weaker and more finely beaded cord emerging from suture at base of last whorl. Aperture oval. Colour dark cream, protoconch pale brown.

Size: holotype height 1.8 mm., maximum width 0.6 mm; height of protoconch 0.42 mm; width of protoconch at base 0.35 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 14 coll. M. Jay.

Etymology. Named after its shape, from Greek, meaning "large head".

Remarks. This species has the same shape as *Horologica macrocephala* (Laseron, 1956), but differs from it in the 3 spiral cords instead of 2 on the teleoconch whorls, its weaker, more numerous and more close-set beads, and its smaller size. It differs from *Joculator minima* Laseron, 1956 in its smaller size (1.8 mm instead of 2.3mm), its proportionally larger protoconch (0.5 mm for the 2 species), its colour (cream instead of brown), and its subequal beaded cords, the beads of the upper cord being somewhat larger on *J. minima*.

***Joculator melanoraphis* n.sp.**

Plate 5, F; colour plate I, Fig. 25

Material examined. 2 spmns MNHN; 24 spmns (11 with complete protoconch) coll. M. Jay; 5 spmns (2 with complete protoconch) coll. J. Drivas.

Description. Shell pupiform, rather globose, with strongly constricted base and high protoconch. Protoconch of 3.5 smooth convex and translucent whorls, rounded apex, well delimited from teleoconch by an oblique line marking change of sculpture. Teleoconch of 7 whorls with straight sides and shallow suture. 3 spiral cords per whorl, the uppermost one a little weaker on first whorl, but equal to the other ones on following whorls. Rounded and widely-spaced axial ribs, a little smaller than cords, crossing them at right angles, with a rounded bead at each intersection, beads close-set and numbering 16 or 17 per whorl. On fresh specimens, very fine axial riblets visible under

microscope on whole surface including cords and ribs, numbering 6 to 7 in each interval. A fourth spiral cord emerging from suture at base of last whorl, with only weak swellings rather than beads; a fifth smooth cord on base of mature specimens. Aperture circular. Colour plain beige to pale brown; suture, base and protoconch darker brown. On fresh specimens, the upper cord is a little darker than the other ones, but remains clearly paler than suture.

Size: holotype total height 2.9 mm, maximum width 1 mm; height of protoconch 0.44 mm; width of protoconch at base 0.30 mm.

Type locality. Found dead in hand-dredged sand at 10-30 m, off Saint-Gilles-les-Bains, between harbour and Boucan-Canot beach.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 12 coll. M. Jay; paratypes 13 and 14 coll. J. Drivas.

Etymology. Named on account of its colour pattern from Greek meaning brown suture.

Remarks. *Dizoniopsis herosae* n. sp. which has the same colour and a brown suture, is easily separated from this species by its 2 spiral cords instead of 3, and its axially ribbed protoconch. The other species discussed below lack the darker suture: *Joculator granata* Kay, 1979, is higher and less constricted basally, and its upper cord is weaker on all whorls; it also has a crimped suture on the protoconch whorls. *Joculator keratochroma* n. sp. is of the same shape, but is smaller and has a plain coloration; *Joculator lozoueti* n.sp. can be separated on account of its more ventricose shape, its white protoconch and the plain, darker colour of the teleoconch; *Bittium (Joculator) tenthrenois* Melvill, 1896 from Bombay, differs in its more ventricose shape and its plain brown colour; *Cerithiopsis (Joculator) ridicula* Watson, 1866 from Wednesday Isl., NE Australia, differs in having only 3 teleoconch whorls, and its upper cord is weaker on all whorls, and its coloration plain; *Joculator minima* Laseron, 1955, *J. niasensis* (Thiele, 1925), and *J. psyllos* n.sp. are of similar shape, but are much smaller.

***Joculator mygaki* n. sp.**

Plate 5, E; colour plate I, Fig. 26

Material examined. 2 spmns MNHN; 15 spmns (10 with complete protoconch) coll. M. Jay; 5 spmns coll. J. Drivas.

Description. Shell very small and pupiform, its slender apex topped by protoconch, and constricted at base. Protoconch of 5.5 convex smooth whorls, the last one wide and ventricose, its limit from teleoconch marked by beginning of sculpture along an oblique line; the earlier whorls regularly tapering to the

rounded but very narrow apex. Teleoconch of 4.5 whorls, with 3 subequal spiral cords per whorl, crossed at right angles by weak axial ribs, with a rounded bead at each intersection; beads close-set, numbering 23-24 per whorl. A fourth beaded spiral cord emerging from suture at base of last whorl, weaker than the other ones. 2 weak and unbeaded spiral cords on base. Aperture rounded. Colour plain orange-brown, vivid when fresh, the 3 last whorls of protoconch brown, the earlier 2 white.

Size: holotype total height 1.9 mm, maximum width 0.6 mm; height of protoconch 0.42 mm; width of protoconch at base 0.30 mm.

Type locality. Found dead in hand-dredged sand at 30m, off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 10 coll. M. Jay.

Etymology. Named for its size, after Greek meaning midge.

Remarks. This species resembles *Joculator minima* Laseron in its shape, but differs from it in its smaller size (1.9 mm instead of 2.3 mm) and its 3 rows of equal beads. It differs from *Bittium (Joculator) uveanum* Melvill & Standen, 1896, from Loyalty Isl. in its smaller size (1.9 mm instead of 2.3 mm), its less swollen shape, its finer and more numerous beads, and its colour; it differs from *Joculator myia* n.sp. in its protoconch (brown tinted and more acute) and in its more orange colour.

***Joculator myia* n. sp.**

Plate 4, C; colour plate I, Fig. 27

Material examined. 2 spmns MNHN; 10 spmns (7 with complete protoconch) coll. M. Jay.

Description. Very small pupiform shell, more pointed and narrow towards apex than towards the constricted base. Protoconch of 5 whorls, conical, the 2 last whorls convex and ventricose, the 3 earlier tapering regularly towards the rounded and rather wide apex; a narrow spiral row of fine and very short axial riblets in suture, overlapping on the upper 1/8 of lower whorl; the earlier whorls finely granulose under SEM. Limit from teleoconch very oblique marked by change of colour and appearance of adult sculpture. Teleoconch of 4.5 whorls, with 3 spiral beaded cords per whorl, crossed at right angles by fine axial ribs, with a rounded bead at each intersection; the 3 beaded cords subequal, beads close-set, and numbering 19-20 per whorl. A fourth spiral cord, with smaller beads, emerging from suture at base of last whorl. Aperture circular. Colour pale golden brown, protoconch white. Some specimens with one more wider whorl, but also constricted at base.

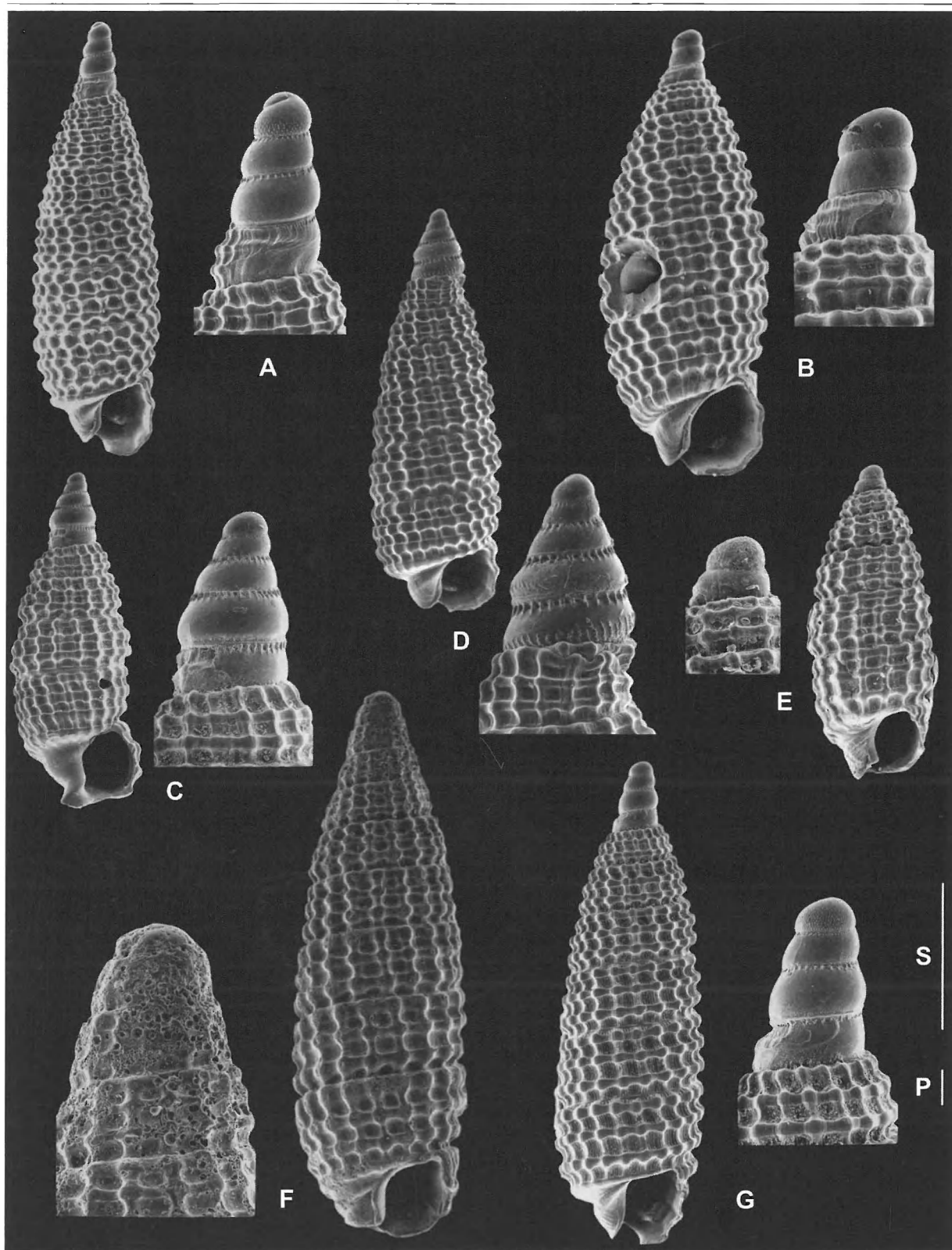


PLATE 4. Fig. A. *Joculator albocinctum* Melvill & Standen, 1896. Off Saint Gilles les Bains, 10-20 m, height 3 mm; MNHN. Fig. B. *J. lozoueti* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 3.2 mm; MNHN. Fig. C. *J. myia* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; holotype, height 2.2 mm; MNHN. Fig. D. *J. granata* Kay, 1979. Off Saint Gilles les Bains, 10-20 m; height 2.5 mm; MNHN. Fig. E. *J. psyllos* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 2 mm; MNHN. Fig. F. *J. salvati* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 35 m; holotype, height 3.6 mm; MNHN. Fig. G. *J. skolix* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 35 m; holotype, height 3.2 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 µm.

Size: holotype total height 2.2 mm; maximum width 0.6 mm; height of protoconch 0.46 mm; width of protoconch at base 0.34 mm.

Type locality. Found dead in hand-dredged sand at 30 m, off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 6 coll. M. Jay.

Etymology. Named for its size, after Greek meaning fly.

Remarks. This species resembles *Joculator mygaki* n.sp., but differs from it in its protoconch (wider at apex and with a row of fine axial riblets in and under suture), its slightly larger size (2.2 mm instead of 1.9 mm) and its darker colour. It differs from *J. granata* Kay, 1979, which has a protoconch with the same fine, brephic riblets, in its slightly smaller size (2.2 mm instead of 2.4 mm), its shorter and more swollen shape, and its paler colour.

***Joculator phtyr* n.sp.**

Plate 5, G; colour plate I, Fig. 28

Material examined. 2 spmns MNHN; 48 spmns (5 with complete protoconch) coll. M. Jay.

Description. Shell small, pupiform, strongly constricted at base, pointed at apex, with a high conical protoconch; the greatest width at the lower third of teleoconch. Protoconch conical of 5 whorls, slightly convex and smooth, their convexity more marked abapically; apex rounded, limit from teleoconch marked by the development of the 3 cords simultaneously in a vertical line, but without a clear-cut boundary. Teleoconch of 4 flat whorls, 3 spiral cords per whorl, bearing rounded beads, of equal importance on the 3 cords, regularly diminishing in size towards both extremities; beads numbering 19-20 per whorl. Axial ribs joining the beads poorly visible in their intervals. A fourth beaded spiral cord, obviously weaker, emerging from suture at base of last whorl; beads of last whorl becoming weaker and axially elongate towards outer lip of aperture, except the beads of the upper cord which remain rounded. One smooth cord on base, followed by 2 very fine spiral threads on edge of anterior canal. Aperture circular. Colour dark brown to blackish-brown, upper spiral cord and its beads slightly darker. Protoconch of the same colour.

Size: holotype total height 2 mm, maximum width 0.9 mm; height of protoconch 0.44 mm; width of protoconch at base 0.26 mm.

Type locality. Found dead in hand dredged sand at 35 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 6 coll. M. Jay.

Etymology. Named for its size, after Greek meaning crablouse.

Remarks. *Prolixodens sknips* n.sp. has the same shape, but is slightly smaller, with teleoconch whorls more numerous, and axially ribbed protoconch. *Dizoniopsis gothica* n. sp. bears only 2 beaded spiral cords per whorl, instead of 3, and has a ribbed protoconch. *Joculator subula* Laceron, 1956, lacks its pointed apex. *Joculator lozoueti* n. sp. is more regularly ovate and larger.

***Joculator psyllos* n.sp.**

Plate 4, E; colour plate I, Fig. 29

Material examined. 2 spmns MNHN; 7 spmns (4 with complete protoconch) coll. M. Jay; 2 spmns with complete protoconch coll. J. Drivas.

Description. Shell of very small size, pupiform with strongly constricted base. Protoconch not prominent of 1.25 smooth whorls, appearing finely punctate under microscope, apex rounded; limit from teleoconch clear and oblique, marked by change of colour, but 2 very fine beaded cords begin on last 1/4 whorl. Teleoconch of 6 slightly convex whorls, suture moderately impressed. Three spiral cords per whorl, subequal in middle of shell, the upper cord slightly weaker on earlier whorls. Axial ribs, weaker than cords, crossing them at right angles, with a rounded bead at each intersection, numbering 16 per whorl. A fourth weaker spiral cord emerging from suture at base of last whorl. On last whorl, strongly constricted at base, beads become smaller towards aperture and obsolete on lower cords. Several very fine spiral threads on base. Colour pale brown, apex a little paler, protoconch white.

Size: holotype total height 2.0 mm; maximum width 0.8 mm; height of protoconch 0.19 mm, maximum width of protoconch 0.18 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 5 coll. M. Jay; paratypes 6 and 7 coll. J. Drivas.

Etymology. Named on account of its small size, after Greek meaning "flea".

Remarks. This species differs from other *Joculator* species in its very short protoconch. Besides, it differs from *Joculator thielei* n.sp. in its more elongate outline and slightly paler colour; it differs from *J. tribulationis* (Hedley, 1909) in its less numerous beads, smaller size, and paler colour; it differs from *Bittium (Joculator) uveanum* Melvill & Standen, 1896

from Loyalty Isl. in its much shorter protoconch, narrower shape and colour.

***Joculator salvati* n.sp.**

Plate 4, F; colour plate I, Fig. 30

Material examined. 1 spmn MNHN; 3 spmns (1 with complete protoconch) coll. M. Jay.

Description. Shell fusiform, slightly constricted at base. Protoconch conical, extending the general outline of teleoconch, made of 2.5 smooth whorls, under SEM showing a worn surface; apex wide and rounded, limit from teleoconch ill-defined by the progressive development of adult sculpture. Teleoconch of 7 whorls with flat sides, with 3 spiral cords per whorl, crossed at right angles by axial ribs of similar strength, with a rounded bead at each intersection; beads rather widely-spaced and numbering 18-19 per whorl. A fourth beaded cord emerging from suture at base of last whorl. Base with a weak smooth cord. Aperture roundly quadrate. Colour dark brown, beads a little paler, mostly those of the upper cord. First whorl and protoconch white. Size: holotype total height 3.6 mm; maximum width 1.1 mm; height of protoconch 0.69 mm; width of protoconch at base 0.61 mm.

Type locality. Found dead in hand-dredged sand at 35 m, off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype in MNHN; paratype 1 coll. M. Jay.

Etymology. Dedicated to B. Salvat, a French malacologist.

Remarks. This species has the same shape and colour as *Joculator psyllos* n. sp. but is twice as high, and its protoconch has 2.25 whorls instead of 1.25. It differs from *J. lozoueti* n.sp. in its slightly larger size, less swollen shape, and wider, less elevated protoconch. This species resembles *J. tomacula negrita* Laseron, 1955, from Michaelmas Cay, NE Australia, in its shape, size and colour, but differs from it in its more constricted aperture, and in the paler beads of the upper cord. The holotypes of *J. tomacula* and *J. tomacula negrita* Laseron, 1955 have a broken protoconch.

***Joculator skolix* n.sp.**

Plate 4, G; colour plate I, Fig. 31

Material examined. 2 spmns MNHN; 9 spmns (6 with complete protoconch) coll. M. Jay.

Description. Shell fusiform, narrow, nearly cylindrical and constricted at base. Protoconch narrow and slender, comprising 4 smooth slightly convex whorls, the earlier two finely granulose under microscope and

SEM, the last one obviously narrower than the first whorl of teleoconch; suture wide, with very short axial riblets, limited to suture, and numbering 20-22 per whorl; limit from teleoconch a distinct oblique line marked by change of colour, but the 3 beaded spiral cords of adult sculpture develop progressively on last 1/2 whorl. Teleoconch of 7 flat whorls, bearing 3 spiral cords per whorl, crossed at right angles by axial ribs, with a rounded bead at each intersection; beads numbering 20-21 per whorl; the 3 beaded cords subequal in strength. A fourth spiral cord emerging from suture at base of last constricted whorl, and underlining angle of excavated base. Aperture broken on the type, but circular on other specimens. Columella smooth. Colour plain creamy-white. Size: holotype total height 3.2 mm; maximum width 1 mm; height of protoconch 0.48 mm; width of protoconch at base 0.29 mm.

Type locality. Found dead in hand-dredged sand at 35 m, off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 7 coll. M. Jay.

Etymology. From Greek meaning maggot, to which this species resembles by shape and colour.

Remarks. This species may recall *Cerithiopsis eutrapela* Melvill & Standen, 1896, but differs from it in its narrower width, its more cylindrical shape (constricted at base, instead of conical), and its 3 rows of beads being equal.

***Joculator thielei* n.sp.**

Plate 5, C; colour plate I, Fig. 32

Material examined. 2 spmns MNHN; 23 spmns (9 with complete protoconch) coll. M. Jay.

Description. Shell very small, pupiform, short, with strongly constricted base. Protoconch prominent, nearly cylindrical, slightly tapering to the wide, rounded apex, and comprising 3.25 convex whorls, looking smooth but worn on type under SEM; limit from teleoconch obliquely marked by change of colour and beginning of adult sculpture. Teleoconch of 5 whorls, with 3 spiral cords per whorl, crossed at right angles by weaker axial ribs, with a rounded bead at each intersection; beads numbering 16 on penultimate whorl. The 3 cords subequal on the entire shell. A fourth spiral cord, smooth and unbeaded, emerging from suture at base of last whorl. On last whorl, the beads of the lower cords become smaller and disappear near aperture. 2 more fine smooth spiral cords on base. Aperture circular. Colour dark blackish-brown, the upper cord a little darker, protoconch whitish.

Size: holotype height 1.5 mm; maximum width 0.5 mm; height of protoconch 0.26 mm; width of protoconch at base 0.22 mm.

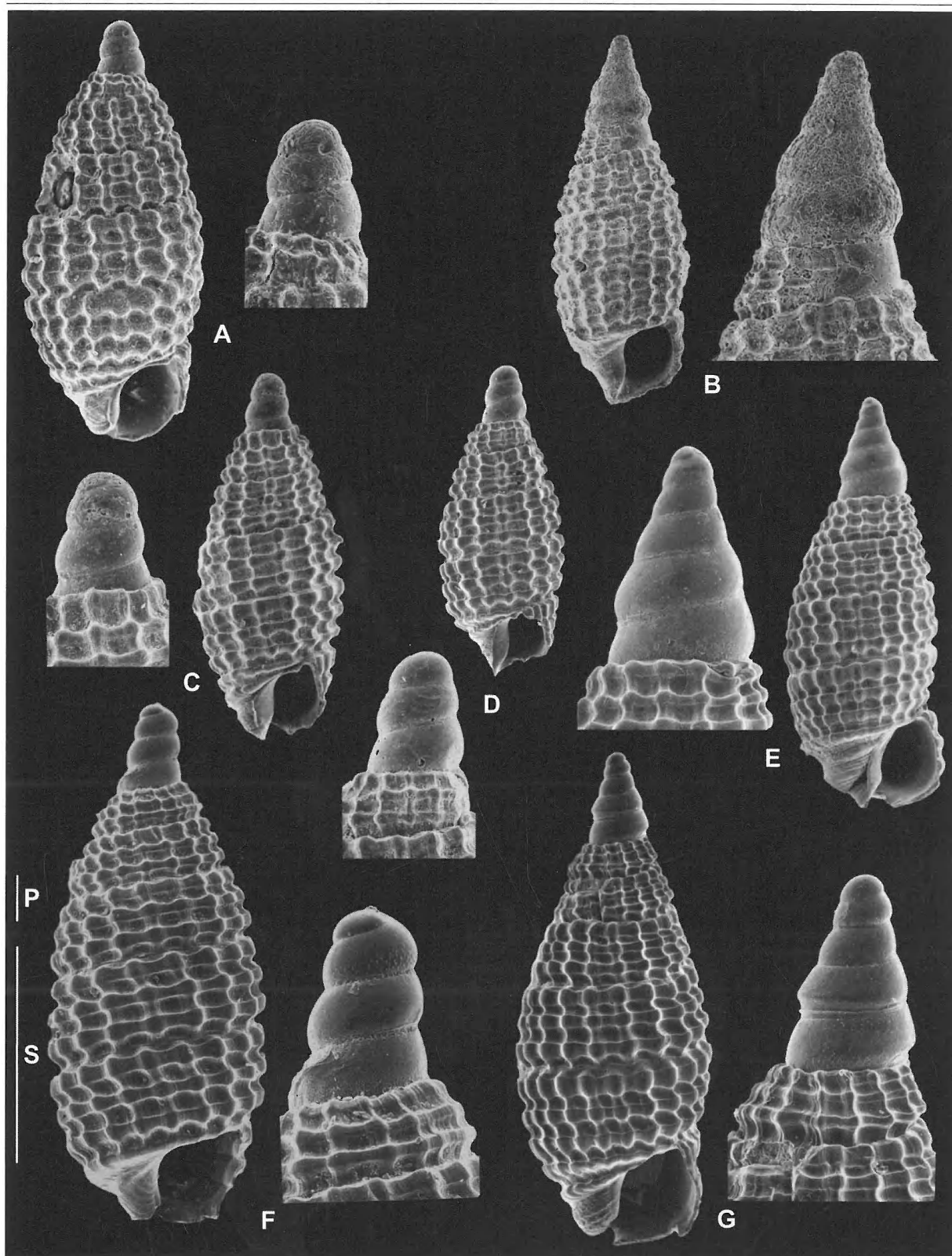


PLATE 5. Fig. A. *Joculator laseroni* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; holotype, height 2.3 mm; MNHN. Fig. B. *J. megacephala* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 1.8 mm; MNHN. Fig. C. *J. thielei* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 1.5 mm; MNHN. Fig. D. *J.IGNALI* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; holotype, height 1.4 mm; MNHN. Fig. E. *J. mygaki* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; holotype, height 1.9 mm; MNHN. Fig. F. *J. melanoraphis* n.sp. Off Saint Gilles les Bains, 10-30 m; holotype, height 2.9 mm; MNHN. Fig. G. *J. phtyr* n.sp. Off Saint Gilles les Bains, 35 m; holotype, height 2 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 μ m.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 10 coll. M. Jay.

Etymology. Dedicated to Pr. J. Thiele, who described several species of Cerithiopsidae.

Remarks. This species was compared with the holotype of *Cerithiopsis niasensis*, Thiele, 1925, from Nias Isl. (MNK lot Nr 102725) which has same shape and size, but has a broken protoconch with only a piece of the last smooth whorl left, and has 2 spiral cords per whorl, 3 cords on the last whorl only: thus, following our criteria, this species should be attributed to the genus *Horologica*. Our new species is less ventricose than *Joculator minutissima* Laseron, 1955. It differs from *Joculator psylos* n. sp. in its more swollen shape and its higher protoconch (3.25 whorls instead of 1.5). It differs from *Joculator phytir* n.sp. in its more ovate shape and its protoconch more cylindrical than conical of 3.5 whorls instead of 5.

***Joculator vignalii* n.sp.**

Plate 5, D; colour plate I, Fig. 33

Material examined. 1 spmn MNHN; 2 spmns (1 with complete protoconch) coll. M. Jay.

Description. Shell very small, fusiform, with cylindrical protoconch, base constricted. Protoconch of 3 moderately convex whorls, with a rounded apex, smooth but granulose under microscope, well delimited from teleoconch by an oblique line marked by change of colour and beginning of adult sculpture. Teleoconch of 4 whorls, with 3 subequal beaded spiral cords per whorl, crossed at right angles by axial ribs, a rounded bead at each intersection; beads numbering 16 per whorl. A fourth weaker beaded spiral cord emerging from suture at base of last whorl. A fifth spiral cord still more weakly beaded at mid-height of base. Aperture circular. Colour golden brown, protoconch white. Size: holotype total height 1.4 mm; maximum width 0.5 mm; height of protoconch 0.33 mm, width of protoconch at base 0.22 mm.

Type locality. Found dead in hand-dredged sand at 30m off Souris-Chaude, Trois-Bassins.

Type material. Holotype in MNHN; paratype 1 coll. M. Jay.

Etymology. Dedicated to Vignal, malacologist who worked on material from Reunion.

Remarks. This species differs from *Joculator megacephala* n.sp., which is smaller, in its very

different protoconch, cylindrical of 3 whorls instead of conical of 5.5 whorls; It differs from *J. mygaki* n.sp., *J. myia* n.sp., and *J. phytir* n.sp. which are a little larger, by its cylindrical protoconch instead of conical. It differs from *J. thielei* n.sp. which is the most similar species, in its smaller size, its more slender shape, and its higher protoconch.

Genus *Horologica* Laseron, 1956

Type species *Horologica bicolor* Laseron, 1956, Queensland: Shell fusiform with constricted base, teleoconch with 2 beaded spiral cords, protoconch smooth or punctate, without axial ribs or spiral cords.

***Horologica balteata* Watson, 1886.**

Plate 7, A; colour plate II, Fig. 34

Material examined. 1 spmn MNHN; 3 spmns coll. M. Jay; 3 spmns coll J. Drivas; none having a complete protoconch.

Description. Shell pupiform, strongly swollen at middle and constricted at base, apical angle 50°. Protoconch known only by its 2 last smooth whorls, extending the outline of teleoconch, separated from it by an indistinct line marking the beginning of adult sculpture. Teleoconch of 6 whorls, with 2 spiral cords per whorl, crossed by finer axial ribs, with a large rounded bead at each intersection; 17 or 18 beads per whorl; beads of upper cord stronger, axially elongate on penultimate whorl, then incised and divided by a spiral furrow, forming thus a third cord on last whorl, the lower cord always weaker. One more beaded cord, much weaker than the other ones, emerging from suture at base of last whorl. On last part of the very constricted last whorl, the upper cord remains strong, the lower 3 weaker, beads reduced to single swellings; a fine smooth spiral thread on base. The 2 earlier whorls plain white, protoconch brown; on the other whorls of teleoconch, the upper beaded cord white, the lower cord and base pale brown.

Size: maximum height with broken protoconch 3 mm; width 1.1 mm.

Locality. Found dead in hand-dredged sand at 12 m, off Saint-Gilles-les-Bains.

Remarks. This species, characterised by its shape and colour pattern, matches Watson's description and figure in spite of a slight difference in size (2.21 mm for Watson's holotype instead of 2.30 to 3.4 for our specimens). It also matches the description and figure of *Cerithiopsis aeolomitres* Melvill & Standen, 1896, which has the same size (2.26 mm for holotype); *Cerithiopsis aeolomitres* Melvill & Standen, 1896, is thus a junior synonym of *Horologica balteata* (Watson, 1886). Our specimens differ from *Cerithiopsis perligera* Thiele, 1925 (MNK lot Nr 67483) which has the same colour pattern, in is

obviously smaller size, and its 6 teleoconch whorls instead of 9.

***Horologica bicolor* Laseron, 1956.**

Plate 7, B; colour plate II, Fig. 35

Material examined. 1 spmn MNHN, 7 spmns coll. M. Jay; none having a complete protoconch.

Description. Shell small and pupiform, more slender towards apex than towards the constricted base. Protoconch of our specimens known only by its last smooth whorl, separated from teleoconch by the progressive growth of adult sculpture. Teleoconch of 6 whorls, with 2 spiral cords per whorl, crossed by axial ribs of equal strength, with a more or less rounded bead at each intersection; beads numbering 16-17 per whorl; intervals between cords rather wide. On earlier whorls, lower cord stronger, but the 2 cords equal in the middle of the shell. On last whorl, beads of upper cord incised then divided by a spiral furrow, the median beaded cord so born remaining slightly weaker than the other ones; a fourth spiral cord, with small beads, emerging from suture at base of last whorl. On last whorl near aperture, beads become weaker and axially elongate. One more spiral cord, smooth, at mid-height of base. Aperture quadrangular. Colour cream, the upper cord and its beads chocolate brown. Size: height without protoconch: 2.1 mm; width 0.9 mm.

Locality. Found dead in hand-dredged sand at 30m, off Saint-Gilles-les-Bains.

Remarks. Our specimens match the description and figure of *Horologica bicolor* Laseron 1956, type locality Michaelmas Cay, NE Australie, but are smaller (2.1 mm instead of 3.2 mm for Laseron); the specimens from Réunion could be considered as a dwarf variety of the species. The species may be confused with several other bicolored species: it differs from *Joculator pulvis* (Issel, 1869), *Joculator eudeli* n.sp. and *Cerithiopsis (Joculator) insignis* Smith in its 2 cords per whorl instead of 3 since earlier whorls for the 3 last species; it differs from *Dizoniopsis herberti* n.sp. which also has 2 cords, in its smooth protoconch while *D. herberti* has a ribbed protoconch, the ribs of which are well visible even on a fragment. It differs from *Horologica semipicta* (Gould, 1861) in the way the third cord is born, and by its base.

***Horologica macrocephala* Laseron, 1956.**

Plate 6, A; colour plate II, Fig. 36

Material examined. 1 spmn MNHN; 17 spmns, coll. M. Jay; 5 spmns coll. J. Drivas; all with a complete protoconch.

Description. Small shell, pupiform, constricted at base, with prominent protoconch, its height about one third of total height of shell. Protoconch of 5 convex smooth whorls, the last one swollen, the earlier ones tapering regularly to the fine and rounded apex; limit from teleoconch oblique, marked by change of colour and appearance of adult sculpture. Teleoconch of 4 whorls, penultimate one widest. Two beaded spiral cords per whorl, their interval wider than the interval at suture; axial ribs crossing the cords at right angles, with a rounded bead at each intersection; beads numbering 16 per whorl. A third spiral cord, unbeaded or very weakly beaded, emerging from suture at base of last whorl. Aperture quadrangular. Colour golden brown.

Size: height of shell 1.7 mm, maximum width 0.5 mm; height of protoconch 0.45 mm; width of protoconch at base 0.28 mm.

Locality. Found dead in hand-dredged sand at 20-30m, off Saint-Gilles-les-Bains.

Remarks. This species matches on every point the figure and description of *Horologica macrocephala* Laseron, 1956, type locality Darwin, but also found in Indian Ocean (Christmas Isl.). The difference of size (1.7 mm for our specimens and 1.9 mm for Laseron's description) seems unimportant.

***Horologica minareta* Laseron, 1955.**

Plate 6, B; colour plate II, Fig. 37

Material examined. 1 spmn MNHN; 51 spmns (23 with complete protoconch) coll. M. Jay; 9 spmns coll. Drivas.

Description. Shell fusiform, slender, slightly constricted at base, apical angle 30°. Protoconch conical, prominent, comprising 5 convex, smooth whorls, and forming about 1/5 of total height of shell; its penultimate whorl swollen, earlier whorls tapering to the pointed apex; limit from teleoconch marked by an ill defined oblique line. Teleoconch of 7 whorls, with 2 subequal beaded spiral cords, crossed by slightly weaker axial ribs, with a slightly axially elongate bead at each intersection; beads numbering 22-23 on last whorl, close-set, except on base. Suture weakly impressed. Last whorl and base constricted, the beads of the 2 cords more axially elongate, the axial ribs becoming more conspicuous; a third weakly beaded spiral cord emerging from suture at base of last whorl; one more spiral thread, smooth, at mid-height of base. Aperture quadrangular. Colour plain dark brown including protoconch. Some specimens ill formed or twisted, with supplementary whorls widening after a normally constricted whorl.

Size: maximum height 2.6 mm, maximum width 1.1 mm; height of protoconch 0.42 mm; width of protoconch at base 0.30 mm.

Locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Remarks. This species is characterized by its shape, and by the shape of its protoconch. Our specimens are slightly smaller than the holotype of *Horologica minareta* Laseron, 1955, (type locality Michaelmas Cay, NE Australia), (2.6 mm instead of 2.8).

***Horologica purpurea* Laseron, 1955.**

Plate 7, D; colour plate II, Fig. 38

Material examined. 1 spmn MNHN; 50 spmns coll. M. Jay; 15 spmns coll. J. Drivas; 2 with a complete protoconch.

Description. Shell fusiform, swollen, slender towards apex, slightly constricted at base, angle at apex of teleoconch 30°. Protoconch of 2.5 convex smooth whorls, cylindrical in shape, with rounded apex; SEM reveals very fine axial striae on lower part of whorls; limit from teleoconch clear-cut and oblique, marked by change of colour and appearance of adult sculpture. Teleoconch of 7 or 8 whorls, bearing 2 spiral cords per whorl, crossed by finer axial ribs, with at each intersection, a slightly axially elongate bead; 18 or 19 beads per whorl. The 2 rows of beads subequal on earlier whorls, but on penultimate whorl, the beads of the upper cord are more axially elongate, becoming incised and then divided on last whorl by a spiral furrow. A fourth spiral beaded cord, a little weaker than the other ones, emerging from suture at base of last whorl; one more spiral cord, weak and smooth, at mid-height of base. Aperture roundly quadrate. Colour of teleoconch plain violet, paler near apex, protoconch white.

Size: maximum height 3.1 mm; maximum width 1.2 mm; height of protoconch 0.25 mm; width of protoconch at base 0.24 mm.

Locality. Found dead in hand-dredged sand at 10-20 m off Cap La-Houssaye, Saint-Gilles-les-Bains.

Remarks. Our specimens match the description and figure of *Horologica purpurea* Laseron, 1955, type locality Heron Isl., but Laseron did not describe the protoconch of the species, remarkable by its size and its colour. All our specimens are smaller than Laseron's holotype (3.1 mm instead of 3.9 mm), and are less cylindrical; but Laseron had noted size and shape variations, with one specimen from Hope Isl. smaller than ours. Our specimens likewise show large variations, with adult teleoconch height ranging from 3.1 mm and 6 whorls, to 1.4 mm and 4 whorls, with all intermediates, each of them with a similar protoconch.

***Horologica cf semipicta* (Gould, 1861)**

Plate 7, C; colour plate II, Fig. 39

Material examined. 1 spmn MNHN; 23 spmns coll. M. Jay; none of them having a complete protoconch.

Description. Shell small and pupiform, more slender towards apex than towards the constricted base. Protoconch of our specimens broken and reduced to the last smooth whorl, limited from teleoconch by a clear-cut oblique line. Teleoconch of 6 whorls, with 2 beaded spiral cords per whorl, widely spaced, distinct axial ribs crossing cords at right angles, with one bead at each intersection, beads of upper cord always a little weaker and transversally elongate, beads of the lower cord a little stronger and rounded. On penultimate whorl, a spiral thread develops in interval between the 2 cords, growing into a third beaded cord on last whorl. A fourth spiral cord emerging from suture at base of last whorl, only weakly swollen at intersection with axial ribs. Base smooth. Aperture roundly quadrate. Colour cream, the upper cord and its beads reddish-brown.

Size: height of teleoconch 2.1 mm; width 0.8 mm.

Locality. Found dead and worn in hand-dredged sand at 30 m, off Saint-Gilles-les-Bains.

Remarks. This species resembles *Horologica bicolor* Laseron, 1956, and in the absence of protoconchs, differs from it only in its base being smooth instead of bearing one spiral cord, and in the way the third spiral cord is born on last whorl. Our specimens match the figure of *Cerithiopsis semipicta* Gould, 1861 provided from Hawaii by A. Kay, showing a third spiral beaded cord on last whorl, without visible incision of the upper row; but according to Kay, the species is known from Fiji as *Cerithiopsis balteata* Watson, 1886 from Levuka, Fiji, which we believe is a distinct species. The holotype of *Cerithiopsis semipicta* Gould, 1861, (type locality "China seas"), is, following the original description, a little higher than our specimens (2.4 mm instead of 2.2 mm), with 7 whorls instead of 6 for our specimens; but its protoconch is not described, nor the way the third cord is born. The holotype of Gould figured by Johnson looks very worn, more elongate, and does not show an incision of the upper row of beads. The identification of our species with *Cerithiopsis (Horologica) semipicta* Gould, 1861 remains doubtful. However, this species could be confused with other pupiform bicolor species: *Joculator pulvis* (Issel, 1869), *Joculator eudeli* n.sp., and *Cerithiopsis (Joculator) insignis* Smith, 1906, are easily separated, having 3 beaded cords from the earlier whorls; *Dizoniopsis herberti*

n.sp., with its 2 beaded cords, is easily distinguished by its axially ribbed protoconch, the ribs being visible even on a small piece of the protoconch.

***Horologica turrigera* (Watson, 1886)**

Plate 7, E; colour plate II, Fig. 40

Material examined. 1 spmn MNHN; more than 200 spmns coll. M. Jay; more than 50 spmns coll. J. Drivas; all with complete protoconch. This is the only species sometimes found alive.

Description. Shell fusiform, or pupiform elongate, base constricted. Protoconch prominent of 5.5 whorls, slightly convex and smooth, the 2 last of equal width, the earlier ones tapering to the rounded and narrow apex; its limit from teleoconch axially marked by the growth of adult sculpture. Teleoconch of 8 whorls, with 2 beaded spiral cords per whorl, separated by an interval wider than sutural area, and crossed by axial ribs, a little weaker than the cords but distinct. A strong rounded bead at each intersection, beads numbering 18-19 on penultimate whorl. On the 3 last whorls, beads of upper cord stronger and axially elongate, beads of the lower cord remaining rounded. On penultimate whorl, the upper beads incised by a spiral furrow, then divided on last whorl, thus forming a third cord. A fourth cord emerging from suture at base of last whorl, weaker with slight swellings rather than beads. One more spiral cord, smooth, at mid-height of base. Some specimens twisted, with one more whorl, widening after the normal constricted whorl. Colour very pale brown, the apex of the shell and the upper beaded cord yellowish white, protoconch white or weakly tinted.

Size: maximum height 3.7 mm; maximum width 1.2 mm; height of protoconch 0.45 mm; width of protoconch at base 0.30 mm.

Locality. Commonly found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Remarks. Our specimens have been found identical to the type of *Cerithiopsis turrigera* Watson, 1886, type locality Honolulu, in NHM (Lot Nr 1887.2.9.1643.4).

***Horologica anisocorda* n. sp.**

Plate 6, C; colour plate II, Fig. 41

Material examined. 1 spmn MNHN; 15 spmns (2 with complete protoconch) coll. M. Jay.

Description. Shell fusiform with strongly constricted base. Protoconch continuing the general outline of teleoconch, conical, comprising 4 smooth whorls tapering to rounded apex; a small spiral thread above lower suture; limit from teleoconch oblique marked by change of colour and beginning of adult sculpture. Teleoconch of 6 whorls, 2 spiral cords per whorl, crossed at right angles by subequal axial ribs, with a

rounded bead at each intersection; beads numbering 18 per whorl. From the second whorl, beads of upper cord clearly stronger, and becoming progressively more axially elongate towards anterior end; on last whorl, beads of upper cord incised, then divided in 2 parts by a spiral furrow, beads of upper cord remaining larger. A fourth spiral cord, weakly beaded, emerging from suture at base of last whorl. Two more spiral unbeaded cords on base. Aperture rounded. Colour blackish-brown, protoconch white.

Size: holotype total height 2.2 mm, maximum width 0.7 mm; height of protoconch 0.35 mm, width of protoconch at base 0.27 mm.

Type locality. Saint-Gilles-les-Bains, in hand-dredged sand at 30 m.

Type material. Holotype in MNHN, paratypes 1 and 2 coll. M. Jay.

Etymology. Named on account of its 2 strongly unequal beaded cords.

Remarks. This species resembles *Horologica telegraphica* Hedley, 1909, (type locality Hope Isl.) in size, shape, and its 2 unequal beaded cords, but it differs from it in its 6 whorls teleoconch instead of 5, in its 2 beaded cords being more widely spaced, its more numerous beads per whorl, and in the beads of the upper row being divided on last whorl. The protoconch of *H. telegraphica* was not described by Hedley nor by Laseron who figured the species. Our new species differs from *Horologica glaubrechti* n. sp. which is of the same size and colour, in its 2 rows of beads being strongly unequal on the whole height, and in its protoconch of 4 whorls instead of 5. It differs from *Horologica minareta* Laseron, 1956 in its 2 unequal rows of beads, its slightly smaller size, its darker coloration and its 4 whorled protoconch instead of 5.

***Horologica glaubrechti* n.sp.**

Plate 6, D; colour plate II, Fig. 42

Material examined. 2 spmns MNHN; 9 spmns (7 with complete protoconch) coll. M. Jay; 8 spmns coll. J. Drivas.

Description. Shell fusiform, surmounted by a wide and conical protoconch. Protoconch of 5 whorls, convex and looking smooth, but with very fine granulations under SEM; last whorl as wide as the first whorl of teleoconch, separated from it by an oblique line marking the appearance of adult sculpture; earlier whorls regularly tapering towards the rounded apex. Teleoconch of 5 whorls, with 2 spiral cords per whorl, crossed at right angles by axial ribs equal to the cords, with a rounded bead at each intersection; beads numbering 19-20 per whorl, of equal strength on the 2 cords, becoming axially elongate on last whorl; beads

contiguous on cords, but separated axially from the other row, leaving axial ribs clearly visible. On last whorl beads of upper cord become slightly stronger, then incised on last half-whorl, then divided near aperture by a spiral furrow, while all beads become progressively smaller; one more spiral cord, weaker and finely beaded, emerging from suture at base of last whorl; a fourth spiral cord on base, unbeaded, and followed by 4 very fine spiral threads. Aperture circular. Colour plain dark brown, with the upper cord and its beads a little darker, the earlier whorls paler; protoconch white.

Size: holotype total height 2.3 mm; maximum width of shell 1 mm; height of protoconch 0.45 mm; width of protoconch at base 0.30 mm.

Type locality. Off Saint-Gilles-les-Bains, between the harbour and Boucan-Canot beach, in hand-dredged sand at 30-50 m.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 7 coll. M. Jay; paratype 8 coll. J. Drivas.

Etymology. Dedicated to Dr. Glaubrecht, MNK, Berlin.

Remarks. This species differs from *Horologica minareta* Laseron, 1956 in its more swollen shape, its larger beads, the sculpture of base, its darker colour, and its white instead of brown protoconch; it differs from *Horologica macrocephala* Laseron, 1956 in the smaller size of its protoconch, its larger size (2.3 mm instead of 1.7 mm), and the sculpture of base. It differs from *Horologica anisocorda* n.sp. which is quite similar, in its more swollen and shorter shape, in the beads of the 2 cords being equal on earlier whorls instead of strongly unequal. It differs from *Dizoniopsis gothica* n.sp. in its smooth instead of ribbed protoconch.

***Horologica konops* n. sp.**

Plate 6, E; colour plate II, Fig. 43

Material examined. 2 spmns MNHN; 9 spmns (6 with complete protoconch) coll. M. Jay; 5 spmns coll. J. Drivas.

Description. Very small shell, elongate, nearly cylindrical, slightly constricted at base. Protoconch conical, wide and high, of 5.5 whorls, convex and smooth, its 2 last whorls swollen; limit from teleoconch along an oblique line marking the change of colour and start of adult sculpture; earlier whorls tapering towards rounded apex. Teleoconch of 5 whorls, 2 beaded spiral cords per whorl, interval between them wider than the interval at suture; weaker axial ribs crossing them at right angles, with a rounded bead at each intersection; beads numbering 17-18 per whorl, subequal on the 2 cords on early whorls, beads

of upper cord larger and axially elongate on subsequent whorls. A third beaded cord emerging from suture at base of last whorl. A fine smooth cord on base. Aperture rounded, broken on type. Colour plain cream, protoconch and base a little darker on fresh specimens.

Size: holotype total height 1.7 mm; maximum width 0.5 mm; height of protoconch 0.43 mm; width of protoconch at base 0.31 mm.

Type locality. Found dead in hand-dredged sand at 30 m, off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 7 coll. M. Jay; paratype 8 coll. J. Drivas.

Etymology. Named from Greek, meaning mosquito, after its size and slenderness.

Remarks. This species resembles *Horologica macrocephala* Laseron, 1956 in its size and the shape of the protoconch, but differs from it in its more cylindrical shape, less swollen at the middle and less constricted at base, its somewhat smaller protoconch (1/4 of total height instead of 1/3), and its more numerous beads (18-19 instead of 16). This new species may be compared to *Horologica martini* n.sp. which has a similar protoconch and colour, but differs from it in being less swollen and of smaller size (1.7 mm instead of 2.2 mm).

***Horologica martini* n. sp.**

Plate 6, F; colour plate II, Fig. 44

Material examined. 2 spmns MNHN; 58 spmns coll. M. Jay; 23 spmns coll. J. Drivas; all with complete protoconch.

Description. Shell fusiform with constricted base, apex of teleoconch topped by the prominent protoconch. Protoconch conical of 5 convex smooth whorls, the last 2 whorls of equal size, their limit from teleoconch unprecise, marked by the progressive development of adult sculpture; the earlier whorls regularly tapering to the rounded apex. Teleoconch of 5-6 whorls, with 2 spiral cords, crossed by slightly finer axial ribs, with a rounded bead at each intersection; beads close-set, subequal on earlier whorls, and numbering 20-21 per whorl. On the 2 last whorls, beads of upper cord stronger and axially elongate, then incised by a spiral furrow, then divided into two beaded cords on last whorl. A fourth beaded cord emerging from suture at base of last whorl. A smooth finer spiral cord at mid-height of base, followed by 4 very fine spiral threads. Towards aperture, the beads progressively reduced to weak axial swellings. Aperture rounded. Colour white, base very pale brown, the lower cord tinted with pale brown

on the 2 last whorls, the upper cord remaining white; this colour pattern disappearing on worn specimens. Size: holotype total height 2.2 mm; maximum width 0.8 mm; protoconch height 0.44 mm; width of protoconch at base 0.32 mm. Height of specimens ranging from 2.0 to 2.5 mm.

Type locality. Found dead in hand-dredged sand at 30m off Boucan-Canot beach, Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 15 coll. M. Jay; paratypes 16 to 20 coll. J. Drivas.

Etymology. Dedicated to J.C. Martin, skin diver and collector, who collected the sand in which the first specimen was found.

Remarks. This species has the same outline as *Horologica turrigera* Watson, 1886, of which it could be considered as a dwarf form (2.2 mm instead of 3.7mm), but no intermediate exists between the 2 forms, even though many specimens of the 2 species could be found. This species differs from *Horologica balteata* Watson, 1886, which has a similar colour pattern, in its smaller size (2.2 mm instead of 3 mm), less rounded shape, and its less neatly marked colour pattern. It differs from *Horologica macrocephala* Laceron, 1956, in its larger size (2.2 mm instead of 1.7 mm), in the proportionally smaller size of its protoconch, and its colour pattern. *Horologica konops* n.sp. which has a comparable protoconch, is less swollen and smaller (1.7 mm instead of 2.2 mm).

Genus *Dizoniopsis* Sacco, 1895

Type species: *Cerithium bilineatum* Hörnes, 1855, type locality Tertiary banks of Piémont: teleoconch with 2 beaded spiral cords per whorl, protoconch bearing axial ribs, extending from suture to suture, with smooth intervals (*Dizoniopsis* ss). We provisionally consider as *Dizoniopsis* (sl) the species with 2 spiral beaded cords per teleoconch whorl, with protoconchs bearing spiral cords in intervals between the ribs (type 3) or with axial ribs that do not reach the upper suture (type 4).

***Dizoniopsis gothica* n.sp.**

Plate 9, C; colour plate II, Fig. 45

Material examined. 2 spmns (1 with complete protoconch) MNHN: 7 spmns (1 with complete protoconch) coll. M. Jay; 2 spmns (1 with complete protoconch) coll. J. Drivas.

Description. Teleoconch pupiform, with pointed apex, topped by the prominent protoconch, general outline recalling that of a gothic tower; apical angle of teleoconch 55°; maximum width at the penultimate whorl; base slightly constricted. Protoconch high,

nearly cylindrical, consisting in 4.5 convex whorls; its earliest 1.5 whorls smooth, the subsequent whorls with their upper 1/3 concave, smooth and finely frosted, their lower 2/3 convex and bearing slightly prosocline axial ribs (ribbed protoconch of type 4). Teleoconch of 6 whorls, rather low, suture moderately impressed; 2 spiral cords per whorl, crossed at right angles by axial ribs weaker than cords, reaching upper and lower suture, but discontinuous from one whorl to another; a rounded bead at each intersection, beads rather small and widely-spaced, numbering 20-21 per whorl. On last whorls, beads of upper cord progressively axially elongate, incised on last whorl and divided near aperture by a spiral furrow. A fourth spiral cord emerging from suture at base of constricted last whorl, finer and bearing finer beads. Beads of the 4 cords becoming smaller towards outer edge of aperture, axial ribs becoming predominant. A fifth fine, smooth, unbeaded cord on base. Aperture roundly quadrate. Colour blackish-brown, protoconch and the first 2 whorls of teleoconch clearly paler or creamy-white.

Size: holotype total height 2.7 mm; maximum width 1.2 mm; height of protoconch 0.42 mm; maximum diameter of protoconch 0.33 mm.

Type Locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 (without protoconch) in MNHN; paratype 2 coll. M. Jay; paratype 3 coll. J. Drivas.

Etymology. Named after the general shape and the prominent protoconch, recalling gothic churches.

Remarks. This species differs from *Dizoniopsis herosae* n.sp. in its more swollen shape, and its protoconch, the protoconch of *D. herosae* n.sp. being shorter with axial ribs extending from suture to suture. *D. herberti* n.sp. which has a similar protoconch of type 4, is easily separated by its colour pattern.

***Dizoniopsis herberti* n.sp.**

Plate 9, B; colour plate II, Fig. 46

Material examined. 2 spmns MNHN; 10 spmns (3 with complete protoconch) coll. M. Jay.

Description. Shell pupiform with constricted base, and pointed apex surmounted by the prominent protoconch. Protoconch of 4.5 convex whorls, the first 1.5 smooth, the following ones with axial riblets, numbering 18-19 per whorl, slightly prosocline, present only on the lower 3/4 of whorls, leaving smooth and concave the upper 1/4 (ribbed protoconch of type 4). Teleoconch of 6 whorls, with 2 beaded spiral cords per whorl, crossed at right angles by distinct flattened axial ribs, with a rounded bead at each intersection; beads numbering 19 or 20 per whorl; beads of lower cord slightly stronger and

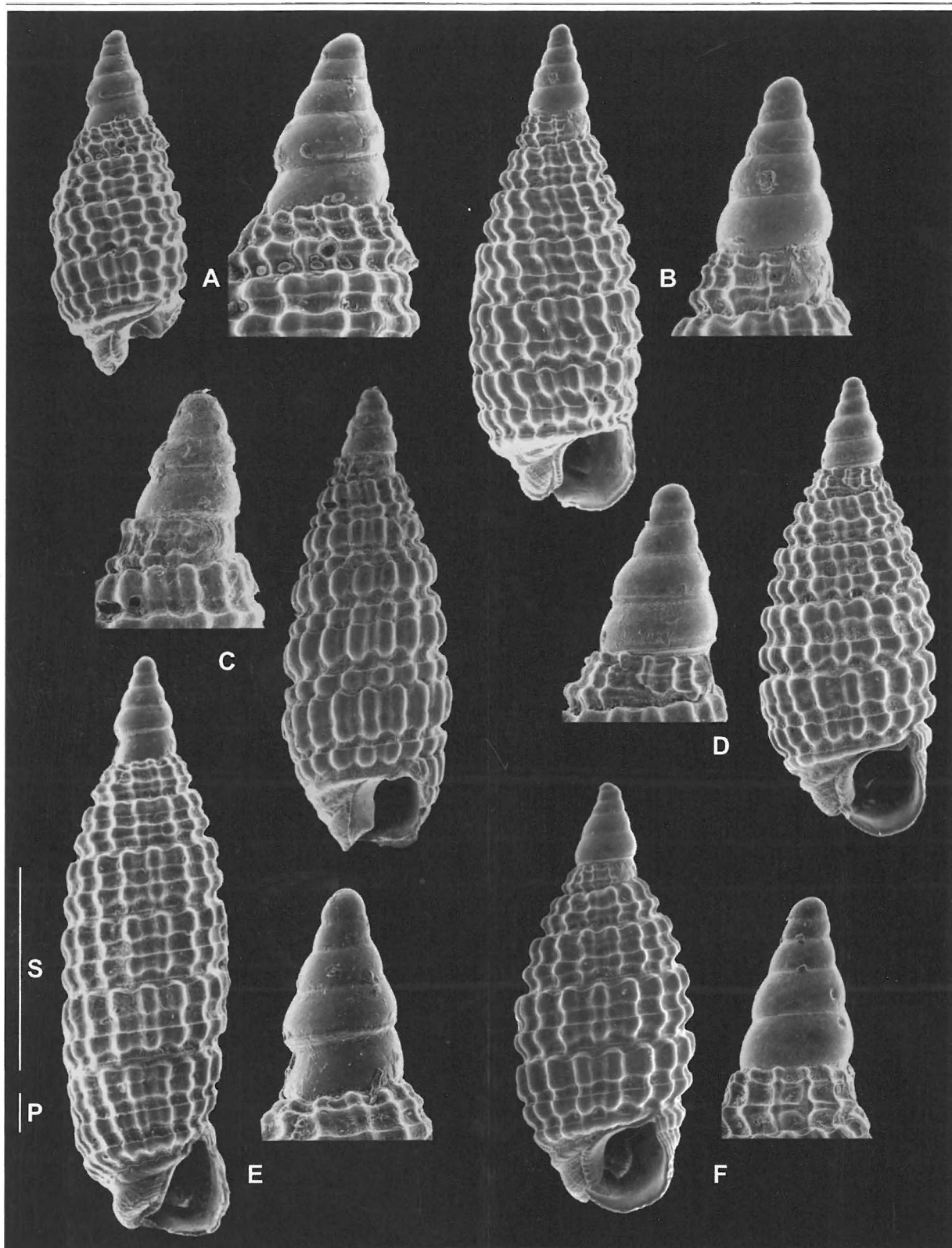


PLATE 6. Fig. A. *Horologica macrocephala* Laseron, 1956. Off Saint Gilles les Bains, 20-30 m; height 1.7 mm; MNHN. Fig. B. *H. minareta* Laseron, 1956. Off Saint Gilles les Bains, 10-20 m; height 2.6 mm; MNHN. Fig. C. *H. anisocorda* n.sp. Off Saint Gilles les Bains, 30m; holotype, height 2.2 mm; MNHN. Fig. D. *H. glaubrechtii* n.sp. Off Saint Gilles les Bains, 30-50 m; holotype, height 2.3 mm; MNHN. Fig. E. *H. konops* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; holotype, height 3mm; MNHN. Fig. F. *H. martini* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; holotype, height 2.7 mm; MNHN.
Scale bars: S (shells): 1 mm; P (protoconchs): 100 μ m.

axially elongate. On the 5th whorl, a third finely beaded spiral cord develops from a fine thread between the 2 earlier cords, and becomes comparable to them but slightly weaker on last whorl; a fourth weaker beaded spiral cord emerging from suture at base of last whorl, the beads of all cords becoming smaller towards outer edge of aperture. A fifth flattened smooth cord on base. Aperture circular. Colour cream to pale orange-beige, the upper cord and its beads reddish-brown, the median cord on last whorl between these two colours. Protoconch brown.

Size: total height 2.4 mm; maximum width 0.9 mm; height of protoconch 0.4 mm; width at base of protoconch 0.3 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 4 coll. M. Jay.

Etymology. Dedicated to Dai Herbert, Natal Museum.

Remarks. The teleoconch of our species resembles a specimen labelled *Cerithiopsis insignis* E.A. Smith, 1906, from Southern Africa, in NHM (lot Nr. 1906.6.23.10, type material, syntype?); this specimen has no protoconch, 3 beaded spiral cords only on last whorl, and 2 cords only on earlier whorls. But Smith described the species (type locality Port Shepstone, South Africa) as bearing 3 beaded spiral cords, the median one weaker, and his figure shows 3 subequal spiral cords from the first whorl of teleoconch. Topotypic specimens from Port Shepstone, in Natal Museum, have no protoconch and 3 beaded spiral cords on all whorls of teleoconch, equal, or the median cord slightly weaker on a few specimens; other specimens from Durban area, similar to the specimens from Port Shepstone, have a smooth 4.5 whorled protoconch (personal communication from D. Herbert, Natal Museum): these specimens match the description and figure of Smith, but differ from the type material in NHM in the number of spiral cords on the teleoconch. We think that these specimens are the real *Cerithiopsis insignis*, and that the syntype in NHM is another species. Our specimens with the costate protoconch are also another species, for which we propose the name *Dizoniopsis herberti*. Furthermore, *Dizoniopsis herberti* n.sp. differs from other bicolored species, namely *Horologica bicolor* (Laseron, 1955), *Horologica semipicta* (Gould, 1861), *Joculator pulvis* Issel, 1869, *Joculator eudeli* n.sp., in its axially ribbed protoconch (instead of smooth). This species is referred to the genus *Dizoniopsis* on account of its ribbed protoconch and its 2 spiral beaded cords on the earlier whorls of the teleoconch.

***Dizoniopsis herosae* n.sp.**

Plate 9, A; colour plate II, Fig. 47

Material examined. 2 spmns MNHN; 32 spmns (12 with complete protoconch) coll. M. Jay; 11 spmns coll. J. Drivas.

Description. Shell small and fusiform, strongly constricted at base, apical angle 25°, the greatest width at the lower third of total height. Protoconch elongating the general outline of teleoconch, consisting in 2.5 convex whorls, well delimited from teleoconch by the clear-cut change of sculpture; apex rounded and smooth, subsequent whorls with strong axial ribs, extending from suture to suture, numbering 15-16 on last whorl, their intervals smooth. Teleoconch of 8 whorls, suture shallow. 2 beaded spiral cords per whorl, situated near upper and lower sutures, with a wide interval; 18 to 20 axial ribs per whorl, wide and low, crossing the cords at right angles, with a rounded bead at each intersection. A third beaded spiral cord on last whorl, developed from a fine thread between the 2 main cords, and remaining weaker than them. A fourth weak, unbeaded spiral cord emerging from suture at base of last whorl, followed immediately by a fifth spiral cord equal to it. Beads becoming smaller towards aperture. Aperture circular. Colour plain pale brown, suture a little darker, protoconch and the 3 earlier whorls of teleoconch creamy-white.

Size: holotype total height 3.3 mm; maximum width 1.3 mm; height of protoconch 0.49 mm; width of protoconch at base 0.36 mm.

Type locality. Found dead in hand-dredged sand at 30 m, Souris-Chaude, Trois-Bassins.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 12 coll. M. Jay; paratypes 13 to 15 coll. J. Drivas.

Etymology. Dedicated to Mrs Virginie Heros, MNHN.

Remarks. This species could be confused, in its shape and colour, with *Joculator keratochroma* n. sp., but differs from that in its larger size, its 2 cords instead of 3, and its ribbed protoconch instead of smooth. It differs from *Horologica turrigera* (Watson, 1886) and *Horologica martini* n.sp. in its ribbed protoconch. It differs from *Dizoniopsis gothica* n.sp. in its colour (pale brown instead of black), and its ribbed protoconch of 2.5 whorls instead of 4.5. It differs from other species of *Mendax* and *Prolixodens* in its 2 beaded cords on teleoconch whorls instead of 3.

Genus *Mendax* Finlay, 1927

Type species *Cerithiopsis trizonalis* Odhner, 1924, North Island, New Zealand: spire high, teleoconch with 3 beaded spiral cords per whorl. Protoconch with axial ribs extending from suture to suture. 2 species with spiral cords in the intervals between protoconch ribs are provisionally attributed to the genus.

***Mendax mascarenensis* n.sp.**

Plate 8, C; colour plate II, Fig. 48

Material examined. 2 spmns MNHN; 4 spmns (3 with complete protoconch) coll. M. Jay; 3 spmns coll. J. Drivas.

Description. Shell with high spire, slightly fusiform, base not constricted. Protoconch rather cylindrical of 4 convex whorls, the earlier 1.5 appearing smooth by the naked eye, but bearing fine close-set granules under SEM, the subsequent whorls with axial riblets, extending from suture to suture, weak but clearly visible under oblique light; their intervals smooth. Limit from teleoconch oblique marked by change of colour and start of adult sculpture. Teleoconch of 9 whorls, with 3 beaded cords per whorl, equal on last whorl, but upper cord smaller and contracted on all preceeding whorls. Intervals between cords rather wide, with distinct axial ribs joining the beads at right angles. A fourth weaker cord emerging from suture at base of last whorl. Aperture rather quadrangular. Colour plain bright orange-brown, protoconch white. Size: total height 4.2 mm; maximum width 1.1 mm; height of protoconch 0.52 mm; width at its base 0.33 mm.

Type locality. Found dead in hand-dredged sand at 30 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 4 coll. M. Jay; paratype 5 coll. J. Drivas.

Etymology. Named after Mascarene Isl. since Melvill knew this species from Mauritius.

Remarks. Our specimens were compared with the specimens of a lot labelled *Cerithiopsis aurantiaca* Melvill & Standen, 1896, in NMW (lot N° Z.1955.158.02268) from Mauritius: this lot includes 4 specimens, only one of them with its axially ribbed protoconch, and quite identical to ours; 2 other specimens with identical teleoconch but without protoconch; the fourth specimen, with only the last whorl of a smooth protoconch, and the upper spiral cord of teleoconch weaker and darker, is a quite different species. Another lot in NMW from Lifu (lot N° Z.1955.158.00189), labelled syntypes of *Cerithiopsis aurantiaca* Melvill & Standen, 1896, includes 2 specimens without protoconch, which look identical to ours after their teleoconchs, but could be attributed to any of our 9 species discussed above with *Cerithiopsis boucheti* n.sp. But the holotype of *Cerithiopsis aurantiaca* Melvill & Standen, 1896, type locality Loyalty Isl. in MM has no protoconch left, and a teleoconch obviously wider than our specimens and specimens in NMW. The specimens labelled syntypes in NMW are then another species, difficult to

identify without protoconch. Our specimens, identical to the specimens from Mauritius in NMW, belong certainly to another species, which seems undescribed, and for which we propose the name of *Mendax mascarenensis*.

Besides, the name *Cerithiopsis aurantiaca* attributed by Melvill & Standen to the holotype in MM, is preoccupied by *Cerithiopsis aurantiaca* Gould, 1861, which is a quite different species. For the species of Melvill and Standen, we propose here a new name, *Cerithiopsis melvilli* nom. nov., in honour of J.C. Melvill; but without a protoconch, assigning it to a genus is quite impossible and it will provisionally be left in the genus *Cerithiopsis*.

***Mendax metivieri* n. sp.**

Plate 8, B; colour plate II, Fig. 49

Material examined. 2 spmns MNHN; 105 spmns Coll. M. Jay; 20 spmns coll. J. Drivas; all with complete protoconch.

Description. Shell fusiform, protoconch extending general outline of teleoconch, last whorl not constricted; all whorls strongly convex giving the shell a characteristic profile. Protoconch of 2.5 whorls, with axial ribs extending from suture to suture, numbering 18-19 per whorl, their intervals with much finer, close-set spiral cords (ribbed protoconch of type 3); limit from teleoconch progressive along 1/4 whorl. Teleoconch of 9 convex whorls, suture deeply impressed, 3 spiral cords per whorl, crossed at right angles by axial ribs, with a big rounded bead at each intersection; beads numbering 19 or 20 on penultimate whorl. The upper spiral cord hardly visible on first whorl, very weak on the 2 following whorls, but equal to the other ones on last whorls. Last whorl with a fourth spiral cord emerging from suture, weaker than the other ones, and underlining angle with the excavated base; a fifth spiral cord, weak and unbeaded, at the upper part of base. On last whorls, suture marked by a fine spiral thread. Aperture trapezoidal with its upper and outer angle acute. Colour plain golden brown, with a reddish gleam on fresh specimens; protoconch brown or white. Size: maximum height of shell 4.3 mm; width at base 1 mm; height of protoconch 0.40 mm; width at its base 0.35 mm.

Type locality. Found dead in hand-dredged sand at 30-50 m, off Saint-Gilles-les-Bains, between harbour and Boucan-Canot beach.

Type Material. Holotype and paratype 1 in MNHN, paratypes 2 to 20 coll. M. Jay; paratype 21 to 25 coll. J. Drivas.

Etymology. Dedicated to Mr. Bernard Metivier, MNHN.

Remarks. This species recalls *Mendax ribesae* n. sp. in its shape and colour, but differs in that its protoconch bears spiral cords.

Mendax penneyi n.sp.

Plate 8, A; colour plate II, Fig. 50

Material examined. 1 spmn MNHN; 4 spmns (1 with complete protoconch) coll. M. Jay; 2 spmns coll. J. Drivas.

Description. Shell fusiform, with moderately constricted base, apex surmounted by the prominent cylindrical protoconch. Protoconch of 4.5 whorls, the earlier 1.5 smooth with rounded apex, the following ones with axial ribs extending from suture to suture, their intervals smooth (ribbed protoconch of type 1); limit from teleoconch oblique, marked by change of colour, but adult sculpture develops progressively on last half-whorl. Teleoconch of 7 whorls, 3 spiral cords per whorl, crossed at right angles by a little weaker axial ribs, with a rounded bead at each intersection; beads numbering 18 or 19 per whorl, the 3 spiral cords subequal. A fourth unbeaded spiral cord emerging from suture at base of last whorl. A strong smooth cord at mid-height of base. Colour white, the upper beaded cord very pale brown on fresh specimens. Size: total height 4.1 mm; maximum width 1.4 mm; height of protoconch 0.58 mm; width of protoconch at base 0.32 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype in MNHN, paratype 1 coll. M. Jay.

Etymology. Dedicated to Dr. David Penney, assistant keeper of Zoology, Manchester Museum.

Remarks. The teleoconch of this species is similar to that of *Cerithiopsis hedista* Melvill & Standen, 1896 (type locality Loyalty Isl.) in its size, sculpture and colour pattern; but the holotype of *Cerithiopsis hedista* in MM (lot EE 3743) has 4 whorls of protoconch left, with a broken summit, these 4 whorls slightly convex and smooth; this character is quite distinctive from our species. The colour pattern of *Mendax penneyi* n.sp. recalls that of *Cerithiopsis eutrapela* Melvill & Standen, 1896, from which it is easily separated by its smaller size, its 3 equal cords, and ribbed protoconch.

Mendax ribesae n.sp.

Plate 8, D; colour plate II, Fig. 51

Material examined. 2 spmns MNHN; 1 spmn coll. M. Jay; 1 spmn coll. J. Drivas; all with complete protoconch.

Description. Shell small and slender, fusiform, slightly constricted at base. Protoconch conical of 4.5 whorls, slightly convex, apex rounded, the first whorl

smooth, the following 3 with fine axial ribs, extending from suture to suture, numbering 20 per whorl, their intervals smooth; suture with very fine close-set axial threads (ribbed protoconch of type 2); limit from teleoconch oblique, marked by change of sculpture and colour. Teleoconch of 5 slightly convex whorls and impressed suture. 3 beaded spiral cords per whorl, the uppermost one weaker and recessed except on last whorl where the 3 cords are subequal; finer axial ribs, crossing them at right angles, with one bead at each intersection, beads numbering 20-21 per whorl. A fourth spiral cord weaker, and bearing finer beads emerging from suture at base of last whorl. One more fine smooth cord at mid-height of the excavated base. Aperture rounded. Colour pale orange-brown, base slightly darker, protoconch white.

Size: holotype total height 2.6 mm; maximum width 0.8 mm; height of protoconch 0.5 mm; width of protoconch at base 0.4 mm.

Type locality. Found dead in hand-dredged sand at 55 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN, paratype 2 coll. M. Jay; paratype 3 coll. J. Drivas.

Etymology. Dedicated to Mrs Sonia Ribes, curator of the Natural history Museum of Saint Denis, La Réunion.

Remarks. This species has the same size as *Mendax theodosiae* n.sp. but differs from it in its narrower width, weak and recessed upper cord, and colour. The other species of *Mendax* collected on Reunion are much larger. This species is easily separated from *Joculator* species of the same size, by its ribbed protoconch.

Mendax theodosiae n.sp.

Plate 8, E; colour plate II, Fig. 52

Material examined. 2 spmns MNHN; 9 spmns coll. M. Jay; 3 spmns coll. J. Drivas.

Description. Shell pupiform with strongly constricted base, more slender towards apex, topped by the prominent and pointed protoconch, its maximum diameter at the lower 1/3 of teleoconch. Protoconch of 4.5 convex whorls, the earlier 1.5 whorl with rounded apex, looking smooth but showing under SEM, a narrow spiral row of close-set axial riblets, numbering about 50 per whorl, situated in suture and extending shortly on the upper part of lower whorl; following whorls bearing strong axial ribs numbering 18-20 per whorl, with the same very narrow row of axial riblets in and under suture (ribbed protoconch of type 2); limit from teleoconch oblique marked by change of colour, but adult sculpture develops progressively on the last half-whorl. Teleoconch of 6 slightly convex whorls, suture shallow. 3 spiral cords per whorl,

except on the 2 earlier whorls where there are only 2 cords, the other one originating on the second whorl, between the 2 earlier cords, becoming equal to the other ones on the third whorl. Axial ribs weaker than cords, crossing them at right angles, and numbering 18 on penultimate whorl, with a rounded bead at each intersection. Last whorl strongly constricted at base, a fourth weakly beaded spiral cord emerging from suture at its base. On the last half-whorl, beads become weaker and more axially elongate towards the outer lip of aperture. A fifth spiral cord, smooth, on base. Colour dark brown to golden brown, the earlier whorls of teleoconch paler, protoconch white.

Size: holotype total height 3.3 mm; maximum width 1.2 mm; height of protoconch 0.73 mm; width of protoconch at base 0.42 mm.

Type locality. Found dead in hand-dredged sand from 10-20 m, off Saint-Gilles-les-Bains, between harbour and Boucan-Canot beach.

Type material. Holotype and paratype 1 MNHN, paratypes 2 to 7 coll. M. Jay; paratype 8 coll. J. Drivas.

Etymology. Dedicated to Mrs Theodosia Drivas.

Remarks. This species differs from other *Mendax* species in its characteristic protoconch, bearing under suture the narrow row of fine axial riblets; besides, it differs from *Mendax ribesae* n.sp. which has a similar colour, in its shorter and more compact shape, and its size (2.7 mm instead of 4.1 mm); it differs from *Mendax metivieri* n.sp. which has the same colour, in its shorter and more compact shape and its size (2.7 mm instead of 4.5 mm). It is easily separated from *Prolixodens sknibs* n.sp. in its higher and differently sculptured protoconch (protoconch of type 2 instead of type 4), and its colour less blackish. *Joculator lozoueti* n.sp., which has a similar shape, is somewhat larger and has a smooth protoconch.

Genus *Prolixodens* Marshall, 1978

Type species: *Cerithiopsis infracolor* Laseron, 1951, Long Reef, NSW, Australia: teleoconch with 3 beaded spiral cords per whorl, protoconch with axial ribs on the lower 2/3 of whorls, the upper 1/3 smooth or punctate (ribbed protoconch of type 4).

***Prolixodens nicolayae* n. sp.**

Plate 8, F; colour plate II, Fig. 53

Material examined. 2 spmns MNHN; 1 spmn coll. M. Jay; 1 spmn coll. J. Drivas; all with complete protoconch.

Description. Shell very small, fusiform, with constricted base, and relatively high protoconch. Protoconch conical with pointed apex, comprising 4 strongly convex whorls, the first one slightly granular,

the following ones with axial ribs on the lower 2/3 of whorls, the upper 1/3 slightly concave and granulous; no spiral sculpture on protoconch; limit from teleoconch clear-cut and oblique, marked by change of colour and sculpture. Teleoconch of 4 whorls, bearing 3 beaded spiral cords per whorl, the upper one weaker and recessed, becoming nearly equal to the other ones on last whorl; weaker axial ribs crossing them at right angles, with a rounded bead at each intersection; beads numbering 16 per whorl. A fourth spiral cord, finely beaded, emerging from suture at base of last whorl; a fifth smooth spiral cord on base. Colour creamy-white, protoconch more milky white.

Size: holotype total height 1.4 mm; maximum width 0.6 mm; height of protoconch 0.40 mm; width of protoconch at base 0.29 mm.

Type locality. Found dead in hand-dredged sand at 30m, off Souris-Chaude, Trois-Bassins.

Type material. Holotype and paratype 1 in MNHN, paratype 2 coll. M. Jay; paratype 3 coll. J. Drivas.

Etymology. Dedicated to Mrs K. Nicolay, foundress of "La Conchiglia".

Remarks. This species differs from *Prolixodens sknibs* n.sp. the protoconch of which is of similar type, in its less swollen shape, smaller size (1.4 mm instead of 1.8 mm) and colour (cream instead of blackish-brown); it differs from *Dizoniopsis gothica* n.sp. and from *Dizoniopsis herberti* n.sp. the protoconch of which is also of similar type, in its teleoconch with 3 beaded spiral cords instead of 2, its shape and colour.

***Prolixodens sknibs* n.sp.**

Plate 8, G; colour plate II, Fig. 54

Material examined. 2 spmns MNHN; 7 spmns (1 with complete protoconch) coll. M. Jay; 2 spmns coll. J. Drivas.

Description. Shell pupiform, strongly swollen, the maximum diameter at the middle of teleoconch, base strongly constricted, and apex topped by the prominent protoconch. Protoconch of 3.5 whorls, the first one rounded and finely granular, the following ones with axial ribs numbering 20-21 per whorl, appearing only on the lower 2/3 of whorls, the upper 1/3 being concave and finely granular; limit from teleoconch axial, marked by change of colour and development of spiral sculpture. Teleoconch of 6 slightly convex whorls, suture shallow. 3 spiral cords per whorl, crossed at right angles by weaker axial ribs, numbering 16 on penultimate whorl. A strong rounded bead at each intersection, beads more close-set axially than spirally; the 3 cords subequal, in spite of the narrowing of both ends of shell. A fourth spiral cord emerging from suture at base of last whorl, with only weak swellings; a fifth unbeaded smooth cord on base, and

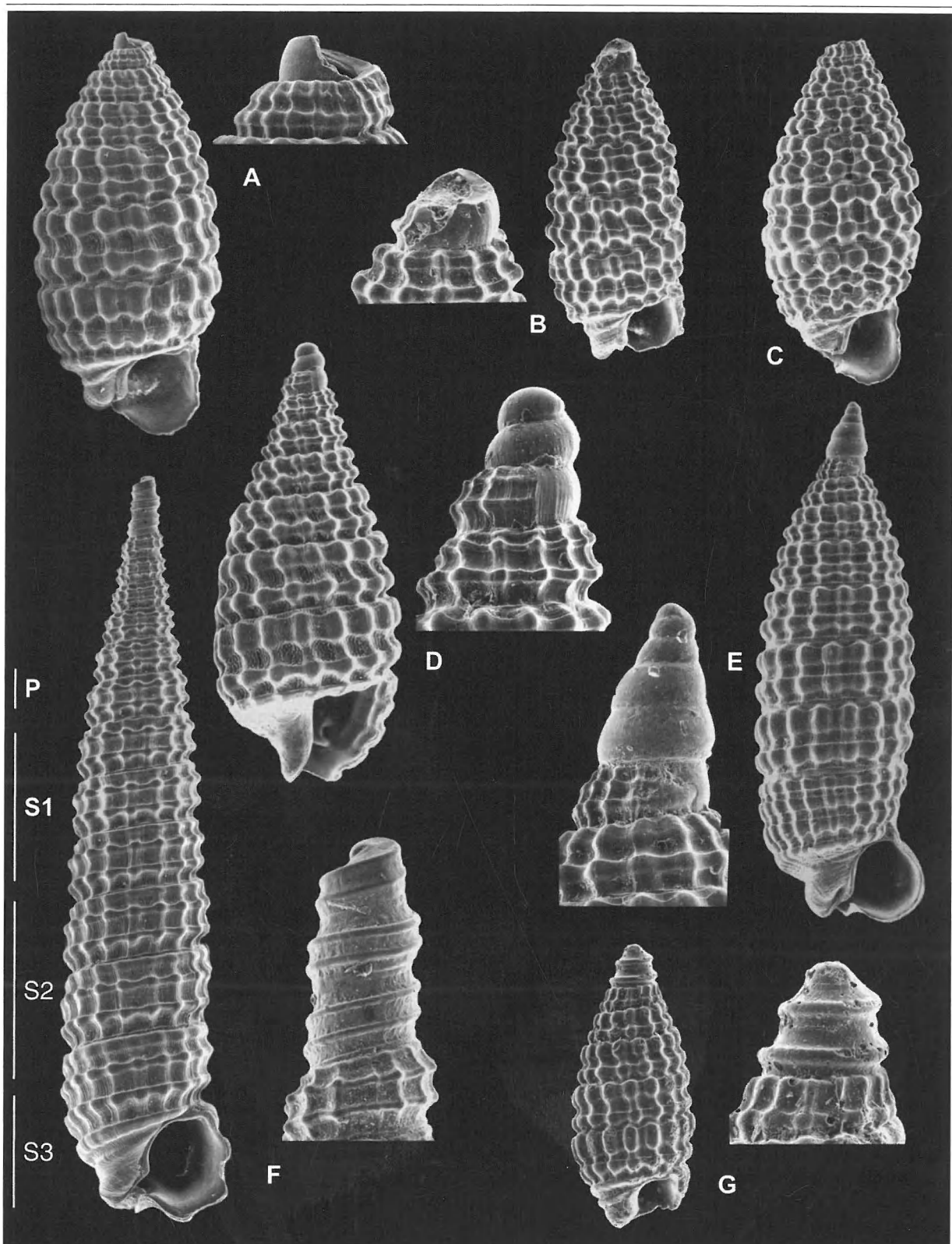


PLATE 7. Fig. A. *Horologica balteata* (Watson, 1886). Off Saint Gilles les Bains, 12m; height 3 mm; MNHN. Fig. B. *H. bicolor* Laseron, 1956. Off Saint Gilles les Bains, 30 m; height 2.1 mm; MNHN. Fig. C. *H. cf semipicta* (Gould, 1861). Off Saint Gilles les Bains, 30 m; height 2.1 mm; MNHN. Fig. D. *H. purpurea* Laseron, 1955. Off Cape La Houssaye, Saint Gilles les Bains, 10-20 m; height 3.1 mm; MNHN. Fig. E. *H. turrigera* (Watson, 1886). Off Saint Gilles les Bains, 10-20 m; height 3.7 mm; MNHN. Fig. F. *Belonimorphis belonimorphis* n.sp. Off Saint Gilles les Bains, 10-30 m; holotype, height 6 mm; MNHN. Fig. G. *Koilofera koilofera* n.sp. Off Saint Gilles les Bains, 10-30 m; holotype, height 2.7 mm; MNHN.

Scale bars: S (shells): 1 mm; P (protoconchs): 100 μ m.

below it, several fine spiral threads visible under microscope. Aperture circular. Colour plain dark brown to blackish-brown, with reddish gleam on fresh specimens, protoconch paler brown with white apex. Size: holotype total height 1.8 mm; maximum width 0.9 mm; height of protoconch 0.25 mm; width of protoconch at base 0.25 mm.

Type locality. Found dead in hand-dredged sand at 10-30 m, off Saint-Gilles-les-Bains, between harbour and Boucan-Canot beach.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 coll. M. Jay; paratype 3 coll. J. Drivas.

Etymology. Named for its size after Greek, meaning small fly.

Remarks. This species differs from *Prolixodens nicolayae* n. sp. in its size (1.8 mm instead of 1.4 mm), shape, equal spiral cords instead of unequal, and shorter protoconch (3.5 whorls instead of 4.5). It resembles *Dizoniopsis gothica* n. sp. in the sculpture of the protoconch, but differs from that species in its 3 beaded cords on teleoconch whorls instead of 2; it is easily separated from *Koilofera koilofera* n.sp. and from small species of *Joculator* in its ribbed protoconch. The *Prolixodens* species of Marshall (1978) are much larger.

Genus *Belonimorphis* n. gen.

Teleoconch conical elevated and narrow with 3 spiral cords. Protoconch high, cylindrical, each whorl convex with 2 spiral keels, and without axial ribs. Type species: *Belonimorphis belonimorphis* n.sp.

***Belonimorphis belonimorphis* n.sp.**

Plate 7, F; colour plate II, Fig. 55

Material examined. 2 spmns MNHN; 200 spmns (100 with complete protoconch) coll. M. Jay; 50 spmns coll. J. Drivas.

Description. Shell fusiform, high and slender, tapering regularly to the apex of teleoconch, protoconch more elevated and pointed. Protoconch of 3.5 whorls, nearly equal in diameter, and thus cylindrical; each whorl strongly convex bearing 2 prominent and well separated spiral keels, without any other sculpture; limit from teleoconch ill-defined, marked by the development of axial ribs. Teleoconch of 11 or 12 whorls with fine, prominent, widely spaced spiral cords, numbering 2 on earlier whorls, 3 on the following ones, the new cord originating immediately under the upper suture; this upper cord remaining weaker except on last whorl. Rounded axial ribs, a little weaker than the cords, crossing them at right angles, and numbering 18-19 per whorl; each intersection with a small bead, more or less rounded, sometimes reduced to a faint swelling. Numerous close-set axial riblets well visible under microscope,

on the whole surface including spiral cords, axial ribs and their intervals, numbering 18 or 19 on each axial rib and the near interval, totalling 400 per whorl. A fourth spiral cord emerging from suture at base of last whorl, as strong as the other cords, but bearing only faint swellings rather than beads. A fifth spiral cord, smooth and unbeaded, at mid-height of base. Aperture circular, anterior canal markedly oblique. Colour dark blackish brown to golden brown, the 3 earlier whorls of teleoconch and protoconch white.

Size: holotype total height 6 mm; width at base 1.5 mm; height of protoconch 0.74 mm; maximum width of protoconch 0.40 mm.

Type locality. Found in hand-dredged sand at 10-20 m off Saint-Gilles-les-Bains, between Hermitage and St Paul Bay.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 20 coll. M. Jay; paratypes 21 to 30 coll. J. Drivas.

Etymology. Named after its shape, from Greek meaning needle-shaped.

Remarks. This species is easily distinguished from other species of Cerithiopsidae by its slender shape, and by its protoconch bearing 2 spiral keels. Species of the genus *Cerithiopsis* with a slender shape have a smooth protoconch. Species of the genus *Mendax* have an axially ribbed protoconch. Some species with a similar shape and similar teleoconch sculpture have been described by Laseron (1956) in the genus *Cerithiopsis*, and by Marshall (1978) in the genus *Laskeya*, but their protoconchs are very different. A protoconch with a similar sculpture has been illustrated by Marshall (1978) in the family Triphoridae (*Inella gigas*) but with a sinistral coiling. This species seems to have some variable characters: its colour ranging from blackish brown to golden brown; the size of its teleoconch beads, (either well rounded on some specimens or obsolete on other ones, the sculpture being thus reduced to a cancellate pattern); and its size, with specimens smaller and narrower though in their adult state; however all these specimens have identical protoconchs, and many intermediates exist between these variations.

Genus *Koilofera* n. gen.

Teleoconch pupiform with 2 beaded spiral cords per whorl as *Horologica*, but protoconch with a strong spiral swelling just above suture, and a strong concavity above this, without any other sculpture. Named from Greek meaning "bearing a concavity". Type species: *Koilofera koilofera* n.sp.

***Koilofera koilofera* n.sp.**

Plate 7, G; colour plate II, Fig. 56

Material examined. 2 spmns MNHN; 2 spmns coll. M. Jay; 1 spmn coll. J. Drivas; all with complete protoconch.

Description. Shell pupiform with strongly constricted base, the maximum width just under mid-height. Protoconch of 2.5 whorls, with a flat apex, delimited by a well marked angle; whorls of protoconch with a very strong rounded spiral swelling, situated just above lower suture, its upper part appearing very slightly beaded under oblique light on fresh specimens; whorl strongly concave above this swelling, without any other sculpture either axial or spiral; limit from teleoconch clear-cut and oblique, marked by change of colour and development of adult sculpture. Teleoconch of 6 slightly convex whorls, shallow suture. 2 spiral cords per whorl, crossed at right angles by fine axial ribs, with at each intersection a slightly axially elongate bead; beads numbering 17-18 per whorl. On the fourth and fifth whorls, beads become larger on the upper cord than on the lower one; on last whorl, these upper beads are more axially elongate, and partially incised in their middle by a spiral furrow, but are never quite divided on our specimens. Last whorl strongly constricted at base, with a third spiral cord, unbeaded, emerging from suture; a fourth unbeaded spiral cord on base. Aperture circular. Colour very dark brown to blackish-brown, protoconch distinctly paler.

Size: holotype total height 1.7 mm; maximum width 0.6 mm; height of protoconch 0.29 mm; width of protoconch at base 0.36 mm.

Type locality. Found dead in hand-dredged sand at 10-30 m, off Saint-Gilles-les-Bains, between harbour and Boucan-Canot beach.

Type material. Holotype and paratype 1 in MNHN; paratype 2 and 3 coll. M. Jay; paratype 4 coll. J. Drivas.

Etymology. Named for the shape of protoconch whorls, from Greek meaning "bearing a concavity".

Remarks. In its shape and colour, this species resembles *Dizoniopsis gothica* n.sp. but is easily separated from it by its protoconch. Some species with a more or less similar protoconch have been described by Marshall (1978) in the genus *Seila*, but these have a quite different adult sculpture.

Genus *Seila* A. Adams, 1861

Type species *Triphoris dextroversus* Adams & Reeve, 1860, China seas. Shell high and slender, teleoconch with 3 or more smooth spiral cords per whorl and fine close-set axial lamellae in their intervals. Protoconch smooth or axially ribbed.

***Seila bandorensis* (Melvill, 1893).**

Plate 9, D; colour plate II, Fig. 57

Material examined. 1 spmn MNHN; 19 spmns coll. M. Jay; 5 spmns coll. J. Drivas.

Description. Shell elongate pyriform; base strongly constricted. Rounded protoconch of 1.5 smooth convex translucent whorls; limit from teleoconch ill-defined on 1/4 whorl, marked by development of the 3 spiral cords. Teleoconch whorls with 3 smooth spiral cords, equal in strength on last whorl, the median cord weaker on earlier whorls. Very fine lamellose axial threads in their intervals, well distinct under microscope. A fourth smooth, weaker spiral cord emerging from suture at base of last whorl, followed immediately below it by a fifth cord, and a sixth one at mid-height of base. Colour plain orange-brown, the 3 earlier whorls paler and whitish, protoconch white.

Size: maximum total height 3.8 mm; maximum width 1.2 mm; height of protoconch 0.30 mm; width of protoconch at base 0.33 mm.

Locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Remarks. Our specimens were compared and found identical to the holotype of *Cerithiopsis* (*Seila*) *bandorensis* Melvill, 1893, type locality Bombay (NHM lot Nr. 1893.2.16.7).

***Seila hinduorum* (Melvill, 1898)**

Plate 9, E; colour plate II, Fig. 58

Material examined. 1 spmn MNHN; 3 spmns coll. M. Jay; 2 spmns coll. J. Drivas.

Description. Shell conical, slightly fusiform, elongate, base not constricted. Protoconch of 3 smooth convex whorls; limit from teleoconch ill-defined on 1/4 whorl, marked by development of the 3 adult cords. Teleoconch up to 14 whorls, suture weakly impressed, whorls with 3 smooth spiral cords, subequal on the whole height of the shell. Fine very close-set lamellose axial threads in their intervals. A fourth much weaker spiral cord emerging from suture at base of last whorl. Base flat and smooth. Colour plain orange brown to golden brown; summit paler to white, protoconch white.

Size: total height 5.5 mm; maximum width 1.2 mm; height of protoconch 0.58 mm; width of protoconch at base 0.38 mm.

Locality. Found dead in hand-dredged sand at 40-50 m; off Saint-Gilles-les-Bains.

Remarks. Our specimens were compared and found identical to the specimens labelled syntypes of *Cerithiopsis* (*Seila*) *hinduorum* Melvill, 1898, type locality Karachi, in NMW (lot Nr Z.1955.158.00206), 18 specimens.

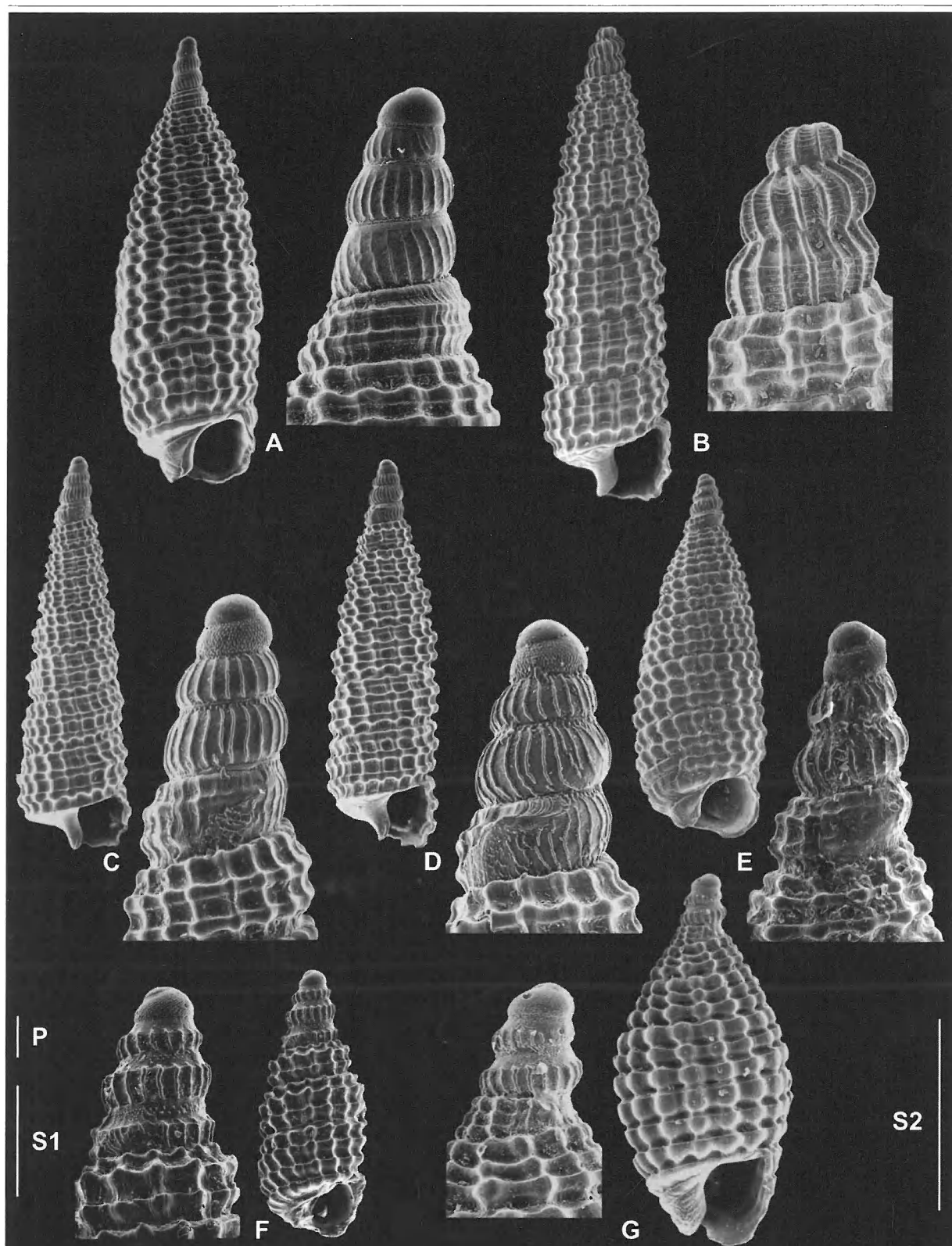


PLATE 8. Fig. A. *Mendax penneyi* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 4.1 mm; MNHN. Fig. B. *M. metivieri* n.sp. Off Saint Gilles les Bains, 30-50 m; holotype, height 4.3 mm; MNHN. Fig. C. *M. mascarenensis* n.sp. Off Saint Gilles les Bains, 30 m; holotype, height 4.2 mm; MNHN. Fig. D. *M. ribesae* n.sp. Off Saint Gilles les Bains, 55 m; holotype, height 2.6 mm; MNHN. Fig. E. *M. theodosiae* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 3.3mm; MNHN. Fig. F. *Prolixodens nicolayae* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; holotype, height 1.4 mm; MNHN. Fig. G. *P. sknips* n.sp. Off Saint Gilles les Bains, 10-30 m; holotype, height 1.8 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 µm.

Seila chenui n.sp.

Plate 9, F; colour plate II, Fig. 59

Material examined. 2 spmns MNHN; 16 spmns (10 with complete protoconch) coll. M. Jay; 5 spmns coll. J. Drivas.

Description. Shell elongate conical slightly fusiform, base not constricted, protoconch a little more prominent than the general outline of teleoconch. Protoconch conical of 6 whorls, all of them since the first one bearing axial ribs, numbering 16 or 17 per whorl, strictly axial on earlier whorls, then more and more prosocline on following whorls; the 3 last whorls of protoconch bearing 3 very weak spiral cords in lower half of whorls, in the intervals between ribs; limit from teleoconch clear-cut, marked by change of colour and start of 2 adult cords. Teleoconch of 13 or 14 whorls with straight sides; the 5 earlier whorls with 2 spiral cords per whorl; a third spiral cord beginning at the sixth whorl, originating from a fine spiral thread in the interval between the 2 cords; a fourth cord beginning at the twelfth whorl, originating between the second and the third cord, but remaining obviously weaker up to the last whorl; 4 unequal cords on last whorls. All the cords prominent and bearing regularly spaced undulations, sometimes with a slight swelling. Suture marked by a fine spiral thread. Intervals between cords bearing very numerous close-set lamellose axial riblets, and a very fine spiral thread on last whorls. Last whorl with a fifth weaker cord, emerging from suture, followed immediately by a sixth cord; the remaining part of base smooth. Aperture quadrangular; anterior canal short and very oblique. Colour plain orange, protoconch a little more brownish.

Size: holotype total height 5.4 mm; width at base 2 mm. Height of protoconch 0.66 mm; maximum diameter of protoconch 0.40 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m off Saint-Gilles-les-Bains, between Hermitage and Boucan-Canot beach.

Type material. Holotype and paratype 1 in MNHN, paratypes 2 to 11 coll. M. Jay; paratypes 12 to 16 coll. J. Drivas.

Etymology. Dedicated to Dr. J.C. Chenu, French conchologist in last century.

Remarks. This species resembles the following one (*Seila reunionensis* n.sp.) from which it is undistinguishable on teleoconch characters alone, but is easily separated from it by its protoconch of 6 whorls instead of 2.5. Other remarks will be discussed with the following species.

Seila reunionensis n.sp.

Plate 9, G; colour plate II, Fig. 60

Material examined. 2 spmns MNHN; 19 spmns (10 with complete protoconch) coll. M. Jay; 5 spmns coll. J. Drivas.

Description. Shell elongate conical, slightly fusiform, not constricted at base. Protoconch of 2.5 whorls, regularly tapering to apex; first whorl rather wide, the earlier 0.25 whorl smooth, the following ones with axial ribs extending from suture to suture, and 4 finer spiral cords in the lower half of their intervals; limit from teleoconch ill-defined on 1/4 whorl, marked by development of 2 spiral cords deforming axial ribs. Teleoconch of 11 whorls with straight sides, suture weakly impressed marked from earlier whorls onwards by a fine undulose spiral thread; 2 spiral cords per whorl on the 3 earlier whorls; then a third spiral cord arising at the end of fourth whorl, developing from a fine thread situated between the 2 cords, this third cord remaining weaker than the earlier two except on last whorl. At the beginning of the tenth whorl, a fine spiral thread emerges between the second and third cords, developing into a fourth cord, distinct on last whorl but remaining weaker than the three other ones. A fifth spiral cord, weaker than the fourth one, emerging from suture at base of last whorl, immediately followed by a sixth cord still a little weaker than the fifth one. All these spiral cords with wide undulations, sometimes with slight swelling. The intervals between cords with numerous close-set very fine lamellose axial riblets, and a fine spiral thread on last whorls. Base smooth. Aperture roundly quadrate, anterior canal wide and strongly oblique. Colour plain orange brown.

Size: maximum height 7.6 mm; width at base 1.9 mm; height of protoconch 0.56 mm; width of protoconch 0.43 mm.

Type locality. Found dead in hand-dredged sand at 10-20 m, off Saint-Gilles-les-Bains.

Type material. Holotype and paratype 1 in MNHN; paratypes 2 to 8 coll. M. Jay; paratypes 9 and 10 coll. J. Drivas.

Etymology. Named after Reunion island.

Remarks. This species resembles the preceeding one (*Seila chenui* n.sp.) in that its teleoconch bears spiral cords with distinct undulations, and differs from it only in its 2,5 protoconch whorls instead of 6. Both species are provisionally attributed to the genus *Seila*, though their spiral cords are undulose and occasionally slightly swollen. Some specimens resembling ours have sometimes been identified as *Seila laqueata* (Gould, 1861) (type locality China Seas) but Gould did not describe the protoconch of his species, and the figure given by Johnson shows a

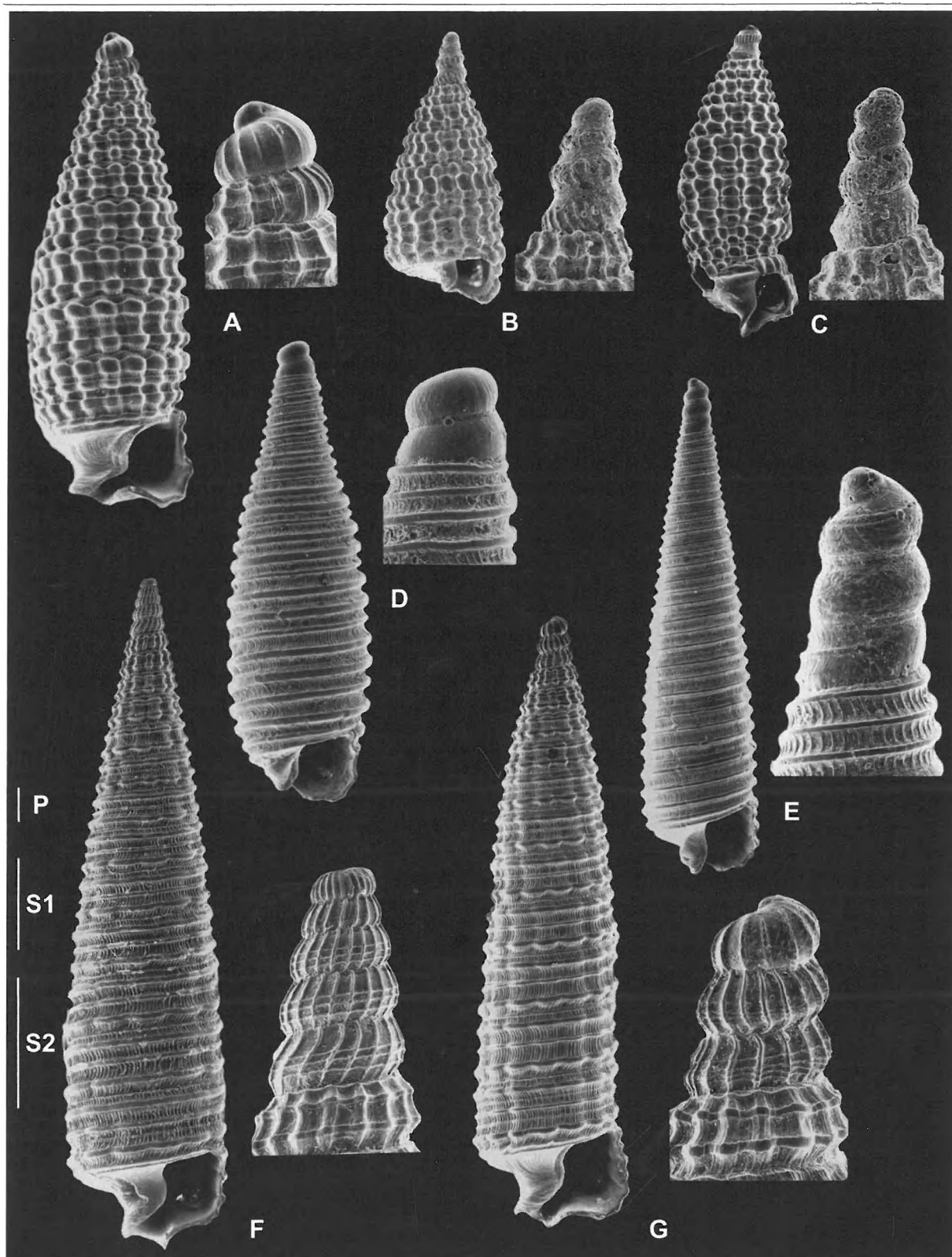


PLATE 9. Fig. A. *Dizoniopsis herosae* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; holotype, height 4.8 mm; MNHN. Fig. B. *D. herberti* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 2.4 mm; MNHN. Fig. C. *D. gothica* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 2.7 mm; MNHN. Fig. D. *Seila bandorensis* (Melvill, 1892). Off Saint Gilles les Bains, 10-20 m; height 3.8 mm; MNHN. Fig. E. *S. hinduorum* (Melvill, 1898). Off Saint Gilles les Bains, 40-50 m; height 5.5 mm; MNHN. Fig. F. *S. chenui* n.sp. Off Saint Gilles les Bains, 10-20 m; holotype, height 5.4 mm; MNHN. Fig. G. *S. reunionensis* n.sp. Off Saint Gilles les Bains, 30-50 m; holotype, height 7.6 mm; MNHN. Scale bars: S (shells): 1 mm; P (protoconchs): 100 μ m.

shell broken at both ends, bearing 3 spiral cords per whorl, unequal, smooth, neither undulose nor swollen. A lot labelled *Seila laqueata* (Gould, 1961) in NMW (lot N° Z.1955.158.02266, 2 specimens from Hong-Kong) shows only 3 smooth spiral cords. Our new species differs from *Seila crocea* Angas, 1878 (type locality NSW, Australia), in its fourth spiral cord and the undulations on the cords; Angas did not describe the protoconch of his species. One specimen labelled *Seila crocea* in NMW (lot Z.1955.158.02267) shows four spiral cords on last whorl, but all of them are smooth without any undulation, and have a colour pattern with scattered white blotches, very different of our species. Our specimens were compared with *Seila cinctum* Dunker (MNK lot Nr 3237); *Seila capitata* Thiele, 1925 (type locality Agulhas bank) (MNK lot Nr 102723); *Seila alfredensis* Bartsch, 1915 (type locality Port Alfred, South Africa) (NMW, not material type); and *Seila dissimilis* Sutter, 1908, type locality New Zealand (NMW, not material type) but all these species differ from ours by their smooth spiral cords instead of regularly undulose or slightly swollen.

ACKNOWLEDGEMENTS

We are particularly grateful to Dr. Philippe Bouchet, MNHN, Paris, for his aid and remarks, and for allowing us to examine material in MNHN; without him, this study would not have been performed; and to Dr. Dai Herbert, Natal Museum for his aid, and the re-reading of the manuscript.

We thank similarly Mrs J. Pickering and Mrs K. Way, NHM, London; Dr M. Glaubrecht, MNK, Berlin; Mr. D. Penney, MM, Manchester; Dr. M. Seddon and Mrs H. Wood, NMW, Cardiff, for their aid and for having given us the opportunity to examine collections. Mr Lozouet and Mr. Metivier, MNHN, for their aid in bibliography; Mr. B. Fontaine and A. Abdou, MNHN, for their aid in photos SEM; Mr. Claude Michel, late curator in the Museum of Port Louis, Mauritius; Mr. Pierre Viader, Cardiff for their advice.

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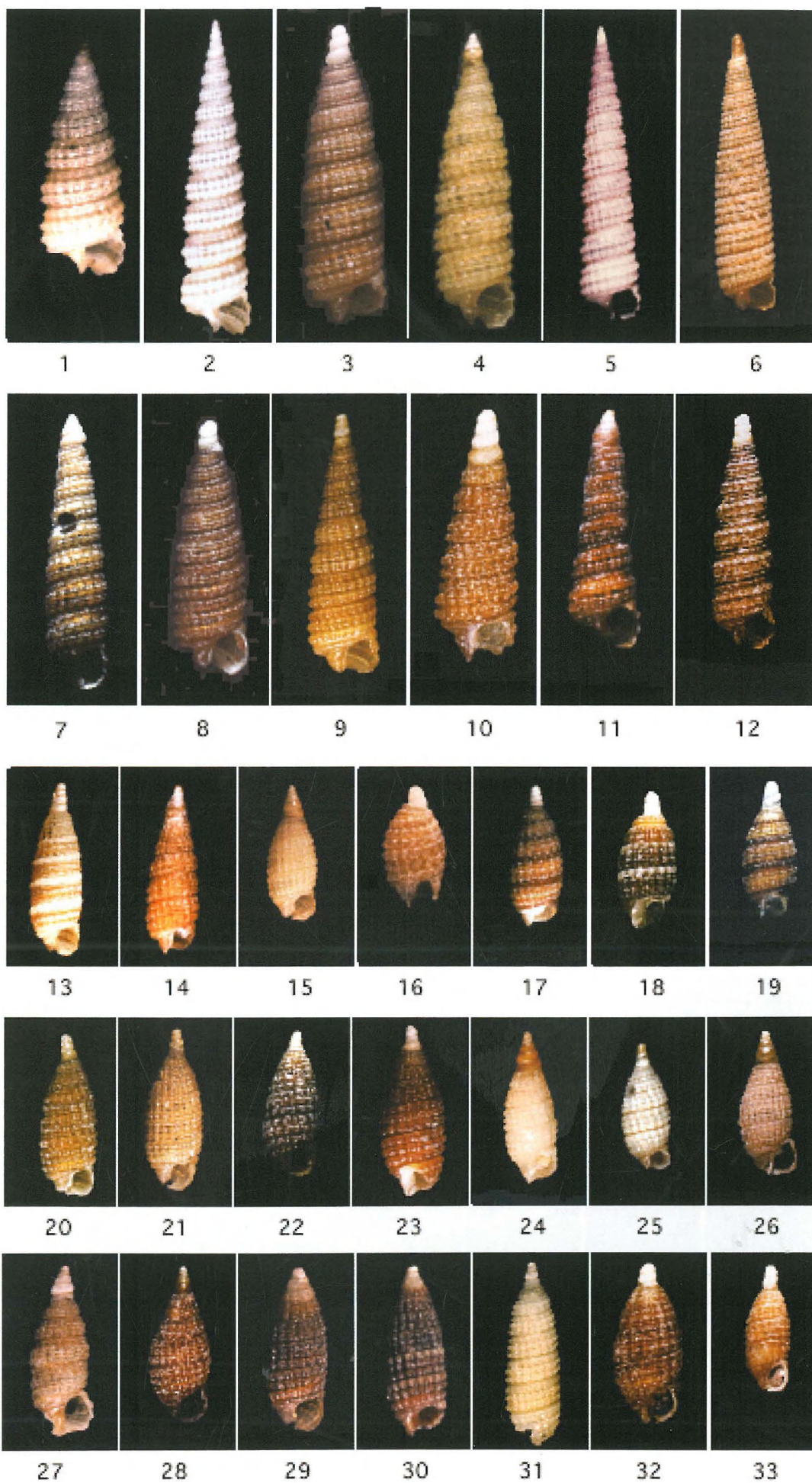
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COLOUR PLATES

COLOUR PLATE 1

1. *Cerithiopsis eutrappela* Melvill & Standen, 1896. Off Saint Gilles les Bains, 10-20 m; height 6.5; coll. M. Jay.
2. *C. fosterae* Melvill & Standen, 1896. Off Saint Gilles les Bains, 30-55m; height 6.1 mm; coll. M. Jay.
3. *C. boucheti* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 4.5 mm; coll. M. Jay.
4. *C. hadfieldi* n.sp. Off Saint Gilles les Bains, 45 m; paratype 2, height 5.6mm; coll. M. Jay.
5. *C. iochrous* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 5.5 mm; coll. M. Jay.
6. *C. jousseumei* n.sp. Off Saint Gilles les Bains, 10-30 m; paratype 2, 6 mm, coll. M. Jay.
7. *C. lamyi* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; paratype 2, height 1.5 mm; coll. M. Jay.
8. *C. nutzeli* n.sp. Off Saint Gilles les Bains, 15-30 m; paratype 2, height 3.4 mm; coll. M. Jay.
9. *C. pickeringae* n.sp. Off Saint Gilles les Bains, 20-30 m; paratype 2, height 3.9 mm; coll. M. Jay.
10. *Cerithiopsis seddonae* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 2.2 mm; coll. M. Jay.
11. *C. vaurisi* n.sp. Possession Bay, 55m; paratype 2, height 3.6 mm; coll. M. Jay.
12. *C. wayae* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; paratype 2, height 4.1 mm; coll. M. Jay.
13. *Joculator albocinctum* Melvill & Standen, 1896. Off Saint Gilles les Bains, 10-20 m, height 3 mm; coll. M. Jay.
14. *J. granata* Kay, 1979. Off Saint Gilles les Bains, 10-20 m; height 2.5 mm; coll. M. Jay.
15. *J. minima* Laseron, 1955. Off Saint Gilles les Bains, 10-20 m; height 2.3 mm; coll. M. Jay.
16. *J. minutissima* (Thiele, 1925). Off Saint Gilles les Bains and Possession Bay 10-54 m; height 1.5 mm; coll. M. Jay.
17. *J. pulvis* (Issel, 1869). Off Saint Gilles les Bains, 10-20 m; height 2.9 mm; coll. M. Jay.
18. *J. christiaensi* n.sp. Off Saint Gilles les Bains, 55 m; paratype 1, height 1.9 mm; coll. M. Jay.
19. *J. eudeli* n.sp. Off Saint Gilles les Bains, 30 m; paratype 2, height 1.9 mm; coll. M. Jay.
20. *J. fischeri* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; paratype 2, height 2.3 mm; coll. M. Jay.
21. *J. keratochroma* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 2.5 mm; coll. M. Jay.
22. *J. laseroni* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; paratype 2, height 2.3 mm; coll. M. Jay.
23. *J. lozoueti* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 3.2 mm; coll. M. Jay.
24. *J. megacephala* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 1.8 mm; coll. M. Jay.
25. *J. melanoraphis* n.sp. Off Saint Gilles les Bains, 10-30 m; paratype 2, height 2.9 mm; coll. M. Jay.
26. *J. mygaki* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; paratype 2, height 1.9 mm; coll. M. Jay.
27. *J. myia* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; paratype 2, height 2.2 mm; coll. M. Jay.
28. *J. phtyr* n.sp. Off Saint Gilles les Bains, 35 m; paratype 2, height 2 mm; coll. M. Jay.
29. *J. psyllos* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 2 mm; coll. M. Jay.
30. *J. salvati* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 35 m; paratype 1, height 3.6 mm; coll. M. Jay.
31. *J. skolix* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 35 m; paratype 2, height 3.2 mm; coll. M. Jay.
32. *J. thielei* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 1.5 mm; coll. M. Jay.
33. *J. vignalii* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; paratype 1, height 1.4 mm; coll. M. Jay.



COLOUR PLATE 2

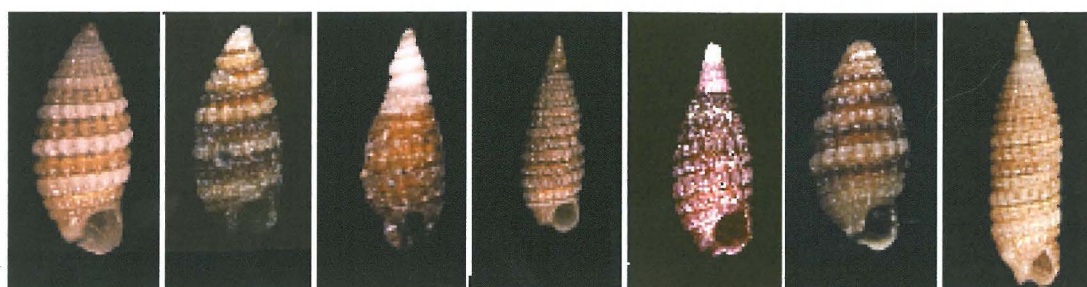
34. *Horologica balteata* (Watson, 1886). Off Saint Gilles les Bains, 12m; height 3 mm; coll. M. Jay.
35. *H. bicolor* Laseron, 1956. Off Saint Gilles les Bains, 30 m; height 2.1 mm; coll. M. Jay.
36. *H. macrocephala* Laseron, 1956. Off Saint Gilles les Bains, 20-30 m; height 1.7 mm; coll. M. Jay.
37. *H. minareta* Laseron, 1956. Off Saint Gilles les Bains, 10-20 m; height 2.6 mm; coll. M. Jay.
38. *H. purpurea* Laseron, 1955. Off Cape La Houssaye, Saint Gilles les Bains, 10-20 m; height 3.1 mm; coll. M. Jay.
39. *H. cf semipicta* (Gould, 1861). Off Saint Gilles les Bains, 30 m; height 2.1 mm; coll. M. Jay.
40. *H. turrigera* (Watson, 1886). Off Saint Gilles les Bains, 10-20 m; height 3.7 mm; coll. M. Jay.
41. *H. anisocorda* n.sp. Off Saint Gilles les Bains, 30m; paratype 2, height 2.2 mm; coll. M. Jay.
42. *H. glaubrechti* n.sp. Off Saint Gilles les Bains, 30-50 m; paratype 2, height 2.3 mm; coll. M. Jay.
43. *H. konops* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; paratype 2, height 3mm; coll. M. Jay.
44. *H. martini* n.sp. Off Boucan-Canot beach, Saint Gilles les Bains, 30 m; paratype 2, height 2.7 mm; coll. M. Jay.,
45. *Dizoniopsis gothica* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 2.7 mm; coll. M. Jay.
46. *D. herberti* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 2.4 mm; coll. M. Jay.
47. *D. herosae* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; paratype 2, height 4.8 mm; coll. M. Jay.
48. *Mendax mascarenensis* n.sp. Off Saint Gilles les Bains, 30 m; paratype 2, height 4.2 m; coll. M. Jay.
49. *M. metivieri* n.sp. Off Saint Gilles les Bains, 30-50 m; paratype 2, height 4.3 mm; coll. M. Jay.
50. *M. penneyi* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 1, height 4.1 mm; coll. M. Jay.
51. *M. ribesae* n.sp. Off Saint Gilles les Bains, 55 m; paratype 2, height 2.6 m; coll. M. Jay.
52. *M. theodosiae* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 3.3mm; coll. M. Jay.

53. *Prolixodens nicolayae* n.sp. Off Souris-Chaude, Trois-Bassins, 30 m; paratype 2, height 1.4 mm; coll. M. Jay.
54. *P. sknips* n.sp. Off Saint Gilles les Bains, 10-30 m; paratype 2, height 1.8 mm; coll. M. Jay,

55. *Belonimorphis belonimorphis* n.p. Off Saint Gilles les Bains, 10-30 m; paratype 2, height 6 mm; coll. M. Jay.

56. *Koilofera koilofera* n.sp. Off Saint Gilles les Bains, 10-30 m; paratype 2, height 2.7 mm; coll. M. Jay.

57. *Seila bandorensis* (Melvill, 1892). Off Saint Gilles les Bains, 10-20 m; height 3.8 mm; coll. M. Jay,
58. *S. hinduorum* (Melvill, 1898). Off Saint Gilles les Bains, 40-50 m; height 5,5 mm; coll. M. Jay.
59. *S. chenui* n.sp. Off Saint Gilles les Bains, 10-20 m; paratype 2, height 5.4 mm; coll. M. Jay.
60. *S. reunionensis* n.sp. Off Saint Gilles les Bains, 30-50 m; paratype 2, height 7.6 mm; coll. M. Jay.



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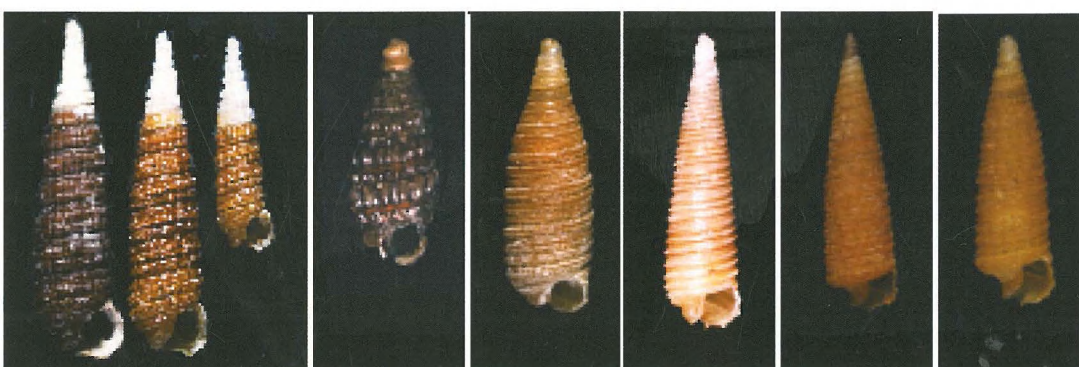
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