

New freshwater gastropods from the Mekong.

By

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With plate 13 and 20 textfigures.

The report of human schistosomiasis from various localities in the Mekong valley initiated a systematic survey of the molluscan fauna at and around these foci in Thailand, Laos and Cambodia. This survey was sponsored by a grant of the U.S. Army Research & Development Command (Grant No. NA-CRD-AFE-S92-544-69-G146). While the Thai staff of this team concentrated mainly on the fauna of the Mekong at Bandan (Thailand) and Khong Island (Laos), the present author studied the molluscan fauna of the Mekong between Sambor and Kratie in North Cambodia. Several French naturalists had previously visited the Mekong at above named localities and had collected numerous species of molluscs during their visits. It was therefore a surprise that the present survey resulted in the finding of still more undescribed species from the Mekong, making this river the richest water course with regard to the molluscan fauna. Some species which were collected by M. PRASONG TEMCHAROEN in Thailand and Laos are included in this paper, as these species were also found in Cambodia. The author wishes to express his thanks to the collector for the kind submission of these species. The author is also indebted to the authorities of the Cambodian Ministry of Public Health and to the members of the "Mekong Committee" for their kind assistance. Dr. AUDEBAUD, Pasteur Institute at Phnom Penh, is thanked for his kindness in submitting specimens of a small collection of molluscs made by him and Dr. JOLIE, formerly also assigned to the Pasteur Institute, to the author. For the history of the malacological research in the Mekong see the introduction of the faunistic report on this river.

Viviparidae GRAY, 1847.

Anulotaia BRANDT, 1968.

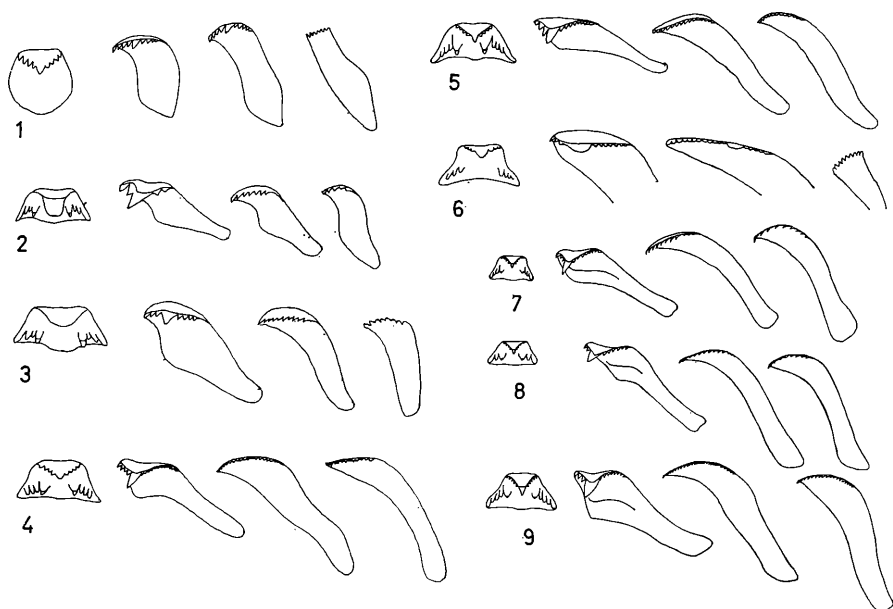
Anulotaia mekongensis n. sp.

pl. 13 fig. 1, textfig. 1.

Diagnosis: A species of *Anulotaia* BRANDT, which differs from the type species, *A. forcarti* BRANDT, by its much larger size and weaker and more numerous spiral ridges. It differs from *A. lagrandierei* (BAVAY) by its much thicker texture, somewhat larger size and by having 11 cusps instead of 7 on the cutting edge of the rhachis.

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Description: Shell rather large for the genus, thick, not translucent, of whitish ground colour, but covered with a thick, greenish periderm which is furry when fresh and young. This has never been seen in juvenile specimens of *A. lagrandierei*. This furry layer of ciliae is rubbed off with age. The 4 whorls are moderately convex; they increase rapidly in width and are separated by a linear, impressed suture. The large, inflated body whorl measures more than $\frac{3}{4}$ of the height of the shell. The protoconch of the adult shell is always eroded. The embryonic shell has a strong peripheral keel and few spiral ridges which are ornate with chaetae. There are no intermediate spiral lines in the interspaces, but there is a very delicate spiral microsculpture. The postnuclear whorl shows generally 3 or 4 spiral ridges, the fourth being the peripheral ridge which sometimes shows above the suture. There are 3 or 4 spiral ridges on the lower half of the body whorl. The lowest of these ridges is the periomphalic keel. The umbilicus is narrow, but open and somewhat funnel-shaped. The microsculpture consists of fine, irregular and wavy, spiral lines which are crossed by the coarser growth lines. — The aperture is large, but hardly expanded. It is bluish-white and glossy within; its shape is broadly ovate with an angle at the upper insertion of the peristome; adult specimens are well rounded at the base, but young specimens show a slight angle at the base corresponding with the periomphalic



Textfig. 1-9. Radula, half-row. — 1) *Anulotaia mekongensis* n. sp.; 2) *Hydrorissoia paviei* n. sp.; 3) *Hydrorissoia cambodiensis* n. sp.; 4) *Paraprososthenia iijimai* n. sp.; 5) *Paraprososthenia fischerpiettei* n. sp.; 6) *Paraprososthenia hanseni* n. sp.; 7) *Paraprososthenia adami* n. sp.; 8) *Paraprososthenia acicula* n. sp.; 9) *Paraprososthenia bollingi* n. sp.

keel. The peristome is connected by a bluish-white parietal callus. The outer margin is rather thin, only in old specimens is it somewhat thickened and blackened. — The operculum is almond-shaped, corneous, concentric, translucent with subcentral nucleus. It is thicker than the opercula of the other species of this genus and those of *Mekongia*, but not so thick as in *Siamopaludina*.

Size: A 27-32 mm; D 24-28 mm.

Animal slate-grey with orange and blackish pigment dusted over head and back. The short, round, tapering tentacles show a blackish ring each, sometimes two. The rostrum is rather short. The eyes are placed into distinct swellings at the base of the tentacles. The right tentacle of the male is transformed into a copulatory organ. The uterine brood-pouch of the females contains few (4-7) mature embryos and many (18-22) eggs and immature embryos in all stages of development. For the description of the embryonic shell see above. — The radula shows a squarish-oval rhachis with a very low cutting edge. This carries 7 small cusps. The laterals have the cusp formula 5-1-3, the inner marginals have 7 cusps, the middle cusp being the largest, and the other marginals have 6 cusps.

Type locality: Mekong at Stung Treng near the mouth of the Sekong river.

Distribution: Live specimens have only been collected at the type locality and in the Sekong river above Stung Treng. Dead shells, however, were found at the banks of the Mekong between Takek and Nakon Panom and at Khong Island.

Material: Holotype SMRL 15866/A; paratypes 15866/12. — SMRL 15867/10 - Sekong river (Tonle Kaong) at Stung Streng.

Hydrobiidae TROSCHER, 1857.

Lithoglyphinae P. FISCHER, 1885.

***Hydrorissoia* BAVAY, 1895.**

***Hydrorissoia paviei* n. sp.**

pl. 13 fig. 2, textfig. 2.

Diagnosis: A species of *Hydrorissoia* BAVAY, which differs from all other species described of this genus by its short, stout shape, greatly convex whorls and almost obsolete spiral sculpture.

Description: Shell medium-sized for the genus, conical, corneous or whitish, translucent, somewhat glossy; with $4\frac{1}{2}$ -5 convex whorls which increase regularly in size and are separated by a deep suture. The first two or three whorls are smooth, the last whorls may show traces of two spiral ridges between periphery and suture. The body whorl is large and measures about $\frac{2}{3}$ of the height of the shell. — Aperture large, ovate, angled above and well rounded below, not expanded. Peristome moderately thickened, at least in the specimens available for description; flattened, connected by a parietal callus. — Operculum thin, brittle, translucent, corneous, paucispiral; nucleus placed near the lower part of the columellar margin.

Size: A 2.8-3.1 mm; D 1.8-2.0 mm.

Animal with large black dots and small sand-coloured spots. — Radula with trapezoidal rhachis. Cutting edge of the rhachis with one simple, large, squarish cusp; there are 3 basal cusps on either side. The wings are fingershaped. The

laterals have the cusp formula 2-1-2, but the inner endocone is in reality only an accessory point of the mesocone. The inner marginals have 7 cusps, the outer 5.

Type locality: Mekong at Sambor, North Cambodia.

Distribution: Known from the type locality only.

Material: Holotype SMRL 16309/A; paratypes 16309/4.

Etiology: This species is dedicated to the memory of AUGUSTE PAVIE, meritorious French diplomat and amateur scientist, who contributed so much to our zoological knowledge of Southeast Asia.

***Hydrorissoia cambodiensis* n. sp.**

pl. 13 fig. 3, textfig. 3.

Diagnosis: A species of *Hydrorissoia* BAVAY, which differs from its closest relatives, *elongata* BAVAY and *hospitalis* BRANDT by its somewhat larger size, darker colour, more compressed body whorl and by having its upper spiral ridge ornamented with tubercles which may extend towards the suture and thus form short, subsutural riblets.

Description: Shell rather large or of medium size for the genus, ovate-conoidal, solid, translucent, of rather dark greenish-olive colour, somewhat glossy. The 5 whorls increase regularly in size and are separated by a shallow suture. The whorls are almost flat, at least not as convex as in *hospitalis* and *elongata*. The body whorl is large and measures about $\frac{3}{5}$ of the length of the shell. It is somewhat compressed ventro-dorsally and flattened in front. The macrosculpture consists of a peripheral spiral ridge and/or one or two spiral rows of obtuse tubercles. These may sometimes flow together or can be extended towards the suture thus forming short subsutural riblets. — The aperture is large and oval, but it is only slightly exerted, much less so than in *elongata*. Peristome thick, connected by a thick parietal and columellar callus. — Operculum ovate, thin, corneous, paucispiral with almost marginal nucleus.

Size: A 3.8-4.6 mm; D 1.9-2.2 mm; d 1.6-1.9 mm.

Animal bright-grey, everywhere stained with small black dots which are particularly dense on the rostrum. The sand-coloured pigmentation is particularly dense at the sides of the back. On the front part of the foot and at the tip of the rostrum the yellow pigmentation may merge into a lemon-colour or rarely into orange. Rostrum short and broad, about $\frac{1}{3}$ of the length of the long, round, slender tentacles. The eyes are placed in moderate swellings at the upper side of the bases of the tentacles. The fecal pellets are small and elongately oval. — Radula with trapezoidal rhachis; its cutting edge is simple and broadly rounded below. There are 3 basal cusps on either side. The wings are finger-shaped. The cusp formula of the laterals is 3-1-4, the inner marginals have 10 cusps, the outer 7 to 8.

Type locality: Mekong at Sambor, North Cambodia.

Distribution: Known from the Mekong between Sambor and Samboc.

Habitat: The species is found in the rapids near Samboc as well as in quiet parts of the river near Sambor. It is easily trapped with all kinds of cellulose and takes to even newspaper, papersacks and cardboard as food.

Material: Holotype SMRL 16296/A; paratypes 16296/200. — SMRL 16267 Mekong at Sandan; 16298 - Mekong at Samboc.

***Paraprososthenia* ANNANDALE, 1919.**

***Paraprososthenia iijimai* n. sp.**

pl. 13 fig. 4, textfig. 4.

Diagnosis: A species of *Paraprososthenia* ANNANDALE, 1919, which differs from its closest relative, *P. levayi* (BAVAY) by its smaller size and more delicate and more numerous tubercles.

Description: Shell elongately turreted, small, thin, but rather solid, somewhat translucent, dull, of dirty-yellow colour. The 7 whorls increase slowly in size. They are somewhat convex and separated by a rather shallow suture. The mammillate apex is smooth, the other five whorls are sculptured with two rows of tubercles. There are 14-16 tubercles in each spiral row on the penultimate whorls. A delicate spiral ridge may sometimes be seen above the suture. The body whorl has the two above described spiral rows of tubercles on the upper half, one spiral ridge on the periphery and two on the lower half, one spiral ridge may sometimes be wanting. Rarely the two upper spiral rows of tubercles are also transformed into solid spiral ridges. The ridges are crossed by rather coarse growth lines which give the ridges a delicately serrate appearance. — The aperture is small, not expanded, pear-shaped; the peristome is somewhat extended or reflexed, thickened without and flattened. — Operculum ovate, corneous, thin, translucent, paucispiral, nucleus near the columellar margin in the lower half.

Size: A 3.4-4.9 mm; D (with aperture) 1.3-2.0 mm.

Animal of light grey colour with fine black and sand-coloured pigment dots dusted over head, back and rostrum. The mantle shows few large black patches. The tentacles are thin and round, they are of more than the double length of the rostrum. The eyes are placed in delicate swellings at the bases of the tentacles. — The cutting edge of the rhachis has generally 4 cusps on either side of the middle cusp and 4 basal cusps on either side. Laterals with the formula 4-1-12 (11-13), inner marginals with 20 cusps, outer with 12. — Male reproductive organs with simple verge with a single duct and no appendages.

Type locality: Mekong at Bandan, East Thailand.

Distribution: Known from the Mekong between the type locality and Sambor in North Cambodia.

Material: Holotype SMRL 5119/A; paratypes 5119/30. — SMRL 5120/20 - Mekong at Ban Khum, north of Bandan; 5129/20 - Mouth of Mun river at Bandan; 5140 Mun river at Pibun Mangsahan; 16305/30 Mekong at Sambor, Cambodia; 16367/25 - Mekong opposite Bandan.

Etiology: The species is dedicated to Dr. TOSHIHIKO IIJIMA, Japan.

***Paraprososthenia fischerpiettei* n. sp.**

pl. 13 fig. 5, textfig. 5.

Diagnosis: A species of *Paraprososthenia* ANNANDALE, which differs from all other species of this genus by its rudimentary or obsolete spiral ridges and by its spiral microsculpture.

Description: Shell of medium size for the genus, rather solid, diaphanous, somewhat glossy and with a silky lustre caused by a delicate microsculpture of spiral lines and growth lines. The typical spiral ridges are either rudimentary or completely obsolete. The $6\frac{1}{2}$ whorls are only little convex; they increase regularly in size and are separated by a rather deeply incised suture. Body whorl large, more than $\frac{5}{8}$ of the length of the shell. There is a very obtuse angle below the suture. When spiral ridges are present, one is placed at the periphery of the body whorl and one below it. — Aperture large, exerted, oval; peristome thick, continued, appressed to the penultimate whorl. — Operculum ovate, thin, translucent, paucispiral with its nucleus placed near the lower half of the columellar margin.

Size: A 4.5-5.8 mm; D 2.0-2.9 mm.

Animal bright grey with few black and many whitish pigment dots. Tentacles round, filiform. The eyes are placed in its bases without noticeable swellings. Verge of the male reproductive organs simple, prong-shaped, with a single duct and without appendages. — The rhachis of the radula has a triangular cutting edge with 4 or 5 cusps on either side of the middle cusp. There are 4 or 5 basal cusps on either side of the trapezoidal plate. The laterals have the cusp formula (2) 3-1-7 (-9), the inner marginals have 13-15 cusps, the outer 10-12. One specimen had outer marginals with 6 cusps only.

Type locality: Mekong at Sambor.

Distribution: Known from the Mekong at Sambor and from the Sedone river near Khong Sedone, South Laos.

Variability: The populations differ in the reduction of the spiral ridges; that from the type locality shows weak spiral ridges while that from the Sedone river shows spiral ridges only in 3% of the specimens. The specimens from the Sedone river have 5 cusps on either side of the cutting edge and 5 basal cusps, those from the type locality have only 4.

Material: Holotype SMRL 16301/A; paratypes 16301/50. — SMRL 16118/50 - Sedone river at Khong Sedone, Laos.

Etiology: It gives me great pleasure to dedicate this species to Prof. E. FISCHER-PIETTE in Paris, whose unselfish help during this survey was truly appreciated.

***Paraprososthenia hansenii* n. sp.**

pl. 13 fig. 6, textfig. 6.

Diagnosis: A species of *Paraprososthenia* ANNANDALE, which differs from *P. bollingi* n. by its larger size, more convex whorls and produced outer margin of the peristome.

Description: Shell regularly conic, with 6 almost flat whorls which are separated by a shallow suture. The protoconch is smooth, the postnuclear whorls are sculptured with 3 (sometimes only 1 or 2) obtuse spiral ridges and the last two whorls have three regular spiral rows of obtuse tubercles between the suture and periphery. On the body whorl there is a fourth row somewhat below the periphery and a fifth weak spiral ridge around the umbilical pit. Colour white or yellowish-white, diaphanous; the shell is glossy and translucent. Umbilicus very narrow, chinklike. — Aperture small, angled above and well rounded below, about half the size of the body whorl. Peristome moderately thick, ap-

pressed to the penultimate whorl, barely expanded. — Operculum ovate, thin, corneous, paucispiral; nucleus near the lower half of the columellar margin.

Size: 5.5-7.0 mm; D 3.0-3.2 mm.

Animal light yellowish-grey, with only few fine black pigment spots, but dense lemon-coloured pigmentation on the tip of the rostrum and the tentacles and few yellow spots dusted over head and back. — Rhachis of the radula trapezoidal, with broad, triangular cutting edge which carries 3 or 4 very delicate lateral cusps on either side of the middle cusp. There are (3 or) 4 basal cusps on either side. Laterals with the cusp formula 3-1-8, inner marginals with 17 cusps (12-14) and outer marginals with 8-10 cusps.

Type locality: Mekong at Sambor in Cambodia.

Distribution: Known from the Mekong at Bandan, Khong Island and Sambor.

Biology: The species lives in the rapids on stones and feeds on algae.

Material: Holotype SMRL 16312/A; paratypes 16312/10. — SMRL 16085/35 - Mekong at Khong Island, Laos; 3475/2 - Mekong at Bandan, Thailand.

Etiology: This species is dedicated to Col. JAMES L. HANSEN, WRAMC, former director of the SMRL in Bangkok.

***Paraprososthenia adami* n. sp.**

pl. 13 fig. 7, textfig. 7

Diagnosis: A species of *Paraprososthenia* ANNANDALE, which differs from its closest relative, *P. vivonai* BRANDT, by its smaller size, thinner texture and weaker or partly wanting sculpture.

Description: Shell rather small for the genus, elongately cylindrical or turreted, thin, translucent, whitish, glossy, with delicate growth lines and sometimes with very fine, irregular spiral microsculpture. The 7 to 8 whorls are either completely flat or only moderately convex. Young specimens are almost always keeled below the periphery, adults are sometimes. Generally this keel carries obtuse tubercles; normally the keel is seen on the upper whorls a little above the suture. The part of the whorls between this keel and the upper suture is either smooth or sculptured with one, two or three spiral rows of tubercles which only rarely form solid spiral ridges. On the base of the body whorl there may be another spiral row of tubercles. The two apical whorls are always smooth. The umbilicus is closed or a narrow chink. The body whorl measures about $\frac{3}{7}$ to $\frac{1}{2}$ of the length of the shell. — The aperture is ovate, about $\frac{1}{2}$ of the length of the body whorl; it is not expanded; peristome not extended, connected by a thin parietal callus; outer margin somewhat tongue-like produced, columellar margin regularly curved. — Operculum oval, thin, corneous, translucent, paucispiral; nucleus placed near the lower part of the columellar margin.

Size: A 3.8-6.8 mm; D 1.5-2.3 mm.

Variability: The shell varies considerably in size, convexity of the whorls and spiral sculpture.

Animal light grey with whitish and black pigmentation dusted over head and back. Sole sand-coloured with deeply embedded white pigment dots, particularly near its margin. — Radula with trapezoidal rhachis with finger-shaped wings. The triangular cutting edge has a pointed mesocone and 4 small cusps on

either side. There are 3 basal cusps on each side near the wings. Laterals with the formula 3-1-8, inner marginals with 11 cusps, outer marginals with 9. — Male reproductive organs with simple verge with one duct and without appendages.

Type locality: Mekong at Sambor, Combodia.

Distribution: Known from the type locality only.

Material: Holotype SMRL 16302/A; paratypes 16302/70.

Etiology: The species is dedicated to Prof. W. ADAM in Brussels in grateful acknowledgment for rendered help.

***Paraprososthenia acicula* n. sp.**

pl. 13 fig. 8, textfig. 8.

Diagnosis: A species of *Paraprososthenia* ANNANDALE, which differs from *P. vivonai* BRANDT, its closest relative, by its smaller size, much more slender shape and extremely pointed apex.

Description: Shell of medium size for the genus, very slender, elongately conical with very pointed apex and narrow body whorl; diaphanous, glossy, whitish, thin; the 8 whorls are scarcely convex and increase regularly in size; suture very shallow; apex smooth, the remaining whorls sculptured with two to five, generally four, spiral ridges, two between periphery and suture, one on the periphery and one below it. A fifth ridge may sometimes appear on the base of the body whorl. — Aperture broadly oval or almost circular; it is somewhat exerted and relatively large. Peristome hardly thickened, continuous, regularly rounded, appressed to the penultimate whorl. — Operculum broadly oval, thin, translucent, corneous, paucispiral; nucleus placed near the lower part of the columellar margin.

Size: A 4.5-7.0 mm; D 1.1-2.4 mm.

Radula with trapezoidal rhachis; its cutting edge has a small, pointed mesocone and 4 very small cusps on either side of it. There are 5 basal cusps on either side, the innermost being the largest. The laterals have the cusp formula 2-1-6 (-8), the inner marginals 10(-14)-1-3(-4), the outer marginals have 10 cusps. — Male reproductive organs with a simple, prong-shaped verge. It has no appendages and only a single duct. No data on the pigmentation can be given, as only specimens preserved in alcohol were available for description.

Type locality: Mekong at Sambor, Cambodia.

Distribution: Mekong between Khong Island in Laos and Sambor.

Material: Holotype SMRL 16314/A; paratypes 16314/25. — SMRL 16318/20 - Mekong at Ban Na, Khong Island, Laos.

***Paraprososthenia bollingi* n. sp.**

pl. 13 fig. 9, textfig. 9.

Diagnosis: A species of *Paraprososthenia* ANNANDALE, which differs from its closest relative, *P. hanseni* BRANDT, by its flattened whorls and curved outer margin of the peristome. From *P. adami* BRANDT it differs by its broader shape and larger aperture.

Description: Shell of medium size for the genus, thin to moderately thick, with 6 almost flat whorls which increase regularly in size and which are separated by a very shallow suture. The shell is either smooth save the delicate growth lines, with only a subperipheral keel, or shows one to five spiral ridges. The specimens on which this description is based show either no keel at all, one keel at the periphery, or two keels of which one is at the periphery and the other keel either below or above it. The fourth keel appears below the suture or on the base of the body whorl, the fifth is, when present, a weak spiral line around the umbilical pit. The spiral ridges may be tuberculated. The body whorl measures $\frac{3}{5}$ - $\frac{2}{5}$ of the length of the shell. Umbilicus closed or chink-like. — Aperture large, ovate, somewhat exserted, measuring $\frac{2}{5}$ - $\frac{1}{3}$ of the length of the shell. Peristome moderately expanded, not very much thickened, continuous, appressed to the penultimate whorl, outer margin sinuously protracted like in *Wattebledia*. — Operculum oval, thin, corneous, translucent, paucispiral; nucleus near the lower part of the columellar margin.

Size: A 3.0-5.6 mm; D 1.7-2.4 mm.

Animal greyish with black and white pigment spots dusted over head and back. — The trapezoidal rhachis with triangular cutting edge which carries 5 small cusps on either side of the mesocone. There are 4 basal cusps on either side of the plate beside the finger-shaped wings, the innermost being the largest. Laterals with the cusp formula 3-1-8, inner marginals (21-23)-5, outer marginals with about 18 cusps. — Male reproductive organs with simple verge without appendages and with a simple duct.

Type locality: Mekong at Sambor, Cambodia.

Distribution: Mekong in South Laos and North Cambodia.

Material: Holotype SMRL 16303/A; paratypes 16303/30. — SMRL 16080/10 - Mekong at Sompamit Fall, Khone, Laos.

Relationship: This species is closely related to *P. hanseni* n. and forms with this species a small group within the genus which differs from all other species of the genus previously described by the short, stout shell which is not turriculated like those of the other species.

***Pachydrobia* CROSSE & FISCHER, 1876.**

***Pachydrobia poirieri* n. sp.**

pl. 13 fig. 10, textfig. 10.

Diagnosis: A species of *Pachydrobia* CROSSE & FISCHER, which differs from *P. harmandi* POIRIER by its smaller size, more slender shape, longer ribs and exserted aperture. It is the smallest species of this genus, since all previously described *Pachydrobia* without sculpture are now assigned to other genera.

Description: Shell small for the genus, with narrow, regularly conic spire and large, exserted aperture. The 6 whorls are only moderately convex, but are separated by a rather deeply incised suture. The protoconch is smooth, the remaining whorls are sculptured with broad, obtuse, straight axial ribs. The body whorl shows a very obtuse subperipheral keel; below this keel the ribs become coarse striae only. The body whorl measures about $\frac{2}{3}$ of the length of the shell. It carries 9 to 11 ribs. — The large aperture is ovate; it is angled above

and well rounded below; at the outer margin it is somewhat expanded; the peristome is connected by a thick parietal callus. In young specimens it is moderately thick and somewhat extended at the outer margin, in old specimens it is extremely thick and shows the growth lines. The surface of the shell shows fine growth lines between the ribs. The subperipheral carina is often very delicately and irregularly tuberculated. — The operculum is ovate, brownish-corneous, thin, transparent, paucispiral, with subcentral nucleus. The umbilicus is closed.

Size: A (3.3-) 5.5-7.2 mm; D (2-) 3.0-3.8 mm.

Animal of very bright-grey colour with few black pigment spots; a whitish pigmentation is dusted over head, rostrum, tentacles and the sides of the back. — The radula differs considerably from that of other *Pachydrobia* species by being similar to that of *Jullienia*. The rhachis has a triangular cutting edge with 7 small cusps on either side of the large central cusp. There are 4 basal cusps on either side. The laterals have the cusp formula 5-1-15, the inner marginals (22-25)-1-(5-7) and the outer marginals have 21-22 cusps.

Type locality: Mekong at Sambor, Cambodia.

Distribution: Known from the Mekong between Khong Island and Sambor.

Material: Holotype SMRL 16306/A; paratypes 16306/50. — SMRL 16268/3 - Mekong at Sompamit Falls, Khone, Laos; 16364/5 - Mekong at Ban Na, Khong Island, Laos.

Etiology: This species is dedicated to the memory of J. POIRIER, French scientist, who contributed so much to our knowledge of Asian malacology.

Relationship: This species is only tentatively placed into this genus where it deserves a separate place beside all other species. It looks like a rather short, small *Hubendickia* with thick peristome like that of *Pachydrobia*, *Pachydrobiella* and *Jullienia*.

***Pachydrobia bavayi* n. sp.**

pl. 13 fig. 11, textfig. 11.

Diagnosis: A species of Lithoglyphinae only tentatively assigned to the genus *Pachydrobia* CROSSE & FISCHER, which differs from all other species of this genus by its very slender shape and complete lack of sculpture.

Description: Shell small for the genus, slenderly ovate-conoidal with large body whorl and large aperture; rather thick when adult but thin when young; of whitish ground colour but covered with a strong periderm which is olive or straw-coloured in young specimens and greyish or even blackish in old specimens. Young specimens are somewhat translucent, old are not. The sculpture consists of fine growth lines only which may be crossed by delicate spiral microlines which disappear with age; young specimens, therefore, have often a silky lustre. The 6½ whorls are only moderately convex and are separated by a rather shallow suture. The body whorl measures about ⅝ of the length of the shell. The umbilicus is completely closed. — The aperture is large and ovate, but not expanded. It is white within. The peristome is very thick in adult specimens and shows distinctly the growth lines. It is connected by a parietal callus. The suture is sometimes margined with a very delicate subsutural sulcus. — The operculum is ovate, corneous, thin, translucent, paucispiral with subcentral nucleus.

Size: A 5.0-7.8 mm; D 2.8-3.4 mm.

Animal slate-grey with black and sand-coloured pigmentation. Rostrum truncate, somewhat tapering towards the tip. Tentacles of more than double the length of that of the rostrum, round, filiform. The eyes are placed in moderate swellings at the bases of the tentacles. Foot rounded behind, almost straight in front. — Radula with trapezoidal rhachis. Cutting edge of the rhachis with 2 cusps on either side of the mesocone; base of the rhachis with semicircular process. Between this process and the wings there are 3 to 4 basal cusps on either side, the innermost cusp being the largest. Laterals with the cusp formula 3-1-4, the inner marginals have 7 cusps, the outer have 11. — The verge of the male reproductive organs is long, bent and prong-shaped. It has a single duct and no appendages.

Type locality: Mekong at Kratie in Cambodia.

Distribution: Mekong between Khong Island and Kratie.

Biology: The animals live on sandy ground in quiet parts of the river. They have not been found in rapids. They feed on decaying matter which they find in the sand.

Material: Holotype SMRL 16285/A; paratypes 16285/200. — SMRL 16139/100 - Mekong at Muang Khong hospital, Laos; 16140/100 - Mekong near wat N of Muang Khong; 16193/5 - Mekong at Sambor, N of Kratie.

This species was independently found by Mr. PRASONG TEMCHAROEN on Khong Island (February 1968) and by D. JOLIE, Pasteur Institute at Phnom Penh, near Kratie in November 1968.

Parasitology: This species is now the first suspect, among other species (*Manningiella*, *Hydrorissioia*), of being an intermediate host of *Schistosoma japonicum* in the Mekong valley at Khong and Kratie. This species was artificially infected with miracidia from Laotian patients with schistosomiasis, but as all snails died before the cercariae matured, the definitive proof, therefore, is still lacking. At Kratie the present author collected large numbers of specimens of this species together with *Pachydrobia spinosa* and three species of *Stenothyra* (*mcmulleni* n., *basisculpta* n. and an undescribed species). These species live directly below the floating villages near Kratie where a high percentage of schistosomiasis was found (personal communication from the Ministry of Public Health in Phnom Penh). This species was the only gastropod which accepted miracidia of *Schistosoma japonicum* when the snail species from Kratie were exposed to them. This species has also been found at Bandan.

***Pachydrobia mcmulleni* n. sp.**

pl. 13 fig. 12, textfig. 12.

Diagnosis: A species of *Pachydrobia* CROSSE & FISCHER, which differs from *P. bavayi* n. by its larger size and by its dorsal tubercle; from all other species of this genus it differs by its slender shape and lack of axial sculpture.

Description: Shell slenderly ovate-conoidal, thick and solid, barely translucent, covered with a yellowish- or greenish-olive periderm; glossy and smooth except for the irregular and coarse growth lines; there are traces of a microsculpture which is typical for *bavayi*, and two delicate spiral grooves may be seen on the lower half of the body whorl. The spire is slenderly conic, the body whorl ovoidal; it measures about $\frac{2}{3}$ of the length of the shell; it carries

on the back a distinct tubercle and is "bossed" at the left side of the ventral face; the ventral side is moderately flattened. The 6 whorls increase regularly in size; they are moderately convex and separated by a shallow, but well incised suture. The upper part of the body whorl below the suture is somewhat concave. There are generally two very delicate spiral grooves on the base of the body whorl. — Aperture almost semicircular, whitish within. Peristome extremely thick, olive-coloured, showing distinctly the lines of growth. It is connected by a strong, straight parietal callus. — Operculum semicircular, extremely thin, corneous, paucispiral with lateral nucleus.

Size: A 7.5-8.5 mm; D 3.7-4.3 mm.

Animal slate-grey with black and whitish pigmentation. The black pigmentation consists of diffuse dots and patches, the whitish of deeply embedded pigment granules. — The radula has a rounded-trapezoidal rhachis with 5 cusps on the cutting edge and 4 basal cusps on either side. The innermost cusps are the largest. The wings are broadly finger-shaped. Laterals with the cusp formula 3-1-3(4), inner marginals with 7 cusps, outer with 5.

Type locality: Mekong branch at Phung Krangcham about 16 km SW of Stung Treng. This is the western branch of the Mekong at Kas (= island) Satay.

Distribution: Known from the type locality only.

Material: Holotype SMRL 16053/A; paratypes 16053/3.

Etiology: This species is dedicated to the memory of DONALD B. McMULLEN, formerly at WRAIR in Washington, D. C.

Relationship: This species is only related to *P. bavayi* and seems to connect this unique species with the other species of the genus. It has the slender shape of *bavayi*, but the tubercle and lateral boss known from several other species. The axial macrosculpture is missing, but traces of a spiral microsculpture which is well developed in *bavayi* may be seen under strong magnification.

***Manningiella* n. gen.**

Diagnosis: A genus of Lithoglyphinae (Hydrobiidae) which differs from *Hubendickia* BRANDT by its complete lack of macrosculpture. From *Pachydrobia* it differs also by having a thin lip and from all other genera it differs by its fusiform or cylindrical shape.

Description: Shell of medium or small size for the subfamily, corneous, thin, sometimes covered with a thick greenish or brownish periderm, generally transparent, at least when young; without any trace of macrosculpture, but sometimes with irregular spiral microsculpture; of pupa-like shape or fusiform, cylindrical or ovate-conoidal. — Aperture somewhat expanded, with extended peristome which sometimes protrudes at the base; the peristome is never thickened as in *Hydrorissoia* or *Pachydrobia*. — Operculum ovate, corneous, paucispiral, translucent; nucleus near the lower half of the columellar margin.

The greyish or sand-coloured animal is dusted with black and yellow pigment dots. The tentacles are thin, round, of twice the length of the truncate rostrum. The eyes are placed in moderate swellings at the bases of the tentacles. The animal has neither food-groove nor suprapedal fold. — Radula with trapezoidal rhachis. Cutting edge with several cusps; there are also 3 or 4 basal

cusps on either side. Laterals with few cusps, marginals generally with more than 10 cusps. — The male reproductive organs have a simple verge with one duct and without appendages.

Type species: *Manningiella polita* n. sp.; another species: „*Pachydrobia*“ *pellucida* BAVAY.

Distribution: Mekong in Thailand, Laos and Cambodia.

***Manningiella polita* n. sp.**

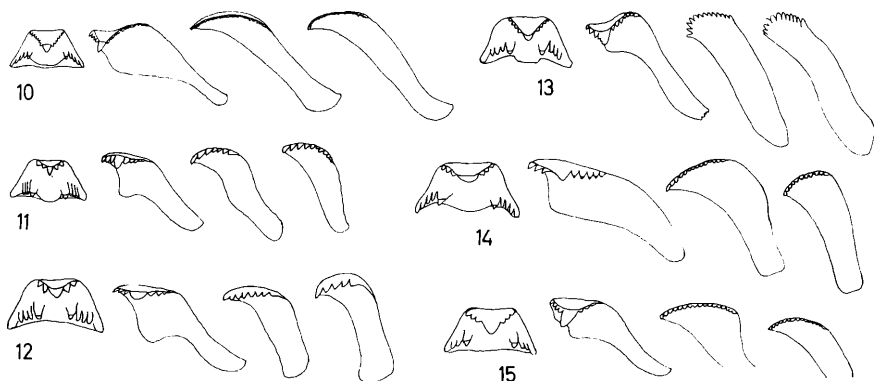
pl. 13 fig. 13, textfig. 13.

Diagnosis: A species of *Manningiella* n. which differs from *M. pellucida* (BAVAY) by its shorter and more ovate shape and by its expanded aperture.

Description: Shell of medium or large size for the genus, ovate-conoidal or fusiform, rarely somewhat cylindrical, rather thin, moderately glossy, greyish or yellowish-corneous, translucent, smooth except for the delicate growth lines. Under strong magnification rudiments of a spiral microsculpture may be found. The 6 whorls are somewhat convex and separated by a rather shallow, but distinct suture. Apex obtuse. The body whorl measures $\frac{3}{5}$ of the length of the shell. Umbilicus covered. — Aperture ovate, angled above and well rounded below. Peristome somewhat extended, connected by a parietal callus, with a thin lip, columellar margin curved. — Operculum thin, ovate, translucent, corneous, paucispiral with eccentric nucleus.

Size: A 3.5-5.1 mm; D 2.2-2.7 mm.

Animal of light grey colour with whitish and sand-coloured pigment spots and black patches. — The radula has a trapezoidal rhachis with a triangular cutting edge; this carries 4 small cusps on either side of the mesocone. One examined specimen had as an abnormality 7 cusps on either side. Base of the rhachis



Textfig. 10-15. Radula, half-row. — 10) *Pachydrobia poirieri* n. sp.; 11) *Pachydrobia bavayi* n. sp.; 12) *Pachydrobia mcmulleni* n. sp.; 13) *Manningiella polita* n. g. n. sp.; 14) *Manningiella expansa* n. sp.; 15) *Manningiella cambodiensis* n. sp.

with a semicircular process and finger-shaped wings. Between the wings and the process there are 4 basal cusps on either side, the innermost being the largest. Laterals with the cusp formula 3-1-6; the mesocone is serrate at the inner side. Inner marginals with 13-15 cusps, inner marginals with 10-12. — The male reproductive organs have a simple, prong-shaped verge with a single duct and no appendages.

Type locality: Mekong at Bandan in East Thailand.

Distribution: Known from the Mekong around Bandan. A doubtful lot of 4 specimens is supposed to be found at the Sompamit Falls near Khone in South Laos.

Material: Holotype SMRL 3377/A; paratypes 3377/1000. — SMRL 16361/2000 Mekong opposite Bandan; 5103/200 - Mekong at Ban Khum, N of Bandan; 5104/2000 Mouth of Mun river, S of Bandan; 16094/4 Mekong branch at Sompamit Falls, Laos.

Relationship: This species forms with *M. pellucida* (BAVAY, 1895) a small group within the genus. The following two species form another group which may even deserve sugeneric rank.

***Manningiella expansa* n. sp.**

pl. 13 fig. 14, textfig. 14.

Diagnosis: A species of *Manningiella* n. which differs from the type species and all other previously described species of the genus by its protruding basal part of the peristome and the thick greenish periderm.

Description: Shell of medium or large size for the genus, ovate or ovoid-conic, thin, but solid, translucent, whitish or corneous, but covered with a thick olive-green or brown periderm. The 6 whorls are almost flat or moderately convex. The apex is generally eroded. The sculpture consists of fine growth lines only. Traces of an obsolete spiral microsculpture are sometimes still visible. The body whorl measures $\frac{1}{2}$ or more of the length of the shell. Umbilicus closed or chink-like. — Aperture obliquely ovate with almost straight parietal margin; somewhat expanded, brownish within, glossy. Peristome moderately thick, connected by a straight parietal callus; appressed to the penultimate whorl; brownish and glossy; it protrudes distinctly at the base and is somewhat extended at the outer margin; at the base it may even form a beak. — Operculum oval, thin, translucent, corneous, paucispiral, with basal nucleus.

Size: A 4.0-8.2 mm; D 2.0-4.0 mm.

Animal slate-coloured, with conspicuously greenish or lemon-coloured tentacles; the tip of the truncate rostrum is of yellowish-green colour. Back, head and rostrum are dusted with fine black pigment dots. These are mixed with fine yellow pigment dots which give the animal a brownish tint. The eyes are placed into moderate swellings at the bases of the tentacles. The ovate foot is of lighter colour. — Radula with trapezoidal rhachis. Its triangular cutting edge carries 3 or 4 cusp on either side of the pointed central cusp. There are 3 (or 4) basal cusps on either side. Laterals with the cusp formula 3-1-4, inner marginals with 10-12 cusps, outer marginals with 8.

Type locality: Mekong at Muang Khong, near Wat, on Khong Island, Laos.

Distribution: Mekong from Bandan to Sandan, N of Kratie.

Material: Holotype SMRL 16288/A; paratypes 16288/90. — SMRL 1098/10 - Mekong at Bandan in Thailand; 5132/10 - Mouth of Mun river at Bandan; 16119/20

Mekong at Sompamit Falls, Khone, Laos; 16120/5 - Mekong at Done Houat, N of Khong; 16125/50 - Mekong at Muang Khong hospital; 16266 - Mekong at Ban Na, Khong Island; 16267 - Mekong opposite Bandan; 16277/10 - Mekong at Sambor, N of Kratie, Cambodia; 16289/5 - Mekong at Sandan, N of Kratie; 16290/5 - Mekong at Samboc, N of Kratie.

Parasitology: This species was accepted by *Schistosoma* miracidia obtained from patients from Khong Island, but development of cercariae has not yet been observed. At the foci of schistosomiasis at Kratie this species was not found. No infected snails have been found at and near Khong.

Biology: The species lives under stones and at rocks in the rapids of the Mekong. It has never been found at quiet, sandy parts of the river. The nearest locality from Kratie was at Samboc, about 14 km N of Kratie.

***Manningiella cambodiensis* n. sp.**

pl. 13 fig. 15, textfig. 15.

Diagnosis: A species of *Manningiella* n. which differs from its closest relative, *M. expansa* n., by its much smaller size and more cylindrical shape. The colour of its periderm is much darker than that of *expansa*.

Description: Shell rather small for the genus, cylindrical when eroded, ovate-conoidal or fusiform when complete. Ground colour white, but covered with a thick periderm which is bright green in young specimens, but which changes into a dark brownish-olive colour with age. Young specimens are translucent and somewhat glossy, old specimens are dull and only slightly transparent. The 5 almost flat whorls are separated by a shallow, simple suture; the first two or three whorls are generally eroded, more often so in old specimens than in young. The large, pupaeform body whorl measures about $\frac{1}{2}$ the length of the complete shell. — Aperture large, glossy and brownish within; it is somewhat expanded. Peristome extended, moderately thickened, but not lipped. It is connected by a thick, glossy parietal callus; it is angled above and well rounded at the outer lower margin; below the columella it forms an angle, but is not so conspicuously protruded as in *M. expansa*. — The operculum is oval, corneous, paucispiral; nucleus near the lower part of the columellar margin.

Size: A (complete) 3.0-3.6 mm; D 1.4-1.7 mm.

Animal slate-grey, tentacles and tip of rostrum yellow; the other parts of the body are dusted with densely placed minute black pigment spots. There are a few large black patches on the mantle lobe; these are bordered by an orange-coloured margin. The eyes are placed deeply inside the bases of the tentacles without swellings. — Radula with trapezoidal rhachis with 5 to 7 cusps on the cutting edge and with 3 basal cusps on either side, the innermost being the largest. The laterals have the cusp formula 4-1-3, the inner marginals have 17 cusps, the outer 15. — Male reproductive organs with simple verge with one duct only and without appendages.

Type locality: Mekong river at Sambor, Cambodia.

Distribution: Known from the Mekong between Khong and Sambor only.

Material: Holotype SMRL 16276/A; paratypes 16276/30. — SMFRL 16264/6 - Mekong branch at Sompamit Falls, Laos; 16323/80 - Mekong at Ban Na, Khong Island, Laos.

Discussion: In spite of the great variability of *M. expansa* this species is well defined and cannot be confused with the preceding species. This species forms, together with *expansa*, a small group within the genus. This group differs from the type species mainly by its expanded peristome and the thick periderm. It may well deserve an own subgeneric name.

Jullienia CROSSE & FISCHER, 1876.

Jullienia microsculpta n. sp.

pl. 13 fig. 16, textfig. 16.

Diagnosis: A species of *Jullienia* CROSSE & FISCHER, which differs from all other species of the genus by its small size and by its spiral microsculpture.

Description: Shell small for the genus, ovoidal-conic, somewhat ear-shaped, rather thin, translucent, diaphanous, sculptured with numerous delicate spiral ridges and with a spiral microsculpture which is crossed by the fine growth lines. The $3\frac{1}{2}$ whorls are moderately convex and increase rapidly in size. The body whorl is large and inflated and measures about $\frac{9}{10}$ of the height of the shell. The microsculpture renders the shell a silky lustre. — The aperture is large, semicircular and extended. The peristome is thick but less so than in the other species of the genus. It measures about $\frac{7}{10}$ of the length of the shell. The ventral side of the body whorl is not flattened, only the periomphalic area which is in the middle somewhat concave. The peristome is connected by a thick columellar callus which is somewhat thickened in the middle. — Operculum semicircular, thin, brownish-corneous, paucispiral, nucleus near the lower half of the columellar margin.

Size: A 3.5-4.5 mm; D 2.8-4.0 mm.

Radula with trapezoidal rhachis. Cutting edge with a large, pointed mesocone and 4 or 5 small cusps on either side of it. There are 4 basal cusps, the innermost being the largest. Laterals with the cusp formula 2-1-(5-6), inner marginals with 14 cusps, outer with 9.

Type locality: Mekong at Sambor, Cambodia.

Distribution: Mekong between Khong Island and Sambor.

Material: Holotype SMRL 16410/A. — SMRL 16411/3 - Mekong at Ban Na, Khong Island.

Jullienia poirieri n. sp.

pl. 13 fig. 17, textfig. 17.

Diagnosis: A species of *Jullienia* CROSSE & FISCHER, which differs from *J. microsculpta* by its four strong spiral ridges and the lack of any microsculpture and from all other species of this genus by its small size.

Description: Shell small for the genus, subglobose-conoidal, rather thin but solid, diaphanous, with $3\frac{1}{2}$ rapidly increasing whorls. The apex is smooth, the remaining whorls are sculptured with four to six distinct spiral ridges, three between periphery and suture, one at the periphery and often two accessory ridges on the lower half of the body whorl. Body whorl large, inflated, measuring about $\frac{5}{6}$ of the height of the shell. It is not ventrally flattened, only the

periomphalic area is somewhat flattened or even concave. — The aperture is large, ear-shaped, semicircular; peristome thick, continued by a thick columellar callus; this carries an obtuse denticle in the middle. — Operculum semicircular, thin, brownish, paucispiral, nucleus near the lower part of the columellar margin.

Size: A 2.8-3.5 mm; D 2.0-2.8 mm.

Radula with trapezoidal rhachis; its cutting edge with 1 large, pointed mesocone and 4 small cusps on either side. There are 4 basal cusps on either side, the innermost being the largest. Laterals with the cusp formula 2-1-4, inner marginals with 13 cusps, outer with 8.

Type locality: Mekong at Sambor, Cambodia.

Distribution: Mekong between Khone and Sambor.

Material: Holotype SMRL 16333/A; paratypes 16333/3. — SMRL 16412/1 Mekong at Sompamit Falls, Laos.

Relationship: These two species form a special group within the genus *Jullienia*; it differs from the other species by its small size, subglobose conic shape and by having only 4 (3-5) small cusps on either side of the cutting edge.

***Saduniella* n. gen.**

Diagnosis: A new genus of Lithoglyphinae (Hydrobiidae) which differs from all other genera of the subfamily by its compressed, planispiral shell. It differs from the species of Cochliopinae, which are also planispiral, by its yellowish pigmentation of the animal and by the simple verge which never carries appendages. It differs from the species of the family Tornidae by its colour pattern and by its lack of pallial processes. Cochliopinae, as well as Tornidae, have a chain of swellings at the left tentacle which is missing in this genus.

Description: For further details see below under the description of the monotype.

Type species: *Saduniella planispira* n. sp.

Distribution: Known from the Mekong between Khong Island in South Laos and Sambor in North Cambodia.

Etiology: The genus is dedicated to Dr. ELVIO SADUN, Walter Reed Army Institute of Research, Washington, D. C., whose parasitological studies in Thailand initiated our malacological surveys in Southeast Asia.

***Saduniella planispira* n. sp.**

pl. 13 fig. 18, textfig. 18.

Diagnosis: A species of *Saduniella* n. which differs from all other species of the family of Hydrobiinae by the characteristics given above under the genus.

Description: Shell greatly depressed, either completely flat or dome-shaped, moderately solid, transparent, somewhat glossy, dirty-greyish-brown. The 4 whorls increase rapidly in size; they are separated by a deeply incised suture. The protoconch appears almost smooth; the other whorls are sculptured, with three spiral ridges on the upper half and one spiral ridge on the periphery which sometimes can be seen just above the suture of the upper whorls. The base of the body whorl shows 4 or 5 more or less distinct spiral ridges. The upper and

lower spiral ridges may be raised to strong spiral pads or may be reduced to obtuse keels. The growth lines are very coarse. The umbilicus is deep and wide open. — Aperture moonshaped, oblique, not expanded; the peristome is slightly thickened; it is continous, with a deep, sinuous incision at the base and a tongue-shaped process at the outer margin between two incisions at the upper and outer margin. — Operculum round, paucispiral, with eccentric nucleus, corneous, with a conspicuous layer of nacreous substance bordering the sutures of the whorls, thus forming a spiral. This strange characteristic has never been seen in any other species of *Lithoglyphinae*.

Size: A 2.0-2.5 mm; D 4.2-4.7 mm; d 3.0-3.3 mm.

Animal light grey, with few black pigment spots which may form a reticulate pattern, and with many small sand-coloured and white pigment spots, particularly on the rostrum, on the tentacles and at the sides of the foot. — The radula shows the close relationship of this genus with *Lithoglyphopsis* THIELE. However, the cutting edge of the rhachis has 3 cusps on either side of the central cusp, that of *Lithoglyphopsis* is smooth. The shape of the rhachis is almost squarish. There is only one broad, cusp-like process on either side. The laterals have the cusp formula 4-1-7 (*Lithoglyphopsis* has only 3 large cusps); the inner marginals are similar to the laterals and have the formula 3-1-9, the outer marginals have 9 cusps.

Type locality: Mekong at Sambor, North Cambodia.

Distribution: Mekong between Khong Island and Sambor.

Material: Holotype SMRL 16272/A; paratypes 16272/20. — SMRL 16274/10 — Mekong at Ban Na, Khong Island, Laos.

Stenothyridae P. FISCHER, 1887.

Stenothyra BENSON, 1856.

Stenothyra basisculpta n. sp.

pl. 13 fig. 19, textfig. 19.

Diagnosis: A species of *Stenothyra* BENSON, which differs from *S. koratensis* BRANDT by its pitted spiral lines around the umbilical area of the body and by its regular spiral microsculpture on the endpart of the last whorl.

Description: Shell of medium size for the genus, ovate-conoidal or rarely somewhat cylindrical, with large penultimate whorl and swollen body whorl; thin, straw-coloured or corneous, translucent, fragile, somewhat glossy. Embryonic whorls generally, but not always, with pitted spiral lines which are missing on the postnuclear whorls, but appear again on the base of the body whorl around the umbilical chink. The 4 whorls are convex and separated by an incised suture which is not so deep between the last two whorls as between the upper whorls. It is generally as deeply incised as the suture of *koratensis*, but specimens with a shallow suture similar to that of *S. fasciata* are not rare. The more slender the shape of the shell, the deeper is the suture. Under strong magnification a strong spiral microsculpture is seen on the last half of the body whorl, particularly so on the end part near the aperture. — Aperture very small, constricted, oval or almost circular, oblique, with receding base. Peristome con-

tinuous, appressed to the penultimate whorl, moderately thickened within and with a delicate notch at the parietal wall. — Operculum almost circular; inner face with the typical two straight diverging ridges and the low, semicircular ridge parallel to the margin. The nucleus of the $3\frac{1}{2}$ whorls is almost central.

Size: A 2.0-2.5 mm; D 1.3-1.7 mm.

Animal sand-coloured or light grey with black pigment patches on back, head, rostrum and tentacles. Rostrum trunk-shaped, with transverse furrows. The filiform tentacles have more than double the size of the rostrum. The eyes are placed at the bases of the tentacles without swellings. The posterior part of the back carries the typical filiform process. — The low, trapezoidal rhachis of the radula has the typical 5 crups on the cutting edge; there are 3 basal cusps on either side. — Male reproductive organs with finger-shaped verge which ends in a conchiolinous stylet. It has a single duct and no appendages.

Type locality: Mekong at Bandan, Ubon Province.

Distribution: Mekong between Ban Khum, N of Bandan, and Kratie in North Cambodia.

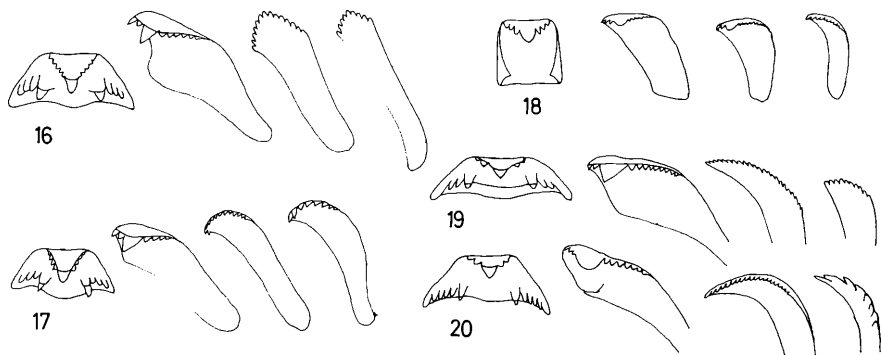
Biology: This species lives on sandy ground at quiet places of the river together with *S. hybocystoides* BAVAY and the following species.

Material: Holotype SMRL 5045/A; paratypes 5045/200. — SMRL 5113/100 - Mekong at Ban Khum, N of Bandan; 5115/150 - Mouth of Mun river at Bandan; 16222/10 - Mekong at Ban Na, Khong Island; 16225/20 - Mekong branch at Prapaeng Falls; 16238/6 - Mekong at Sambor, Cambodia; 16231/900 — Mekong at Muang Khong, Khong Isl.; 16247/50 - Mekong branch at Sompamit Falls; 16248/200 - Mekong opposite Bandan; 16440/6 - Mekong opposite Kratie; 16445/10 - Mekong at Done Dhet, opposite Khone.

***Stenothyra ovalis* n. sp.**

pl. 13 fig. 20.

Diagnosis: A species of *Stenothyra* BENSON, which differs from its closest relative, *S. fasciata* BRANDT, by its lack of a rusty patch on the neck (a delicate touch of it may sometimes be seen), by the deeper suture between the last two



Textfig. 16-20. Radula, half-row. — 16) *Jullienia microsculpta* n. sp.; 17) *Jullienia poirieri* n. sp.; 18) *Saduniella planispira* n. g. n. sp.; 19) *Stenothyra basisculpta* n. sp.; 20) *Stenothyra mcmulleni* n. sp.

whorls and by its sculptured embryonic whorls. It differs from *S. koratensis* BRANDT by its ovate shape, sculptured embryonic whorls and smooth postnuclear whorls. In *koratensis* the embryonic whorls are smooth and the postnuclear whorls are sculptured.

Description: Shell of medium size for the genus, thin, straw-coloured, olive or rarely brownish, smooth except for the first two whorls which are sculptured with few pitted spiral lines; growth lines very delicate. Seen from the back the shape of the shell is ovoidal, seen from a front view it is ovate-conoidal due to the penultimate whorl which is swollen on the left side of the back, particularly so in stout specimens. Suture rather deep, deeper than that of *fasciata*, but less so than in *koratensis*. — Aperture small, oval, oblique, slanting, contracted, deep below the base of the body whorl. Body whorl with well rounded side lines, only moderately compressed dorso-ventrally, without boss. Peristome continuous, appressed to the penultimate whorl, moderately thickened within, with a delicate notch at the parietal margin. — Operculum ovate, corneous, with $3\frac{1}{2}$ whorls and subcentral nucleus. The inner surface carries the typical two high, diverging ridges and the low, semicircular ridge parallel to the margin.

Size: A 2.7-3.2 mm; D 1.7-2.0 mm.

Animal sand-coloured with few blackish pigment spots. The thin, round, filiform tentacles have a little more than twice the length of the truncate rostrum. The eyes are placed at the bases of the tentacles in barely noticeable swellings. The mantle and the visceral sac show few large black pigment patches. As the animals available for description were all preserved in alcohol, no yellow pigmentation could be seen. — Cutting edge of the rhachis with 5 cusps; there are 4 basal cusps on either side. Laterals with the cusp formula 3-1-10, marginals with numerous cusps.

Type locality: Mun river at Rasi Salai, Thailand.

Distribution: Mun river; Songkram river; Mekong between Tha Uthen and Bandan, Thailand.

Material: Holotype SMRL 5146/A; paratypes 5146/500. — SMRL 5147/80 - Songkram river at Sri Songkram; 5148/50 - Songkram river at Wanonivat, Sakon Nakhon; 4981/30 - Small stream 15 km NE of Tha Uthen; 4985/20 - Mekong at Bandan; Ubon Province.

***Stenothyra mcmulleni* n. sp.**

pl. 13 fig. 21, textfig. 20.

Diagnosis: A species of *Stenothyra* BENSON, which differs from the similarly shaped *S. wykoffi* BRANDT and *S. fasciata* BRANDT by its lack of any brownish patch on the neck and by its generally larger size. The body whorl is more elongate than in *fasciata* but less so than in *wykoffi*. It has also a higher spire than *wykoffi*.

Description: Shell of medium size for the genus, ovate or elongately pupaeform; corneous, thin, translucent and glossy; smooth and without any traces of microsculpture except for the growth lines. The 4 whorls are somewhat convex, the apex is dome-shaped and the penultimate whorl swollen at the left side as seen from the back. Body whorl large, elongate, $\frac{2}{3}$ of the length of the

shell. It is not "bossed" at the left side as in *koratensis* BRANDT and several other species. There is a curved shallow chink beside the peristome. The body whorl is only slightly compressed dorso-ventrally. — Aperture oblique, oval, contracted; peristome continuous, somewhat thickened within, not expanded like in *hybocystoides* BAVAY, with a delicate notch at the parietal part. — Operculum oval, thin but solid, brittle, corneous, transparent, paucispiral, with subcentral nucleus. On the inner surface there are two short, but high, diverging ridges and a low, long, semicircular ridge parallel to the margin.

Size (of the holotype): A 3.1 mm; D 1.9 mm. Average size of 50 paratypes: A 2.0-3.6 mm; D 1.2-2.2 mm.

Animal dusted with black and sand-coloured pigment dots which are particularly dense on head, rostrum and tentacles. Foot truncate in front, pointed at the end, without the typical dorsal filiform process. There is a black pigment line in the middle of the posterior part of the back. Rostrum brownish, with two yellow or orange patches on either side of the tip. The yellow pigmentation does not preserve in alcohol. The yellow pigmentation of the tentacles may turn to orange. The yellow pigmentation on the back is more densely placed along the sides of the foot. — Radula typical for the genus; rhachis with 3 cusps on the cutting edge and 4 or 5 basal cusp on either side. Laterals with the cusp formula 3-1-(7-10), inner marginals with 10 cusps, outer with ± 20 . — The simple verge ends in a conchiolinous stylet.

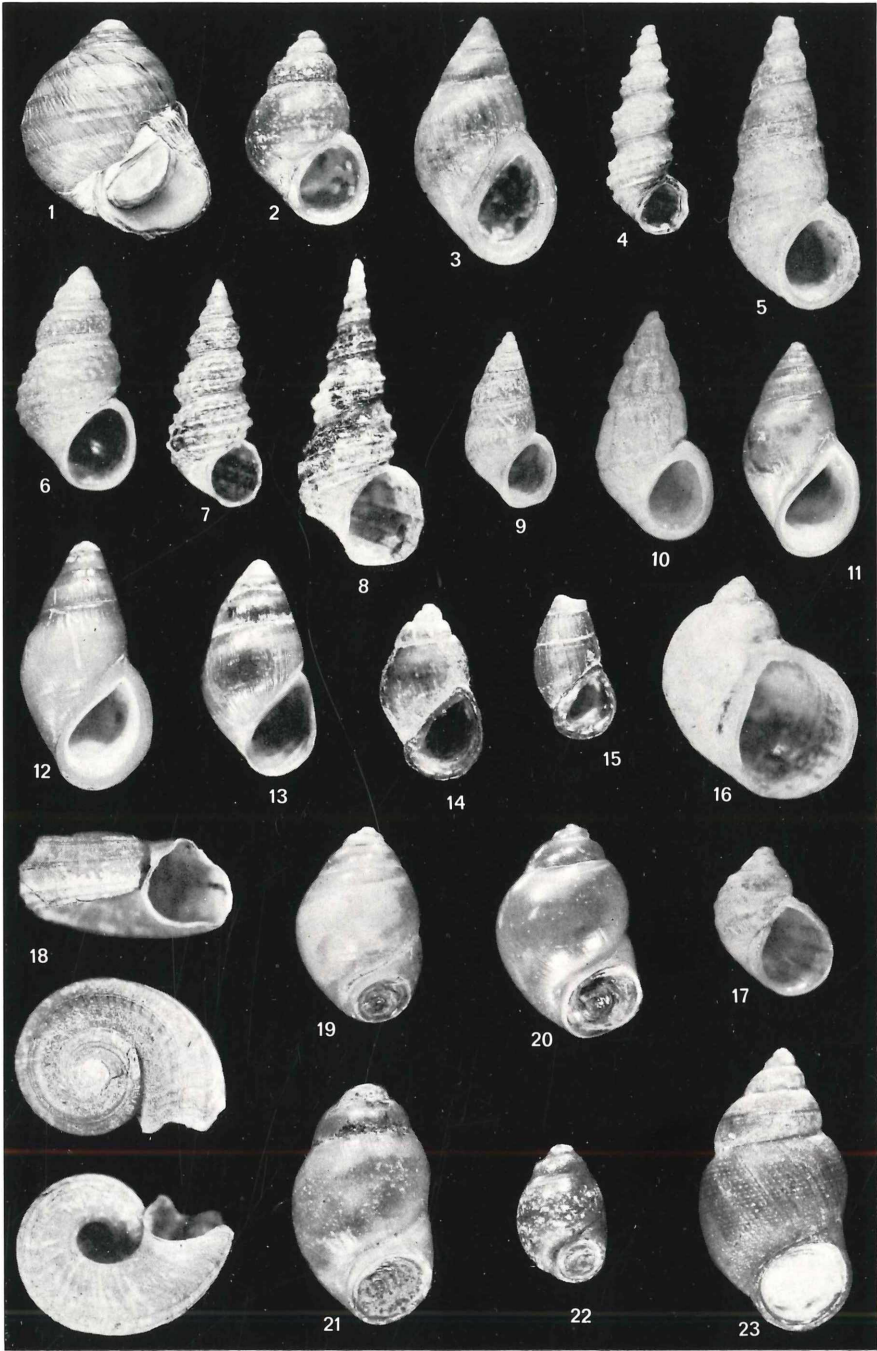
Type locality: Mekong at Bandan in East Thailand.

Distribution: Mekong between Ban Khum and Kratie.

Material: Holotype SMRL 5003/A; paratypes 5003/80. — SMRL 5067/6 — Mouth of the Mun river at Bandan; 5112/8 — Mekong at Ban Khum, N of Bandan; 16230/50 — Mekong near hospital Muang Khong, Laos; 16241/20 — Mekong near Wat Muang Khong, Laos; 16246/8 — Mekong at Sambor, Cambodia; 16432/20 — Mekong opposite Bandan; 16434/8 — Mekong opposite Kratie, Cambodia.

Plate 13.

- Fig. 1. *Anulotaia mekongensis* n. sp., ¹/₁ (SRML 15866/A).
- Fig. 2. *Hydrorissoia paviei* n. sp., ⁸/₁ (SMRL 16309/A).
- Fig. 3. *Hydrorissoia cambodiensis* n. sp., ⁸/₁ (SMRL 16296/A).
- Fig. 4. *Paraprososthenia iijimai* n. sp., ⁶/₁ (SMRL 5119/A).
- Fig. 5. *Paraprososthenia fischerpiettei* n. sp., ⁶/₁ (SMRL 16301/4).
- Fig. 6. *Paraprososthenia hansenii* n. sp., ⁶/₁ (SMRL 16312/A).
- Fig. 7. *Paraprososthenia adami* n. sp., ⁶/₁ (SMRL 16302/A).
- Fig. 8. *Paraprososthenia acicula* n. sp., ⁶/₁ (SMRL 16314/A).
- Fig. 9. *Paraprososthenia bollingi* n. sp., ⁶/₁ (SMRL 16303/A).
- Fig. 10. *Pachydrobia poirieri* n. sp., ⁴/₁ (SMRL 16306/A).
- Fig. 11. *Pachydrobia bavayi* n. sp., ⁴/₁ (SMRL 16285/A).
- Fig. 12. *Pachydrobia mcmulleni* n. sp., ⁴/₁ (SMRL 16053/A).
- Fig. 13. *Manningiella polita* n. g. n. sp., ⁶/₁ (SMRL 3377/A).
- Fig. 14. *Manningiella expansa* n. sp., ⁶/₁ (SMRL 16288/A).
- Fig. 15. *Manningiella cambodiensis* n. sp., ⁶/₁ (SMRL 16276/A).
- Fig. 16. *Jullienia microsculpta* n. sp., ⁶/₁ (SMRL 16410/A).
- Fig. 17. *Jullienia poirieri* n. sp., ⁶/₁ (SMRL 16333/A).
- Fig. 18. *Saduniella planispira* n. g. n. sp., ⁶/₁ (SMRL 16272/A).
- Fig. 19. *Stenothyra basisculpta* n. sp., ¹⁰/₁ (SMRL 5045/A).
- Fig. 20. *Stenothyra ovalis* n. sp., ¹⁰/₁ (SMRL 5146/A).
- Fig. 21. *Stenothyra mcmulleni* n. sp., ¹⁰/₁ (SMRL 5003/A).
- Fig. 22. *Stenothyra schlickumi* BRANDT 1968, ¹⁰/₁ (SMRL 5018/A). [vgl. Arch. Moll., 98: 258].
- Fig. 23. *Stenothyra labiata* BRANDT 1968, ¹⁰/₁ (SMRL 4990/A). [vgl. Arch. Moll., 98: 259].



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Zeitschrift/Journal: [Archiv für Molluskenkunde](#)

Jahr/Year: 1970

Band/Volume: [100](#)

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