

covered in Martinique and Guadaloupe. If not now existing in these islands, there could be little doubt that the form must formerly have occurred there.

The following papers were read:—

1. List of Land and Freshwater Shells collected in Sumatra and Borneo, with Descriptions of new Species. By CARL BOCK.

[Received April 4, 1881.]

(Plate LV.)

The specimens mentioned in this paper were collected in the highlands of Padang, in Sumatra, and in the east and south part of Borneo, during my recent travels.

In determining the species and comparing the specimens with those in the British Museum, I have to acknowledge much assistance received from Mr. Edgar Smith. In the case of such difficult forms as *Melania*, I have not ventured to determine the species myself, but have forwarded my specimens for determination to Dr. A. Brot, of Geneva, who is our highest authority on this group of freshwater shells.

I. *Shells collected in the District of Padang, Sumatra.*

A. LAND SHELLS.

1. NANINA (ARIOPHANTA) FOVEATA, Pfr.

Of this fine sinistral *Helix* I found two adult live shells at Sidjoendjoeng.

2. NANINA (HEMIPLECTA) DENSE, var., Adams & Reeve.

Nanina (Hemiplecta) schumacheriana, Pfr.

Three specimens from Mount Sago and Sidjoendjoeng. Mr. Wallace found this species in Borneo.

3. HELIX (CAMÆNA) TOMENTOSA, Pfr.

Only two specimens found (one adult) at Sidjoendjoeng.

4. NANINA (XESTA) MALACCANA, Pfr.

This brittle shell I found very abundant in the coffee-plantations at Paio.

5. HELIX (PLECTOTROPIS) SUMATRANA (v. Martens).

At Ajer Mantjoer; scarce.

6. HELIX (NANINA) GRANARIA, sp. nov. (Plate LV. fig. 1.)

Shell thin, sinistral, conical, depressed, of an olive-brown colour,

becoming pinkish grey at the apex, narrowly umbilicated, whorls 6, oblique arcuate, sculptured with lines of growth and concentric finely granular striæ, producing a shagreened appearance, especially on the last whorl, which is also considerably wrinkled, and bears a somewhat raised ridge or keel at the periphery, which, however, does not produce an angle, not descending in front. Whorls of the spire only a little convex, the last large, rather ventricose. Spire shortly conical, with the apex obtuse. Aperture large, broadly obliquely lunate, of a somewhat mauve tint within. Peristome thin, simple, only very shortly expanded over the umbilicus.

Hab. Mount Sago, at an elevation of 2000 feet, only *one* specimen found, in a decayed trunk. Like the rest of the *Nanina* I found in Sumatra and Borneo, this also is sinistral. Greatest diameter 40 millim., height 31 millim.

7. *HELIX* (*NANINA*) *MAARSEVEENI*, sp. nov. (Plate LV. fig. 2.)

Shell perforate, sinistral, depressedly trochiform, thick, of a light brown horn-colour, somewhat paler round the umbilicated region. Spire conically depressed, with the apex obtuse. Whorls 7, sculptured with feebly granulated, obliquely arcuate lines of growth, and increasing slowly; last whorl with a very acute pale keel about the middle, below the carina rather concave than convex, sculptured like the upper surface, the lines being rather flexuous. Aperture oblique, angularly lunate. Peristome thick; upper margin above the keel short, oblique, rectilinear, the basal very arcuate, towards perforation somewhat expanded. Greatest diameter 33 millim., axis 14 millim.

Hab. Sidjoendjoeng. I have associated the name of Mr. Maarseveen (the Assistant Resident at Sidjoendjoeng) with this shell, of which I only found three specimens.

A near ally in form and colour is *H. hugonis*, Pfr., from Labuan; but *H. maarseveeni* has an extra whorl, is umbilicated, and the spire is considerably less elevated; and the granular sculpture in *H. hugonis* is much stronger. *H. maarseveeni* comes much nearer *Helix mindaiensis*, found by me in Borneo; but that has only six whorls.

8. *HELIX* *SMITHI*, sp. nov. (Plate LV. fig. 3.)

Shell thin, orbicular, umbilicated, flatly depressed, semitransparent, of a greyish white colour, covered with a thin epidermis of a light horn-colour, spire flattened. Whorls 4, flattish, sculptured with fine lines of growth, the last slightly descending at the mouth, broad, with a strongly marked obtuse keel, and a broad distinct groove above, below convex, obtusely ridged round the deep umbilicus. Aperture large, subquadrangular, oblique. Peristome thin; outer margin expanded, reflexed, especially in the umbilical region. Greatest diameter across 21 millim., height 8 millim.

Hab. Paio, Sumatra. Two specimens found (only 1 adult).

Helix smithi is nearly allied to *H. caseus*, Pfr., from Siam; but the latter differs in having a less acute keel on the last whorl,

which *descends* considerably, and the peristome is almost continuous and ovate. I have associated with this shell the name of Mr. Edgar Smith, the well-known conchologist of the British Museum.

9. *HELIX* (*GEOTROCHUS*) *RUFO-FILOSA*, sp. nov. (Plate LV. fig. 4.)

Shell shortly conical, narrowly umbilicated, thin, semitransparent, of a greyish or horn-colour, sometimes with a thread-like red line bordering the sutures and encircling the last whorl at the periphery. Spire with rectilinear outlines, converging at an angle of about 30°, rather obtuse at the apex. Whorls 7, very obliquely striated, slowly increasing, keeled beneath immediately above the suture; three or four uppermost rather more convex than those beneath, which are but slightly so; last volution acutely carinate at the middle, and convexly flattened beneath. Aperture small, oblique. Peristome thin, outer margin above the keel scarcely expanded, beneath it feebly thickened and narrowly reflexed, in the umbilical region more expanded and partly concealing the perforation. Length from 10 to 11 millim., greatest diameter of base also 10–11 millim.

Hab. In the forest at Paio, 1500 feet above the sea.

Only six specimens found; rare.

10. *HELICARION SUMATRENSIS*, Schepm.

Hab. Paio; very rare.

11. *BULIMUS* (*STENOGYRA*) *PAIOENSIS*, sp. nov. (Plate LV. fig. 5.)

Shell elongate, subulate, imperforate, of a dirty greyish-white colour, covered with a somewhat deciduous and coarsish olive epidermis. Whorls 12, apical ones obtuse, glossy, vitreous, these and the few succeeding rather convex and slowly enlarging, the five last proportionally longer and flatter, increasing more in length than breadth, and separated by a rather oblique deepish suture. Sculpture consists of coarsish oblique flexuous, indistinctly subgranose raised lines of increment. Aperture elongate, subpyriform, acute above, occupying rather more than one fifth of the entire length of the shell. Outer lip (viewed laterally) oblique, a little excurved near the suture, simple, thin. Columella whitish, slightly arcuate and thickened, appressed to the whorl, connected with the extremity of the labrum by a very thin callosity. Length 40 millim., diameter $7\frac{1}{2}$ millim.; aperture 9 millim. long, 3 millim. broad.

Hab. Paio, Sumatra, 1500 feet above the sea.

The animal is of a yellow colour, has a short foot, and carries its shell in an oblique position.

I never met with this interesting species in any other spot in the highlands; and even at Paio it appears to be rare; for in all, after close search, I found but fourteen specimens.

12. *BULIMUS* (*AMPHIDROMUS*) *ADAMSI*, Reeve.

Hab. Sidjoendjoeng, Paio, &c.

13. *VITRINA HYALEA*, sp. nov. (Plate LV. fig. 6.)

Shell depressedly globose, subauriform, olive-brown, glossy, sculptured with very fine lines of growth and microscopic spiral striæ. Spire small, pale, hardly raised above the last whorl. Volutions 2 to 3, depressedly margined at the suture, last very large. Aperture very large, subhorizontal or only a little oblique, lunar-rounded. Outer lip, seen from above, feebly incurved near the suture, the somewhat excurved columellar margin of the peristome thin, membranous. Greatest diameter 20 millim.

Hab. Ajer Angat, near Korinthji.

This species is darker in colour than most others of this genus, but somewhat lighter than the Tasmanian *V. milligani*.

14. *CLAUSILIA SUMATRANA*, v. Martens.

Hab. Common in the coffee-plantations at Paio, Sumatra.

15. *PUPINA SUPERBA*, Pfr.

I collected three specimens at Paio.

16. *CYCLOPHORUS PLANORBULUS*, Lam.

In the dense forests at Sidjoendjoeng, with the aid of some natives, I secured some fifty specimens, all living, and with opercula; but the species is rare, and requires a close search amongst the decayed leaves and in the damp soil; it varies considerably in size.

17. *CYCLOPHORUS EXIMIUS*, Mousson.

Of this glorious shell, the pride of the Sumatra forests, I succeeded in collecting some sixty specimens at Sidjoendjoeng. I first found dead shells in the immense forests there pretty common; and being determined to exhaust the place of live ones, as much as possible, of this fine species, I set some natives to work every day to pull down the decayed trees that were filled with earthy matter, and also to look amongst the masses of dead leaves on the ground; but the former seemed to be their favourite place of resort. We succeeded in finding two or three perfect living specimens every day; but when I looked over all that had been collected, over 50 per cent. were dead white specimens with hardly any colour at all; 30 per cent. were shells in various stages of growth, but without a lip, and in most cases the last whorl near the mouth was broken and rounded; 20 per cent. is left for fine full-grown examples possessing the bronzy shining epidermis.

Hab. Mount Sago and Sidjoendjoeng.

The Dutch Sumatran Expedition found 11 specimens, all dead; but it is interesting to note the localities, all being places with immense forest vegetation:—1 spec. near Silagoi; 1 spec. Soengei Aboe; 2 spec. near Moeara Labol; 1, Mount Korinthji, at a height of 1000 metres; 4 spec. Loeboe Gedang; 2 spec. Ajer Boesock.

18. *CYCLOPHORUS TUBA*, Sow.

Mount Sago and Sidjoendjoeng ; rarer than the foregoing species.

19. *MEGALOMASTOMA SECTILABRUM*, Gould.

Found 8 specimens at Paio.

B. FRESHWATER SHELLS.

The ponds of the Padong district teem with different species of *Melania*, *Ampullaria*, and *Paludina*. Such of these as I could not make out have been determined by Dr. Aug. Brot, of Geneva.

20. *AMPULLARIA AMPULLACEA*, Linn.

All over the highlands in ponds, and in the "sawahs" (rice-fields).

21. *PALUDINA INGALLSIANA*, Lea.

One specimen from Boea.

22. *PALUDINA HAMILTONI*.

The specimens differ from those in the British Museum in being more rounded at the top.

23. *PALUDINA SUMATRENSIS*, Dunker.

Common in the "sawahs" (rice-fields) at Boea, and in the rivers.

24. *MELANIA DATURA*, Dohrn.

Boea.

25. *MELANIA SEMIGRANOSA*, Busch.

Found at Boea and Tanar Datar.

26. *MELANIA LIRATA*, Bens., var. *granosa*.27. *MELANIA LÆVIGATA*.

Locality. Boea and Tanar Datar.

28. *MELANIA MALAYANA*, Issel.

Locality. Boea and Tanar Datar.

29. *MELANIA SUMATRENSIS*, Brot.

One young specimen found at Boea.

30. *MELANIA BŒANA*, sp. nov.31. *MELANIA PROVISORIA*, sp. nov.32. *MELANIA BOCKII*, sp. nov.

Locality. Boea.

The new species of *Melania* will be described by Dr. Brot in M. Crosse's 'Journal de Conchyliologie.'

33. CORBICULA GRACILIS, Prime.

Abundant in all the lakes in Sumatra, especially Lake Singkarak. The shell is fished in quantities, and used for making lime for betel-chewing.

34. UNIO DIMOTUS, Lea.

Abundant.

II. *Shells collected in Koetei and in the Amontai and Bandjermasin Districts of Borneo.*

HELICIDÆ.

1. NANINA (RHYSSOTA) BROOKEI, Adams & Reeve.

I found dead specimens in Koetei. The Dyaks use them as ornaments in the top of the lids of their arrow-cases. Six *live* specimens at Mindai (in Amontai district). It is, however, rare, hiding in layers of decayed leaves.

2. NANINA (XESTA) CONSUL, Pfeiffer.

Found at Mindai. Two specimens.

3. HELIX MINDAIENSIS, nov. sp. (Plate LV. fig. 7.)

Shell very slightly umbilicated, sinistral, convexly conoid, semi-transparent, of a reddish brown colour, with a white-tipped lip. Spire conical, with somewhat convex outlines and the apex obtuse. Whorls 6, but slightly convex, sculptured with finely granulated radiating striæ, regularly increasing; the last acutely keeled. Aperture oblique, lunate. Peristome sharp, slightly thickened; upper margin short, oblique, the basal (seen from beneath) rather sinuous. Greatest diam. 30 millim., axis 13 millim.

Hab. Mindai (Amontai district), very abundant amongst the decaying leaves in the forest.

This species is of a darker colour than *Helix maarseveeni*, has one whorl less, has more convex outlines to the spire, is not so sharply keeled around the last whorl, and more narrowly umbilicated. Its sculpture, too, is rather more coarsely granular.

4. HELIX (VIDENA) METCALFEI, Pfeiffer.

One specimen, collected at Mindai.

5. HELIX (VIDENA) PLANORBIS, Lesson.

From Mindai. Scarce.

6. BULIMUS (AMPHIDROMUS) INTERRUPTUS, Müller.

This shell was very abundant in Bandjermasin, both the dextral and sinistral forms, and variously coloured; of the rare pure white variety only one specimen was obtained. After heavy rains the trees were quite spotted with them.

7. *SCARABUS BORNEENSIS*, A. Adams.

Only one specimen, found at Bandjermasin.

8. *PTEROCYCLOS MINDAIENSIS*, sp. n. (Plate LV. figs. 8, 8a, 8b.)

Shell depressed, orbicular, rather solid, dark reddish brown, varied with zigzag narrow white markings both above and below, covered with a greenish-brown velvety epidermis bearing two series of close-set short hairs, one above and the other beneath the periphery, the former winding up the suture. These cilia are invariably worn off in adult shells. Whorls 5, rounded, divided by a deep suture, marked with distinct spiral striæ and lines of growth. Peristome double, outer margin considerably expanded, especially at the upper part where it joins the body-whorl, but less reflexed than towards the base. Inner margin simple. Greatest diameter 19 millim., axis 5.

Operculum very concave exteriorly, consisting of seven narrow whorls which are coarsely obliquely striated, with the outer margins exerted at the sutural line.

This species very closely resembles *P. lowianus*, Pfr., from the island of Labuan. It is, however, rather larger, has a darker and thicker epidermis, which is ciliated, that of *P. lowianus*, as far as we know, lacking that peculiarity; and the peristome is more expanded and reflexed. The opercula of these two forms present such difference of character as to indicate at once their specific distinctness. That of *P. lowianus* has exteriorly a deep groove separating the whorls, which stand up erect and lamelliform. In *P. mindaiensis* the whorls rest one upon another, and the surface is regularly concave.

Hab. Mindai (Amontai district); exceedingly common amongst the decaying leaves.

Borneo is especially rich in specimens of the genus *Pterocyclos*. In some places, particularly at Mindai, the ground was literally swarming with *Pt. mindaiensis*; they keep amongst and feed on decayed leaves.

9. *OPISTHOPORUS EURYOMPHALUS*, Pfr.

Only two specimens from Long Wai, Koeti; one has the tube directed the opposite way. Two specimens from Mindai.

10. *LEPTOPOMA* (Pfr.) LOWI, Pfr.11. *L. DUPLICATUM*, Pfr.12. *L. BARBATUM*, Pfr.13. *L. SUBCONICUM*, Pfr.14. *L. MASSENA*, Less.

All from Mindai. Only a couple of specimens of each found.

15. *CERITHIDEA* (Sow.) OBTUSA, Lam.

Abundant at Bandjermasin in the swamps; they were more on land than in the river. Amongst the numbers collected I only found one with perfect apex.





Bock, Carl Ernst. 1881. "List of Land and Freshwater. Shells collected in Sumatra and Borneo, with Descriptions of new Species." *Proceedings of the Zoological Society of London* 1881, 628–635.

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