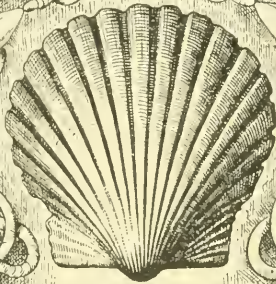




1902

U.S.N.M.



Ex libris

William Healey Dall.



573

QL
401
-C747
MOLL

Division of Mollusks
Sectional Library

THE
JOURNAL OF MALACOLOGY.

ESTABLISHED IN 1890 AS "THE CONCHOLOGIST, A JOURNAL OF
MALACOLOGY."

EDITED BY
WALTER E. COLLINGE,

LECTURER ON ZOOLOGY AND COMPARATIVE ANATOMY IN THE UNIVERSITY
OF BIRMINGHAM.

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR,
The University, Prague.

THE REV. A. H. COOKE, M.A., F.Z.S.,
Fellow of King's College, Cambridge.

CHARLES HEDLEY, F.L.S.,
Australian Museum, Sydney, N.S.W.

E. R. SYKES, B.A., F.Z.S., F.L.S.,
London.

B. B. WOODWARD, F.G.S., F.L.S.,
British Museum (South Kensington), London.

VOLUME VIII.

1901.

Authors alone are responsible for the statements in their respective papers.

LONDON:

DULAU AND CO., 37, SOHO SQUARE, W.

1901.

Mollusks

CONTENTS OF VOLUME VIII.

	PAGE
Notes on the references for authorship of species, as given in Jeffreys, British Conchology, Volumes ii—v. By the Rev. A. H. COOKE, M.A., F.Z.S.	1
Description of two new species of Helicoid Land Shells. By G. K. GUDE, F.Z.S. (Illustrations.)	14
Description of two new species of <i>Microparmarion</i> from the Andaman Islands. By WALTER E. COLLINGE. (Plate i.)	16
Note on <i>Myrina simpsoni</i> , Marsh. By J. T. MARSHALL.	19
Malacological Notes. By E. R. SYKES, B.A., F.L.S.	20
<i>Helix lapicida</i> m. <i>sinistrorsum</i> . By T. D. A. COCKERELL.	21
<i>Trichomya</i> , von Ihering. By T. D. A. COCKERELL.	21
Dates of publication of Forbes and Hanley's History of British Mollusca. By B. B. WOODWARD.	21
Investigations on the Variation and Life-History of British Land and Fresh-water Molluscs. (By A. E. BOYCOTT.)	22
<i>Clausilia</i> mimicked by a Microlepidopteron. By Dr. H. SIMROTH. (Illustrations.)	33
Note sur une Limnée de la faune profonde de Lac Léman. Par le Dr. EMILE ANDRÉ.	35
The Anatomy of the British species of the genus <i>Solen</i> . Pt. i. By H. H. BLOOMER. (Plates ii and iii.)	36
Notes on some known species of <i>Plectopylis</i> , and description of a new variety of <i>Plectopylis plectostoma</i> , Bens. By G. K. GUDE, F.Z.S. (Illustrations.)	47
Note on the Anatomy of <i>Amphidromus palaceus</i> , Mouss. By WALTER E. COLLINGE. (Plate iv.)	50
Description of two new species of <i>Microparmarion</i> from the Andaman Islands: A Correction. By WALTER E. COLLINGE.	52
Notice sur le Professeur de Lacaze-Duthiers. Par Professeur A. VAYSSIÈRE.	57
Malacological Notes. By E. R. SYKES, B.A., F.L.S. (Illustrations.)	59
Note upon <i>Trophon umbilicatus</i> , Tenison Woods. By HENRY SUTER.	61
On the Anatomy of the <i>Vitrina irradians</i> of Pfeiffer. By WALTER E. COLLINGE. (Plates v and vi.)	63

	PAGE
Note on the Anatomy of <i>Apera buruupi</i> . E. A. Smith. By WALTER E. COLLINGE. (Illustrations.)	71
On the genus <i>Ashmunella</i> , Pils. and Ckll. By C. F. ANCEY, with Anatomical Notes. By R. MURDOCH. (Plate vii.)	73
Three new Nudibranchs from California. By T. D. A. COCKERELL.	85
<i>Limax nyctelius</i> , Bgt., in Washington. By T. D. A. COCKERELL.	88
<i>Psammobia ferroensis</i> var. <i>pallida</i> . By T. D. A. COCKERELL.	89
Conchological Society: Committee for Collective Investigation. (By A. E. BOYCOTT.)	89
On some Land Shells from British East Africa. By EDGAR A. SMITH. (Illustrations.)	93
The Anatomy of the British species of the genus <i>Solen</i> . Pt. ii. By H. H. BLOOMER. (Plate viii.)	97
Descriptions of five new species of Shells. By G. B. SOWERBY, F.L.S. (Plate ix.)	101
Descriptions of new species of <i>Nesta</i> , <i>Amphidromus</i> , and <i>Cyclostoma</i> from Madagascar and Peiak. By HUGH FULTON. (Plate ix.)	103
Malacological Notes. By E. R. SYKES, B.A., F.L.S. (Plate x.)	105
On two new and three hitherto unfigured species of <i>Plectopylis</i> from Tonkin. By G. K. GUDE, F.Z.S. (Illustrations.)	110
Description of some new species of Slugs collected by Mr. H. Fruhstorfer. By WALTER E. COLLINGE.	118
Notes on two Californian Nudibranchs. By T. D. A. COCKERELL.	121
Obituary. M. F. Woodward.	123
<i>Physa heterostropha</i> , Say, in South Staffordshire. By JOHN LINTON.	124
<i>Amalia gagates</i> , Drp., at Sutton Coldfield. By H. OVERTON.	124
<i>Limax maximus</i> , L., at Los Angeles, California. By T. D. A. COCKERELL.	124
Proceedings of the Milland Malacological Society.	22, 53, 88, 124
Current Literature.	23, 53, 89, 125
General Reviews.	30, 92, 132
Editor's Notes.	32, 56, 92, 132

LIST OF ILLUSTRATIONS IN VOLUME VIII.

	PAGE
<i>Epiphragmophora dormeri</i> , n. sp.	15
<i>Sesara mouleyitensis</i> , n. sp.	15
New Microparmarions. Plate I.	18
A Coleophoride Lepidopteron imitating <i>Clausilia</i>	34
Anatomy of <i>Solen</i> . Plates II and III.	46
<i>Plectopylis jozia</i> . Armature of	47
<i>Plectopylis schlumbergeri</i> . Armature of	48
<i>Plectopylis villedaryi</i> . Armature of	48
<i>Plectopylis lepida</i> . Shell and Armature of	49
<i>Plectopylis plectostoma</i> v. <i>exserta</i> , n. var.	49
Anatomy of <i>Amphidromus</i> . Plate IV.	52
<i>Helicina rollei</i> , n. sp.	59
<i>Cecina manchurica</i> , A. Ad.	60
Anatomy of <i>Ratnairopia</i> . Plates V and VI.	70
<i>Apera burnupi</i> , E. A. Smith. Generative organs of	72
Anatomy of <i>Ashmunella</i> . Plate VII.	85
<i>Ennea (Gulella) ugandensis</i> , n. sp.	93
<i>Martensia fermanens</i> , n. sp.	94
<i>Limicolaria dohertyi</i> , n. sp.	95
<i>Buliminus bambuseti</i> , Martens, var.	96
<i>Opeas crenulata</i> , n. sp.	96
Anatomy of <i>Solen</i> . Plate VIII.	100
New species of Shells. Plate IX.	104
Land and Marine Shells. Plate X.	109
<i>Plectopylis (Endoplou) hirsuta</i> , Mildf.	111
<i>Plectopylis (Sinicola) fruhstorferi</i> , Mildf.	113
<i>Plectopylis (Endoplou) phlyaria</i> , Mab.	114
<i>Plectopylis (Endoplou) moellenendorffi</i> , n. sp.	115
<i>Plectopylis (Endoplou) villedaryi</i> , Ancey.	117

CORRIGENDA.

p. 61 line 20 *för* Brochi *read* Brocchi.

THE
JOURNAL OF MALACOLOGY.

No. 1.

MARCH 25TH, 1901.

VOL. VIII.

NOTES ON THE REFERENCES FOR
AUTHORSHIP OF SPECIES, AS GIVEN IN JEFFREYS,
BRITISH CONCHOLOGY, VOLUMES II—V.

BY THE REV. A. H. COOKE, M.A., F.Z.S.,

Fellow of King's College, Cambridge, and Head Master of Aldenham School.

I WAS enabled to publish, in Vol. vii of this Journal, pp. 59—64, some Notes on the nomenclature of British Nudibranchiata, with special reference to Jeffreys, *British Conch.*, vol. v. The corrections there found necessary were extensive and, in some cases, of importance. I have been asked to continue the process then initiated, and to apply it to the remainder of "Jeffreys." The present paper is the result.

The notes must be read throughout with close reference to the pages of Jeffreys. It has not been attempted to introduce uniformity into his citations of the same work or volume, but only to correct them when erroneous. For instance, he refers in successive pages (iii, 246) to "Prodr. Zool. Dan.," and (iii, 248, 250) to "Prodr. Z. D.," and (iii, 252) to "Prod. Z. D.," but I have made no correction, though the title of the work is *Zoologiae Danicae Prodromus*. But I have thought it desirable, when Linné has described a species as e.g. *Venus Gallina*, not to acquiesce in his being reported as describing it as *Venus gallina*. Quite apart from the question of fact, important results may follow from observing the use of the capital or the small letter, as I have endeavoured to show in this Journal, in a paper

entitled *Phasianella* “*pullus*” or “*pulla*”? But I have not attempted to decide what the right name of any given species actually is. For instance, it has been no part of my business to substitute *Pecten pes lutrae* for *Pecten septemradiatus*, or *Chenopus serresianus* for *Aporrhais macandreae*. The references have been taken as they stand.

One or two alterations, trivial in themselves, may be mentioned here, and thus save space and time. All the references to Pennant are to the *Seco* edition of 1777. “Müller” is O. F. Müller throughout. When the reference to Linné is undisturbed, it means that it is (unless otherwise indicated) to the 12th edition of the *Systema* (1766—68). The date of the 10th edition is 1758.

VOLUME II.

P. 14. TEREBRATULA CAPUT SERPENTIS.—For *caput-serpentis* . . . ed. 12, p. 1153 read *Caput serpentis* . . . ed. 10, p. 703, no. 200.

P. 19. ARGIOPE CISTELLULA.—The reference to Searles Wood, *Annals*, vi, p. 253, is useless, no description is there given, only a catalogue. Jeffreys doubtfully referred the species to *Terebratula seminulum*, *Phil., Ann. Mag. Nat. Hist.*, 1847, xix, p. 312. The proper reference for the description is *Argiope cistellula* (S. Wood), *Davidson, Brit. Fossil Brachiop.*, pt. 1, p. 10 (1852), pl. i, f. 13a—d.

P. 21. ARGIOPE CAPSULA.—The right reference is omitted and that given is wrong. Read *Argiope cistellula* var.?, *Jeffreys, Ann. Mag. Nat. Hist.*, ser. 3, 1858, ii, p. 125, pl. v, f. 4: *Terebratula capsula*, *Jeffreys, Ann. Mag. Nat. Hist.*, ser. iii, 1859, iii, p. 43, pl. ii, f. 7a, b.

P. 30. ANOMIA EPHIPIUM.—For p. 1150 read ed. 10, p. 701, no. 185.

I venture to suggest that the accepted derivation of the word *Anomia* (ἀ not, νόμος law, hence ‘lawlessness’, ‘irregularity’), with reference to the unsymmetrical growth of the shell, is a mistake. It appears to me more likely to be from ἀνόμοιος, unequal; the κόγχη ἀνομοία will then be the shell whose two valves are unequal to one another. From this it will follow that we should pronounce *Anomīa*, not *Anomīa*.

P. 34. ANOMIA PATELLIFORMIS.—For *Syst. Nat.*, p. 1151 read *Fauna Suec.*, ed. 2 (1761), p. 521, no. 2152. This species, *Aeolis papillosa*, and *Lamellidoris bilamellata* are the only three British mollusca, the references to whose description, according to the present rules of nomenclature, are from ed. 2 of the *Fauna Suecica*.

P. 38. OSTREA EDULIS.—For p. 1148 read ed. 10, p. 699, no. 180.

P. 51. PECTEN PUSIO.—For *Ostrea pusio* . . . p. 1146 read *Ostrea Pusio* . . . ed. 10, p. 698, no. 169.

- P. 53. PECTEN VARIUS.—For p. 1146 *read* ed. 10, p. 698, no. 168.
- P. 59. PECTEN OPERCULARIS.—For p. 1147 *read* ed. 10, p. 698, no. 171.
- P. 65. PECTEN TIGRINUS.—Müller's original name *tigerinus* should not be altered. *Tigerina* remains the accepted name of a well-known *Lucina*.
- P. 73. PECTEN MAXIMUS.—For p. 1144 *read* ed. 10, p. 696, no. 154.
- P. 78. LIMA SARSII.—For Ind. Moll. Scand., p. 32 *read* Oefv. Kon. Vet. Akad. Förh. (1846), iii, p. 186.
- P. 81. LIMA ELLIPTICA.—For *subauriculata*, F. and H. *read* *subauriculata* (Mont.), F. and H.
- P. 85. For f. 4 *read* pl. 113, f. 4.
- P. 95. AVICULA HIRUNDO.—For *Mytilus hirundo* . . . p. 1159 *read* *Mytilus Hirundo* . . . ed. 10, p. 706, no. 222.
- P. 99. PINNA RUDIS.—For p. 1159 *read* ed. 10, p. 707, no. 223.
- P. 104. MYTILUS EDULIS.—For p. 1157 *read* ed. 10, p. 705, no. 215.
- P. 111. MYTILUS MODIOLUS.—For *M. modiolus* . . . p. 1158 *read* *M. Modiolus* . . . ed. 10, p. 706, no. 217.
- P. 114. MYTILUS BARBATUS.—For p. 1156 *read* ed. 10, p. 705, no. 214.
- P. 125. MODIOLARIA COSTULATA.—For p. 324, f. 165, *read* p. 324, no. 874, pl. xi, f. 165.
- P. 143. NUCULA NUCLEUS.—For *Arca nucleus* . . . p. 1143 *read* *Arca Nucleus* . . . ed. 10, p. 695, no. 153.
- P. 149. NUCULA NITIDA.—For p. 5, f. 20 *read* p. 5, pl. 16, f. 20.
- P. 154. LEDA PYGMAEA.—For (Münster) Goldfuss, Petref., p. 157 *read* Münster, in Goldfuss Petref., part ii, p. 157.
- P. 166. PECTUNCULUS GLYCYMERIS.—For *Arca glycymeris* . . . p. 1143 *read* *Arca Glycymeris* . . . ed. 10, p. 695, no. 151.
- P. 171. ARCA PECTUNCULOIDES.—After p. 82 *add* no. 62, t. I, f. 12 a, b.
- P. 175. ARCA OBLIQUA.—Dele Faun.
- P. 177. ARCA LACTEA.—For p. 1141 *read* ed. 10, p. 694, no. 147.
- P. 180. ARCA TETRAGONA.—For ii, p. 137 *read* ii, Ord. 2, p. 137.
- P. 188. GALEOMMA TURTONI.—It should be explained that Turton in his description "omitted to give a specific appellation to this shell, probably supposing it to be the only species known," not a very convincing reason. The authority "Eds. Zool. Journ.," which is generally appended to the name *Turtoni* is awkward and unscientific. Messrs. Bell, Children, and J. and G. B. Sowerby were then acting in that capa-

city, but to attach the names of four authors to one species would perhaps be "too much of a good thing," though dozens of species have two authors and some three.

P. 194. LEPTON SQUAMOSUM.—For Test. Brit., i *read* Test. Brit., ii.

P. 198. LEPTON NITIDUM.—For Conch. Dith. *read* Conch. Ins. Brit., 1822. The facts are as follows: Turton's original work (published 1822) was called *Conchylia Insularum Britannicarum*. Five Orders were indicated, but only the second (Dithyra or bivalves) was described. The verbatim reprint (1848) was hence termed *Conchylia Dithyra Insularum Britannicarum*. It follows that all references should be to ed. 1, on the title-page of which the word Dithyra does not occur.

P. 201. LEPTON SULCATULUM.—For 3rd ser. Jan. 1859 *read* ser. 3, iii (1859).

P. 202. LEPTON CLARKIAE.—For 2nd ser. March 1852 *read* ser. 2 (1852), ix, p. 191.

P. 210. MONTACUTA FERRUGINOSA.—For Test. Brit., p. 44, tab. 26, f. 5 *read* Test. Brit. Suppl., p. 22, tab. 26, f. 2 (the reference to *M. bidentata* is given over again by mistake).

P. 219. LASAEA RUBRA.—For p. 83, tab. 27 *read* p. 83; Suppl. tab. 27. The Supplement to the Testacea Britannica was published five years after the second of the two Parts.

P. 225. KELLIA SUBORBICULARIS.—For p. 39, tab. 26 *read* p. 39; Supp. tab. 26.

P. 233. LORIPES LACTEUS.—For p. 1119 *read* ed. 10, p. 676, no. 50.

P. 235. LORIPES DIVARICATUS.—For p. 1120 *read* ed. 10, p. 677, no. 55.

P. 240. LUCINA SPINIFERA.—For p. 577, pl. 17 *read* p. 577; Suppl. pl. 17.

P. 270. CARDIUM ECHINATUM.—For p. 1122 *read* ed. 10, p. 679, no. 63.

P. 273. CARDIUM TUBERCULATUM.—For p. 1124 *read* ed. 10, p. 679, no. 65.

P. 275. CARDIUM PAPILLOSUM.—For ii, p. 56 *read* Vol. 1, Ord. 2, p. 56.

P. 281. CARDIUM FASCIATUM.—After p. 30 *add* Tab. 27, f. 6.

P. 283. CARDIUM NODOSUM.—For Conch. Dith. *read* Conch. Ins. Brit. (See note on P. 198).

P. 286. CARDIUM EDULE.—For p. 1124 *read* ed. 10, p. 681, no. 77.

- P. 292. CARDIUM MINIMUM.—Dele p. 38.
- P. 298. ISOCARDIA COR.—For *Chama Cor read Chama cor* (one of Linné's slips in printing).
- P. 304. CYPRINA ISLANDICA.—For *Venus Islandica read Venus islandica*.
- P. 311. ASTARTE SULCATA.—For *Pectunculus costatus read Pectunculus sulcatus*.
- P. 327. VENUS EXOLETA.—For p. 1134 *read* ed. 10, p. 688, no. 117.
- P. 330. VENUS LINCTA.—For Hutch. Dors., p. 34 *read* Hutchins' Dorset, ed. i (1799), p. 34. The second edition (1813) exhibits considerable alterations in nomenclature.
- P. 332. VENUS CHIONE.—For p. 1131 *read* ed. 10, p. 686, no. 100.
- P. 337. VENUS CASINA.—For p. 1130 *read* ed. 10, p. 685, no. 95.
- P. 339. VENUS VERRUCOSA.—For p. 1130 *read* ed. 10, p. 685, no. 94.
- P. 344. VENUS GALLINA.—For *V. gallina . . .* p. 1130 *read* *V. Gallina . . .* ed. 10, p. 685, no. 96.
- P. 359. TAPES DECUSSATUS.—For p. 1135 *read* ed. 10, p. 690, no. 126.
- P. 363. LUCINOPSIS UNDATA.—For Brit. Zool., p. 95 *read* Brit. Zool., iv, p. 95.
- P. 367. GASTRANA FRAGILIS.—For p. 1117 *read* ed. 10, p. 674, no. 37.
- P. 371. TELLINA BALAUSTINA.—For p. 1119 *read* ed. 10, p. 676, no. 47.
- P. 375. TELLINA BALTHICA.—For p. 1120 *read* ed. 10, p. 677, no. 52.
- P. 382. TELLINA FABULA.—For *T. fabula*, Gron. Zoophyl., iii, p. 268 *read* *T. fabula*, Gron. Zoophyl. (1781), iii, p. 263.
- P. 384. TELLINA SQUALIDA.—For Hutch. Dors., p. 29 *read* Hutchins' Dorset, ed. i (1799), p. 29.
- P. 386. TELLINA DONACINA.—For p. 1118 *read* ed. 10, p. 676, no. 46.
- P. 392. PSAMMOBIA TELLINELLA.—For V. p. 515 *read* (1818) v, p. 315. It is necessary to indicate the edition.
- P. 394. PSAMMOBIA COSTULATA.—For Conch. Dith. *read* Conch. Ins. Brit. (1822). See note on p. 198.
- P. 402. DONAX VITTATUS.—For p. 202 *read* p. 207.
- P. 407. DONAX TRUNCULUS.—For *D. trunculus . . .* p. 1127 *read* *D. Trunculus . . .* ed. 10, p. 682, no. 85.

- P. 408. DONAX POLITUS.—For 1 p. 44 *read* (1791), Vol. i, Ord. 2, p. 44.
- P. 413. AMPHIDESMA CASTANEUM.—For Test. Brit. App., p. 573, t. 17, f. 2 *read* Test. Brit. Part ii, p. 573; Suppl. t. 17, f. 2.
- P. 415. MACTRA SOLIDA.—For *M. solida* . . . p. 1126 *read Cardium solidam* . . . ed. 10, p. 681, no. 76.
- P. 422. MACTRA STULTORUM.—For *M. stultorum* . . . p. 1126 *read Cardium stultorum* . . . ed. 10, p. 681, no. 80.
- P. 425. MACTRA GLAUCA.—For Born, Test. Mus. Caes. Vind., p. 51, t. 3, f. 11, 12 *read* Born, Ind. Mus. Caes. Vind. (1778), p. 40; there are no plates in the Index; the date of the Testacea is 1780.
- P. 428. LUTRARIA ELLIPTICA.—Add the date (1818) of the edition.
- P. 438. SCROBICULARIA ALBA.—The author of the species should be distinguished as W. Wood.
- P. 442. SCROBICULARIA TENUIS.—For Test. Brit. Suppl., p. 572, t. 17, f. 7 *read* Test. Brit. (1803), p. 572; Suppl. (1808), t. 17, f. 7.
- P. 444. SCROBICULARIA PIPERATA.—Bellonius cannot stand as the author of this species. His “piperata chama” is figured on p. 404 of Liber II of the treatise *de Aquatilibus* (1553). Gmelin is the true author, and Jeffreys gives the reference.

VOLUME III.

- P. 6. SOLECURTUS ANTIQUATUS.—For Cat. Dors. *read* Hutchins’ Dorset, ed. i (1799).
- P. 10. CERATISOLEN LEGUMEN.—For *legumen* . . . p. 1114 *read Legumen* . . . ed. 10, p. 672, no. 26.
- P. 14. SOLEN PELLUCIDUS.—For pl. lxvi *read* pl. 46.
- P. 16. SOLEN ENSIS.—For *ensis* . . . p. 1114 *read Ensis* . . . ed. 10, p. 672, no. 25.
- P. 18. SOLEN SILIQUA.—For *siliqua* . . . p. 1113 *read Siliqua* . . . ed. 10, p. 672, no. 24.
- P. 20. SOLEN VAGINA.—For *vagina* . . . p. 1113 *read Vagina* . . . ed. 10, p. 672, no. 23.
- P. 24. PANDORA INAEQUIVALVIS.—For *Tellina* . . . p. 1118 *read Solen* . . . ed. 10, p. 673, no. 32.
- P. 34. THRACIA PRAETENUIS.—For Cat. Dors. *read* Hutchins’ Dorset, ed. i (1799).
- P. 38. THRACIA PUBESCENS.—For Cat. Dors. *read* Hutchins’ Dorset, ed. i (1799).

P. 45. POROMYA GRANULATA.—For *Corbula granulata* d'Anvers read *Corbula ? granulata*, Nyst and West., Nouv. Recherch. Coq. Foss. d'Anvers (1839).

P. 49. NEAERA COSTELLATA.—For Exp. Scient. Mor. (Géologie), p. 86, t. vii read Exp. Scient. Mor. (Zoologie), 1833, Tome iii, pt. 1, sect. 1, t. xxiv.

P. 51. NEAERA ROSTRATA.—For iii read 1793, iii, pt. 1.

P. 64. MYA ARENARIA.—For p. 1112 read ed. 10, p. 670, no. 17.

P. 66. MYA TRUNCATA.—For p. 1112 read ed. 10, p. 670, no. 16.

P. 70. MYA BINGHAMI.—For Turt. Dith. read Turt. Conch. Ins. Brit. (1822).

P. 86. VENERUPIS IRUS.—For p. 1128 read ed. 10, p. 683, no. 90.

P. 104. PHOLAS DACTYLUS.—For *dactylus* p. 1110 read *Dactylus* ed. 10, p. 669, no. 10.

P. 107. PHOLAS CANDIDA.—For p. 1111 read ed. 10, p. 669, no. 13.

P. 112. PHOLAS CRISPATA.—For *P. crispata* p. 1111 read *Mya crispata* ed. 10, p. 670, no. 15.

P. 116. PHOLADIDEA PAPYRACEA.—For Turt. Dith. read Turt. Conch. Ins. Brit. (1822).

P. 168. TEREDO NORVEGICA.—For f. 4—6B, and 7 read f. 4—6 and B. There is no reason why Spengler's spelling *norvayica* should be altered.

P. 171. TEREDO NAVALIS.—For p. 1267 read ed. 10, p. 651, no. 2.

P. 176. TEREDO MEGOTARA.—For xvii read xviii.

P. 181. TEREDO MALLEOLUS.—The reference, which is omitted, is Turton, Conch. Ins. Brit. (1822), p. 255, pl. 2, f. 19.

P. 182.—TEREDO BIPENNATA (the alteration to *bipinnata* is needless). The reference, which is omitted, is Turton, Conch. Dict. (1819), p. 184, f. 38—40.

P. 191. DENTALIUM ENTALIS.—For *D. entalis* p. 1263 read *D. Entalis* ed. 10, p. 785, no. 688.

P. 214. CHITON DISCREPANS.—For Ill. Conch., p. 65, pl. xxi, f. 20 read Ill. Conch., ed. 1 (1827), pl. 35, f. 20; ed. 2 (1844), p. 65, pl. 21, f. 20. There is no description in ed. 1.

P. 215. CHITON HANLEYI.—Remove the brackets from (Bean).

P. 217. CHITON CANCELLATUS.—The full reference is G. B. Sowerby, Jun., Descriptive Catalogue of British Chitones, p. 4, in Conch. Illust., Part 167, f. 104 (twice) 104a, 104b, 105. "Part" apparently = Plate. It is quite time that Leach's name should cease to be attached to this species. The following remark seems to have been lost sight of. "The supposed *Chiton cancellatus* of Leach,—for the species was

never characterised by that naturalist, and Mr. Sowerby doubtfully gives him the reputation of founding it, solely from the traditionary authority of collectors, . . .”—Forbes and Hanley, *Brit. Moll.* ii, p. 410.

P. 218. *CHITON CINEREUS*.—By a curious slip, Linné treats *Chiton* as feminine in this species only.

P. 224. *CHITON RUBER*.—The Linnean reference is *Syst. Nat.*, ed. 12 (1767), p. 1107, no. 7.

P. 226. *CHITON LAEVIS*.—The reference to Pennant is *Brit. Zool.*, Svo. ed. (1777), iv, pl. 36, f. 3.

P. 236. *PATELLA VULGATA*.—For p. 1258 *read* ed. 10, p. 782, no. 664.

P. 242. *HELICION PELLUCIDUM*.—For p. 1260 *read* ed. 10, p. 783, no. 673.

P. 254. *PROFILIDIUM ANCYLOIDE*.—For *Ancyloides* *read* *ancyloides*.

P. 257. *PUNCTURELLA NOACHINA*. For *Patella Noachina* . . . p. 551 *read* *Patella noachina* . . . (1771), p. 551. The only British species whose prime authority is the *Mantissa*.

P. 259. *EMARGINULA FISSURA*.—For *Patella fissura* . . . p. 1261 *read* *Patella Fissura* . . . ed. 10, p. 784, no. 681.

P. 263. *EMARGINULA CRASSA*.—For p. 73 *read* p. 73 *bis*.

P. 266. *FISSURELLA GRACEA*.—For p. 1262 *read* ed. 10, p. 784, no. 683.

P. 269. *CAPULUS HUNGARICUS*.—Linné's spelling *ungarica* (*Patella*) should certainly not be altered.

P. 273. *CALYPTRAEA CHINENSIS*.—For p. 1257 *read* ed. 10, p. 781, no. 656.

P. 279. *HALIOTIS TUBERULATA*.—For p. 1256 *read* ed. 10, p. 780, no. 648.

P. 287. *CYCLOSTREMA CUTLERIANUM*.—For new ser., vol. iv *read* (1849). Ser. 2, iv.

P. 305. *TROCHUS MAGUS*.—For *T. magus* . . . p. 1228 *read* *T. Magus* . . . ed. 10, p. 757, no. 507.

P. 309. *TROCHUS CINERARIUS*. For p. 1229 *read* ed. 10, p. 758, no. 512.

P. 312. *TROCHUS UMBILICATUS*.—For *N. umb.* *read* *T. umb.*

P. 320. *TROCHUS MONTAGUTI*.—For *T. Montagui*, Wood, Ind. Test. Suppl., p. 6, f. 43 *read* *T. Montagui*, Gray, MS., Hanley's ed. of W. Wood, Ind. Test. (1856), p. 221, Suppl. pl. 6, *Trochus* f. 43. The true name of the species would thus appear to be *T. Montagui* (Gray), W. Wood.

P. 322. *TROCHUS STRIATUS*.—For p. 1230? *read* ed. 10, p. 759, no. 518.

P. 330. *TROCHUS ZIZYPHINUS*.—For *T. zizyphinus* . . . p. 1231 read *T. Zizyphinus* . . . ed. 10, p. 759, no. 520.

P. 338. *PHASIANELLA PULLA*.—Read *pullus* (see A. H. Cooke in Journ. Malac., 1899, vii, p. 31). For *Turbo pullus* . . . p. 1233 read *Turbo Pullus* . . . ed. 10, p. 761, no. 531.

P. 356. *LITTORINA OBTUSATA*.—For p. 1232 read ed. 10, p. 761, no. 526.

P. 361. *LITTORINA NERITOIDES*.—For *Turbo neritoides* . . . p. 1232 read *Turbo Neritoides* . . . ed. 10, p. 761, no. 527.

P. 368. *LITTORINA LITOREA*.—Read *litorea*; it is the height of absurdity to spell the generic name with two t's and the specific with one. For p. 1232 read ed. 10, p. 761, no. 528.

VOLUME IV.

P. 8. *RISSOA CANCELLATA*.—It should be remarked that Da Costa's figures represent the species as sinistral.

P. 22. *RISSOA COSTATA*.—The author should be quoted as J. Adams, and it should be remarked that his figures represent the species as sinistral.

P. 29. *RISSOA ALBELLA*.—For Ind. Moll. Scand., p. 25 read Oefv. Kon. Vetensk. Akad. Förh., 1846, iii, p. 157.

P. 30. *RISSOA MEMBRANACEA*.—The author should be quoted as J. Adams, and for f. 12, 13 read f. 14, 15.

P. 33. *RISSOA VIOLACEA*.—The author's name is not Desmaretz but Desmarest, and the reference is Bull. Sci. Soc. Philom. Paris, 1814, p. 8, pl. i, f. 7.

P. 37. *RISSOA STRIATA*.—The author of this species, and of *R. fulgida* p. 43, should be quoted as J. Adams.

P. 39. *RISSOA PROXIMA*.—The reference is omitted, and I do not think that the species was ever properly described by Alder. (See Thompson, Ann. Mag. Nat. Hist., 1847, xx, p. 174). If so, the right reference will probably be *R. proxima* (Alder), Forbes and Hanley, Brit. Moll., 1853, iii, p. 127.

P. 59. *JEFFREYSIA DIAPHANA*.—The references need complete revision; they should read

Rissoa? glabra, Brown, Alder, Ann. Mag. Nat. Hist., 1844, xiii, p. 325.

Rissoa? diaphana, Alder, Trans. Tynes. Nat. Field Club, 1850, i, p. 149.

P. 69. *HOMALOGYRA ATOMUS*.—For p. 54 read p. 44.

P. 80. *TURRITELLA TEREBRA*.—For *Turbo terebra* . . . p. 1239 read *Turbo Terebra* . . . ed. 10, p. 766, no. 562.

P. 89. SCALARIA TURTONAE.—Turton's original name *Turtonis* seems to have been needlessly altered.

P. 93. SCALARIA TREVELYANA.—The reference to Winch's Geology of Lindisfarn (1822) is quite beside the point, as he gives no description whatever. The name appears to have remained in MS. quite a remarkable length of time, it was still so in 1840 (Thompson, Ann. Nat. Hist., v, p. 245). The proper reference, hinted at by Jeffreys on p. 95, is Johnston, Proc. Bewicksh. Nat. Club, 1841, i, p. 263. It would thus appear that the species should be quoted as *S. trevelyana* (Leach), Johnston.

P. 96. SCALARIA CLATHRATULA.—The reference Ad. Micr., t. 14, f. 19 is quite inadequate. *Read* G. Adams, Essays on the Microsc., ed. 2, 1798, p. 637, pl. 14, f. 19. The species was not described in ed. 1, 1787.

P. 103. ACLIS SUPRANITIDA.—The reference given "Cat Crag. Moll.," is useless, *read* Ann. Mag. Nat. Hist., 1842, ix, p. 534, pl. v, f. 2.

P. 106. ACLIS GULSONAE.—For 3rd. ser. *read* 2nd. ser.

P. 118. ODOSTOMIA CLAVULA.—For Ind. Moll. Scand., p. 18 *read* Oefv. Kon. Vetensk. Akad. Förh., 1846, iii, p. 150.

P. 121. ODOSTOMIA ALBELLA.—For Ind. Moll. Scand., p. 19 *read* Oefv. Kon. Vetensk. Akad. Förh., 1846, iii, p. 151.

P. 124. ODOSTOMIA PALLIDA.—For p. 325, t. 21 *read* p. 325, Suppl. t. 21.

P. 127. ODOSTOMIA CONOIDEA.—For p. 659 *read* p. 660.

P. 137. ODOSTOMIA PLICATA.—For p. 325, t. 21, *read* p. 325, Suppl. t. 21.

P. 155. ODOSTOMIA EXIMIA.—For new ser. *read* 2nd. ser.

P. 164. ODOSTOMIA LACTEA.—For p. 1238 *read* ed. 10, p. 765, no. 552.

P. 169. ODOSTOMIA SCILLAE.—For the remarkable reference Notizie int. alle Conch. p. 51 *read* Ann. Civ. Regn. due Sicil., 1835, vii, p. 11, Tav. ii, f. 2.

P. 186. IANTHINA ROTUNDATA.—The reference to "(Leach MS.), Dillwyn, Contributions towards a History of Swansea (1840), p. 59" cannot possibly stand. I quote the passage:—"1824, July.—Many thousand shells of *Janthina*, of which some retained the animal alive . . . were thrown on the shores of Oxwich Bay . . . A few of these *Janthina*, which had before at different times been washed up in the same bay, received from Dr. Leach his MS. name of *J. rotundata*." The species is generally known as *communis*, Lam.

P. 195. STILIFER TURTONI.—It may be worth while noting that

the Zoological Society's first publication was entitled "Proceedings of the Committee of the Science and Correspondence of the Zoological Society of London ; Part i (1830—1831), Part ii (1832)." Then began "Proceedings of the Zoological Society of London, Part 1 (1833)," and so continued until Part xxviii (1860). In 1861 and afterwards the number of the Part has not appeared on the title-page.

Strictly speaking the name of this species is *Stilifer styliifer*, Turton.

P. 201. EULIMA POLITA.—For p. 1241 *read* ed. 10, p. 767, no. 570.

P. 203. EULIMA INTERMEDIA.—I am quite unable to understand what is meant by the reference to "Cantr. Mal. Méd. (Suppl.), p. 14." *Revel Bull. Acad. Roy. Sci. Bruxelles* (1835), ii, p. 390, the original description. In Jeffreys' list of works referred to (*Brit. Conch.*, v, p. 236), he refers, under Cantraine, F., to a "Malacologie méditerranéenne et littorale" as published in *Nouv. Mém. Acad. Bruxelles*, 1841, and to a supplement to the same, as published in *Bull. Acad. Sci. Bruxelles*, 1842. No such works occur in either of the volumes referred to.

P. 210. EULIMA BILINEATA.—For p. 47 *read* i, p. 141.

P. 214. NATICA ISLANDICA.—For *Nerita Islandica read Nerita islandica*.

P. 227. NATICA MONTACUTI.—*Montagui* should be restored, and for f. 3, 4 *read* f. 3, 4, 5.

P. 235. LAMELLARIA PERSPICUA.—For p. 1250 *read* ed. 10, p. 775, no. 621.

P. 245. TRICHOTROPIS BOREALIS.—For p. 395 *read* p. 375.

P. 250. APORRHAI PES PELECANI.—For *Strombus pes pelecani* . . . p. 1207 *read Strombus Pes pelecani* . . . ed. 10, p. 742, no. 422.

P. 256. CERITHIUM METULA.—For *Ind. Moll. Scand.*, p. 23 *read* *Oefv. Kon. Vetensk. Akad. Förh.*, 1846, iii, p. 155.

P. 261. CERITHIUM PERVERSUM.—For p. 1231 *read* ed. 10, p. 760, no. 523.

P. 271. CERITHIOPSIS METAXA.—For *Mem.* iii *read* *Mem. stor. notom. Napoli*, iii.

P. 276. PURPURA LAPILLUS.—For *Buccinum lapillus* . . . p. 1202 *read Buccinum Lapillus* . . . ed. 10, p. 739, no. 403.

P. 285. BUCCINUM UNDATUM.—For p. 1204 *read* ed. 10, p. 740, no. 410.

P. 293. BUCCINUM HUMPHREYSIANUM.—For *Zool. Journ.*, i, p. 298, pl. xxx (upper figures) *read* *Zool. Journ.*, 1825, i, p. 398, pl. xxii (two upper figures).

P. 298. BUCCINOPSIS DALEI.—For *Min. Conch.*, p. 139 *read* *Min. Conch.*, 1825, v, p. 139.

P. 306. MUREX ERINACEUS.—For *Murex erinaceus* . . . p. 1216
read *Murex Erinaceus* . . . ed. 10, p. 748, no. 451.

P. 319. TROPHON TRUNCATUS.—For (*truncatum*) read (*Truncatum*).

P. 323. FUSUS ANTIQUUS.—For p. 1222 read ed. 10, p. 754,
no. 486.

P. 329. FUSUS NORVEGICUS.—For *Strombus Norvegicus* . . .
Conch. Cab., xi read *Strombus Norvegicus* . . . Conch. Cab., 1788, x.
In the Verzeichniss p. 204 the name is printed *Norvegicus*, but as it
is *Norvegicus* in the description it must so remain.

P. 331. FUSUS TURTONI.—For Mag. N. H., viii read Mag. Nat.
Hist., 1834, vii.

P. 338. FUSUS PROPINQUUS.—For Club), p. 63 read Club, i,
(1847), p. 157.

P. 346. NASSA RETICULATA.—For p. 1204 read ed. 10, p. 740,
no. 411.

P. 359. COLUMELLULA NANA.—For Ind. Moll. Scand., p. 12 read
Oefv. Kon. Vetensk. Akad. Förh., 1846, iii, p. 144.

P. 362. DEFRANCIA TERES.—No proper definition is given by
Forbes in the passage quoted from the Annals. Read (Forbes)
Reeve, Conch. Icon., 1844, i, *Pleurotoma*, pl. xix, f. 161, to which
Forbes refers in the Annals passage.

P. 388. PLEUROTOMA NIVALIS.—For Ind. Moll. Scand., p. 14
read Oefv. Kon. Vetensk. Akad. Förh., 1846, iii, p. 146.

P. 390. PLEUROTOMA SEPTANGULARIS.—For p. 260 read p. 268.

P. 403.—CYPRAEA EUROPEA.—For (ii), p. 88 read Suppl., p. 88.

P. 411. CYLICHNA ACUMINATA.—For Enc. Méth. (Vers.), t. vi
read Enc. Méth. Vers., 1792, i.

P. 412. CYLICHNA NITIDULA.—For Ind. Moll. Scand., p. 10
read Oefv. Kon. Vetensk. Akad. Förh., 1846, iii, p. 142.

P. 417. CYLICHNA ALBA.—For Ill. Conch. G. B. & I., p. 3, pl.
xix, f. 43-44 read Ill. Conch., ed. 1, 1827, pl. 38, f. 43, 44; ed. 2, 1844,
p. 3, pl. 19, f. 43, 44.

P. 421. UTRICULUS TRUNCATULUS.—For (Vers.), t. vi read Vers.,
1792, i.

P. 425. UTRICULUS VENTROSUS.—The species was not described,
but only figured, in the reference from Ann. Mag. It was first
described in the present passage.

P. 433. ACTAEON TORNATILIS.—For p. 1187 read ed. 10, p. 728,
no. 342.

P. 437. BULLA HYDATIS.—For p. 1183 read ed. 10, p. 726, no.
333.

P. 443. SCAPHANDER LIGNARIUS.—For p. 1184 *read* ed. 10, p. 727, no. 335.

P. 447. PHILINE SCABRA.—For Zool. Dan., ii, p. 41, t. lxxi, f. 10—12 *read* Zool. Dan., 1784, ii, p. 90; Atlas, pl. 71, f. 10—12. There are two editions of the Zoologia Danica, differing widely from one another; the date of the later, which contains the Atlas, is 1788—1806.

P. 453. PHILINE PUNCTATA.—This species should not be assigned to Clark but to J. Adams, who described it thirty years before, as *Bulla punctata*, in Linn. Trans., 1798, v, p. 2, pl. 1, f. 6—8.

VOLUME V.

P. 5. APLYSIA PUNCTATA.—For *A. punctata* Cuv., Annals du Muséum, 1803, ii, p. 295, pl. i, f. 2—5 *read* *Laplysia punctata*, Cuvier, Ann. Mus. Hist. Nat. Paris, 1803, ii, p. 295, pl. 51 (*Laplysia* pl. 1), f. 2—5.

P. 7. APLYSIA DEPILANS.—The *Laplysia depilans* of the Systema ed. 12, is now, I believe, regarded as identical with *Tethys limacina* of ed. 10, p. 653.

P. 10. PLEUROBRANCHUS MEMBRANACEUS.—For *Lamellaria membranacea*, Mont. *read* *Lamellaria* or *Bulla membranacea*, Mont.

P. 17. PLEUROPHYLLIDIA LOVENI.—For *P. Loveni*, Bergh in Foren. vidensk. Meddel. for 1860 *read* *P. Lovéni*, Bergh, Vid. Medd., 1860.

P. 95. ONCHIDIUM CELTICUM.—For *Onchidium Celticum*, Cuv., Règne An., iii *read* *Onchidium celticum*, Cuv., Règne Anim. nouv. éd., 1830, iii. As Jeffreys truly says, the species is “indicated but not described” in the above passage. It would be interesting to find out who first attached a description to the species.

P. 101. ASSIMINEA LITTORINA.—For p. 215 *read* p. 225.

P. 115. SPIRIALIS RETROVERSUS.—For p. 498 *read* p. 499.

P. 119. CLIO PYRAMIDATA.—Browne was not a binomial author so that in any case his description “*Clio* 1. *Vaginâ triquetrâ pyramidatâ, ore oblique truncato*” cannot stand. The first edition of the Civ. Nat. Hist. Jamaica was in 1756, the second in 1789. Linné in his ed. 10 of the Systema, published in 1758 (between Browne’s two editions) took up the name *pyramidata*. It thus becomes *C. pyramidata*, Linné.

P. 128. OMMASTREPES TODARUS.—Jeffreys seems to have “Frenchified” the title of the work, and his reference is not correct. *Read* Delle Chiaje, Memor. stor. notom. Napoli, Atlas (1822), Pl. 61, f. i. The species is mentioned, but not described, in the text, vol. iv, p. 161

P. 129. OMMASTREPHEs SAGITTATUS.—For Mém. Soc. H. N., p. 13 *read* Mém. Soc. Hist. Nat. Paris, 1799, p. 13. The volume (the first) does not appear to have been numbered. Repeat the correction on pp. 130, 144, 146.

P. 132. LOLIGO MEDIA.—For p. 1095 *read* ed. 10, p. 659. no. 3.

P. 133. ROSSIA MACROSOMA.—The completely correct reference to Delle Chiaje must be deferred for a while. That author appears to make no reference to *Sepiola macrosoma* in the *text* of the Memorie. But in the Descrizione e Notomia (1841, twelve years later), he refers (i, p. 10, note) to the Memorie Atlas, Pl. lxxi, 11, and again (v, p. 68) to Pl. lxx, 1—11, of the same. (These references are evidently to the same figure, and the error is that of the typographer.) But in the Memorie Atlas, as at first published, there are only 69 plates in all; Delle Chiaje, however, intended to publish more (Descriz. e Notom., p. xiii), but whether he ever did so or not I have not at present been able to discover.

P. 136. SEPIOLA RONDELETHI.—By strict rules the species should be known as *Sepiola sepiola*, Linné. See, on the whole question, Hoyle, 'Challenger,' vol. xvi, p. iii.

P. 138. SEPIA OFFICINALIS.—For p. 1095 *read* ed. 10, p. 658, no. 2.

P. 140. SEPIA ELEGANS.—For t. lxxviii, p. 44 *read* t. xlvi, p. 284.

P. 141. SEPIA BISERIALIS.—For p. 75, pl. 26 *read* p. 73, pl. 26, f.—k.

DESCRIPTION OF TWO NEW SPECIES OF HELICOID LAND SHELLS.

By G. K. GUDE, F.Z.S.

Epiphragmophora dormeri, n. sp. Figs. 1—3.

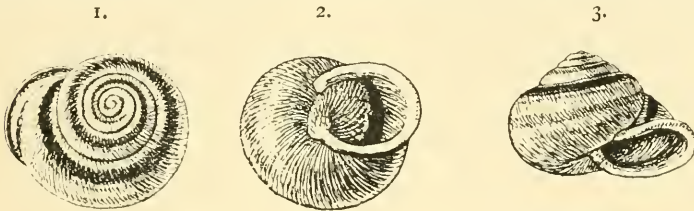
SHELL covered-umbilicate, solid, pale straw-yellow, with a dark brown sutural band ascending the last two whorls, and a faint peripheral band which becomes evanescent towards the mouth. Spire conoid, slightly elevated; suture impressed, apex obtuse. Whorls 5, tumid, increasing rapidly, the last twice as wide as the penultimate, laterally compressed, and deeply descending in front. The apical whorl smooth, the next three finely and regularly ribbed; the ribs almost obliterated by fine wrinkled malleations on the last whorl. Aperture very oblique, ovate; margins convergent, connected by a thin callus. Peristome

white, polished, thickened and strongly reflected; the columellar margin triangularly dilated and covering the narrow umbilicus.

Diam. maj. 23.5, minor 20.5; alt. 17 mm.

Hab.—Mont Ascuncion, Paraguay. *Type* in my collection.

The nearest ally of this shell is *E. estella*, d'Orb., the type of the latter is in the British Museum, where, through the courtesy of Mr. Edgar A. Smith, I have been able to inspect it. The shell is much more depressed than that of the present species, especially in the

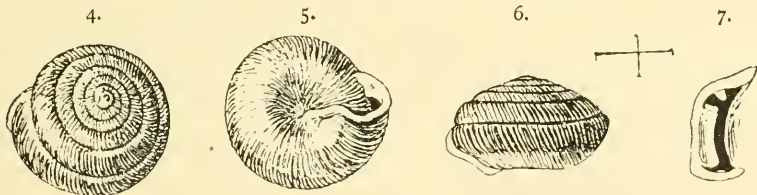


body whorl; and there are only four whorls, which are strongly mal-leated. *E. dormeri* is further distinguished from *E. estella* by its less dilated aperture, the presence of the dark subsutural band, and the deep deflection of the last whorl.

The species is named in honour of the late Lord Dormer who collected the shells.

Sesara mouleyitensis, n. sp. Figs. 4—7, enlarged.

Shell imperforate, semiglobular, corneous brown, finely and regularly ribbed, paler and nearly smooth below; embryonal whorl smooth. Spire convex; suture shallow; apex rather prominent, obtuse. Whorls nearly 7, increasing slowly, the last gradually receding below the



penultimate, rounded, not deflexed in front; deeply impressed at the umbilical region. Aperture subtrapezoid, nearly vertical. Peristome white, strongly thickened and slightly reflected; looked at from below it has the shape of a note of interrogation. Inside the aperture on the palatal wall is a strong, stout, horseshoe-shaped fold, extending over nearly the whole of the basal margin and having the concave side outward. On the columellar margin occurs a narrow entering fold.

Diam. 10; alt. 5.75 mm.

Hab.—Mount Mouleyit, Tenasserim, Burma. *Type* in my collection.

This is an interesting form of *Sesara*, allied to *S. attaranensis*, Theob., which, however, is a much smaller shell. The new species is further distinguished from *S. attaranensis*, by its semiglobular shape, rounded whorls, deeply impressed umbilical region, and receding last whorl. In the shape of the aperture, the form of the peristome, the horseshoe-shaped fold on the basal margin, and the entering collumellar fold, the two species are remarkably alike. Figure 7 (enlarged) shows the aperture with its two folds.

For both the shells here described, I am indebted to the kindness of Colonel Beddome, whose MS. name of the latter species I have had much pleasure in adopting.

DESCRIPTION OF TWO NEW SPECIES OF MICROPARMARION FROM THE ANDAMAN ISLANDS.

BY WALTER E. COLLINGE,

The University, Birmingham.

(Plate i.)

HITHERTO the only reference to any *Parmarion*-like molluscs in the Andaman Islands, is a brief note by Lieut.-Col. Godwin-Austen¹ in a paper on the Land molluscan fauna of these and neighbouring islands. He there states that his brother and Col. Hobday found, when making the ascent of Saddle Peak on North Andaman, a large slug-like form resembling *Girasia*. The specimen, unfortunately, was accidentally lost before they returned into camp.

In the early part of last year Dr. O. F. von Möllendorff sent me two molluscs from the Andaman Islands, both of which belong to the genus *Microparmarion*.

I take this opportunity of expressing to him my best thanks, for so kindly placing these very interesting molluscs in my hands. To the Council of the Birmingham Natural History and Philosophical Society, I also desire to express my best thanks for their kindness in defraying the artist's charges in connection with the accompanying plate.

Microparmarion möllendorffi, n. sp. Pl. 1, figs. 1—6.

Animal a dark blue, excepting laterally just behind the head, and on the dorsum beneath the anterior portion of the mantle, where the ground colour is a dirty yellow. Mantle dark blue, covering the visceral mass from all sides, portion bordering the shell thin. Visceral mass overlapping the posterior portion of the dorsum, which is flattened. Caudal mucous pore a vertical slit not extending to the foot-sole. Keel short and prominent. Rugæ small. Peripodial groove distinct. Foot-fringe dark blue with yellow lineoles. Foot-sole yellowish, divided into median and lateral planes.

Length (in alcohol) 31 millim.

Shell (Pl. 1, fig. 3) oval in form, with a slight indication of the apical whorl, borders thin and membranaceous.

Major diam. 11.5, min. diam. 8 millim.

Type in my collection.

ANATOMY OF THE GENERATIVE ORGANS.

The penis is a thick muscular walled tube, terminating in a beak-like head. In section (Pl. 1, fig. 5), the lumen is seen to pass to almost the distal end and to widen into two sac-like portions, the upper of which is connected with the vas deferens. Viewed externally the vas deferens is connected with the penis on its ventral side, whilst the retractor muscle is inserted a little nearer the distal end on the dorsal side. The receptaculum seminis has a short duct which enters the vagina on its inner side (Pl. 1, fig. 4). Above this is the free oviduct, just before it enters the common duct, it becomes more globose and then narrowing suddenly, becomes the oviducal portion of the common duct. The dart-sac (Pl. 1, fig. 4, *d. s.*) is a large thick muscular organ sharply bent upon itself. The fundus of the dart is situated at the first bend. The dart (Pl. 1, fig. 6) is a long calcareous rod which becomes gradually finer at the free end.

The prostatic and oviducal canals, forming the common duct, are richly folded and partly cover the albumen gland.

Microparmarion andamanica, n. sp. Pl. 1, figs. 7—10.

Animal yellowish with dark mottling laterally, anteriorly the dorsum is light yellow with a dark blue lateral band extending from the head to the visceral mass. Mantle same colour as the body, with well developed keel encircling the visceral mass, mantle covers the visceral mass from all sides, portion bordering the shell thin. Visceral mass overlaps the posterior portion of the dorsum which is flattened.

Caudal mucous pore small. Keel longer than in preceding species. Peripodial groove prominent. Foot-fringe yellowish-brown with yellow lineoles. Foot-sole yellowish-brown, divided into median and lateral planes.

Length (in alcohol) 24 millim.

Shell (Pl. 1, figs. 9 and 10) elongate oval in form, with a slight indication of apical whorl, membranaceous, and slightly wraps over the visceral mass.

Hab.—North Andaman. *Type* in my collection.

The generative organs were not mature in this species.

Having only a single specimen of each of these new species, I am unable to give a more detailed description, but I am hoping to obtain more, when further particulars will be given.

EXPLANATION OF PLATE I.

Microparmarion möllendorffi, n. sp.

- Fig. 1. View of the animal from the right side. $\times 2$.
 Fig. 2. Dorsal view. $\times 2$.
 Fig. 3. Shell. $\times 2$.
 Fig. 4. Generative organs. $\times 2\frac{1}{2}$.

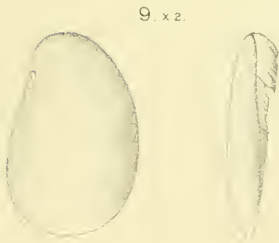
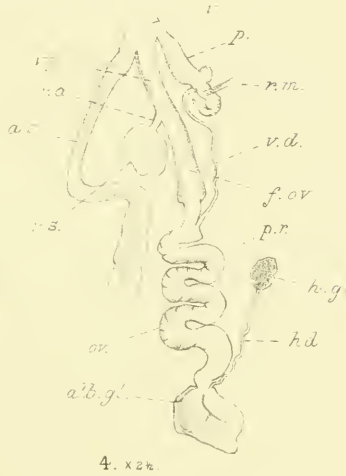
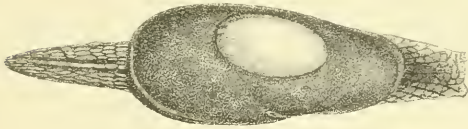
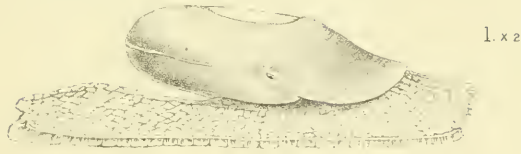
REFERENCE LETTERS.

alb. gl.	Albumen gland.	pr.	Prostate.
d. s.	Dart-sac.	r. m.	Retractor muscle.
f. ov.	Free-oviduct.	r. d.	Receptacular duct.
h. d.	Hermaphrodite duct.	r. s.	Receptaculum seminis.
h. gl.	Hermaphrodite gland.	v.	Vestibule.
ov.	Oviduct.	v. d.	Vas deferens.
p.	Penis.	vg.	Vagina.

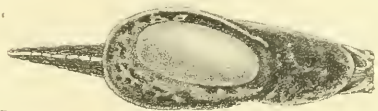
- Fig. 5. Horizontal section through the penis.
 Fig. 6. Dart-sac and dart *in situ*. $\times 10$.

Microparmarion andamanica, n. sp.

- Fig. 7. View of the animal from the right side. $\times 2$.
 Fig. 8. Dorsal view. $\times 2$.
 Fig. 9. Dorsal view of the shell. $\times 2$.
 Fig. 10. Lateral view of the same. $\times 2$.



10. x 2.



Figs 1-3, & 7-10, F.J.P. del. ad nat.
Figs 4-6, F.W.C. del. ad nat.

A.S. Huth, Lith^r London.

NEW MICROPARMARIONS.

NOTE ON MYRINA SIMPSONI, MARSH.

By J. T. MARSHALL.

WITH reference to my paper describing this species¹, I am indebted to Mr. Edgar A. Smith for pointing out to me that he "understands the name *Myrina*, H. and A. Adams, was preoccupied many years ago, but does not see how it is conchologically separable from *Adula* of the same authors." I do not know the genus *Adula*, but my faith in Mr. Smith's conchological instinct is so strong that I have no hesitation in substituting *Adula*, H. and A. Ad., for *Myrina*.

Mr. Smith also writes me that *Adula (Myrina) pelagica*, the type of the genus, was found "off the Cape of Good Hope, attached to floating masses of blubber."

Since my paper on the subject appeared in this journal, a piece of pitch pine, bored by *Xylophaga* and *Teredo*, was landed on the fish-quay of Aberdeen by a trawler, who said it came from the "Shetland fishing-grounds," and in the deserted tubes were *Adula simpsoni* attached by a byssus. This is especially interesting, as the habitat is in complete harmony with that of *A. argenteus*, Jeffr., from frigid water in the Shetland-Faroe Channel. It is probably owing to this concealed habitat that the present specimens are much paler than those originally described. About two dozen specimens were obtained on this occasion, several of which were still alive, and were placed under examination. "They were quite at home in a watch-glass, and travelled by first protruding the foot, and then by contracting it drew the shell along," while under the microscope "the action of the current through the tubes could be seen through the valves of the shell." (Mr. J. Simpson *in litt.*)

A specimen sent me in spirit yielded the following results, which demonstrates that the animal is not far removed from *Modiolaria*:—Body dirty white, viscera light brown; mantle free, plain; incurrent tube formed by the two flaps of the mantle; excurrent tube short, thick, and conical; foot large, white, and tongue-shaped, with a conspicuous groove down the centre for the byssus.

At the time of writing another whale's skull has been landed at Aberdeen by a local trawler, which was brought up "20 miles N.W. of Fair Isle" (between the Orkneys and Shetlands), to which two or three dozen *A. simpsoni* were attached.

MALACOLOGICAL NOTES.*

By E. R. SYKES, B.A., F.L.S.

5. The genus *Rhodea*.

THE genus *Rhodea* has been reviewed three times, namely by Crosse (1), Da Costa (2), and Jousseume (4), and though the last two have added but little to our knowledge save in the description of new forms, it may be convenient to briefly list the species now known. Dr. Jousseume appears to have worked in ignorance of Mr. Da Costa's paper.

The genus was founded by H. and A. Adams in February, 1855, (Genera Rec. Moll., vol. ii, p. 135), as a section of *Columna*, to contain the single known species *R. Pfeifferi*, Crosse, under its then name of *Achatina californica*, Pfr. It was raised to the rank of a genus by Mousson (5) in 1873, when describing a second species, *R. gigantea*. A third species was added by Dohrn (3) in 1875; two by Mr. Da Costa (2) in 1899, and three by Dr. Jousseume (4) in 1900.

Nothing seems to have been stated as to the life-history or anatomy, save the note by Dohrn that *R. wallisiana* is ovoviviparous, and the record by Mr. Da Costa of the finding of ten embryonic shells in *R. gigantea*. The fossil history equally appears to need study. I have not repeated all the references given by Crosse (1), but have only referred to the original diagnosis, and to that paper. We may note the description by de Morgan of a genus *Rhodina* from Perak, said to be allied to *Rhodea*.

LIST OF SPECIES.

RHODEA AEQUATORICA, Da Costa.

R. aequatorica, Da Costa (2), p. 305, fig.

Hab.—Ecuador.

RHODEA COUSINI, Jousseume.

R. cousini, Jousseume (4), p. 36, pl. i, fig. 15.

Hab.—Ecuador.

RHODEA CROSSEANA, Da Costa.

R. crosseana, Da Costa (2), p. 305, fig.

Hab.—U. S. of Colombia.

RHODEA EQUATORENSIS, Jousseume.

R. equatorensis, Jousseume (4), p. 37, pl. i, fig. 17.

* See ante, vol. vii, p. 164.

Hab.—Ecuador.

Probably this species will need re-naming on account of the prior
R. aequatorica.

RHODEA GERETI, Jousseume.

R. gereti, Jousseume (4), p. 38, pl. i, fig. 16 (not fig. 17 as given in text).

Hab.—U. S. of Colombia.

RHODEA GIGANTEA, Mousson.

R. gigantea, Mousson (5), p. 15; Crosse (1), p. 18, pl. i, fig. 2; Da Costa (2), p. 304, fig.

Hab.—U. S. of Colombia.

RHODEA PFEIFFERI, Crosse.

R. pfeifferi, Crosse (1), p. 14, pl. i, fig. 1.

Achatina californica, Pfeiffer (6), p. 89.

Hab.—U. S. of Colombia.

RHODEA WALLISIANA, Dohrn.

R. wallisiana, Dohrn (3), p. 57; Crosse (1), p. 21, pl. i, fig. 3.

Hab.—U. S. of Colombia.

REFERENCES.

1. CROSSE.—J. Conchyl., 1876, vol. xxiv, pp. 1—24, pl. iv.
2. DA COSTA.—P. Malac. Soc. London, 1899, vol. iii, pp. 304—306, figs.
3. DOHRN.—Nachrbl. Deutsch. Malak. Ges., 1875, p. 57.
4. JOUSSEUME.—Bull. Soc. Philom., 1900, vol. ii, pp. 35—39, pl. i.
5. MOUSSON.—Malak. Blätt., 1873, vol. xxi, pp. 15—17.
6. PFEIFFER.—Symb. Hist. Hel., 1846, part iii, p. 89.

NOTES.

Helix lapicida m. sinistrorsum.—This form was named by C. A. Westerlund in 1871, so Mr. Partridge's find (p. 180) is not an absolute novelty, though it is very interesting.—T. D. A. COCKERELL.

Trichomya, von Ihering (see p. 186).—This may I suppose remain, on account of its different derivation, but it is uncomfortably similar to *Trichomyia*, Haliday, a genus of Diptera.—T. D. A. COCKERELL.

Dates of publication of Forbes and Hanley's History of British Mollusca.—This was issued in monthly parts each with four (dated) plates.

Vol. I.—	pp. i—lxxx, 478—486 and all title pages.	1853.
	pp. 1—477 (=Pt. 1—12).	1848.
Vol. II.—	pp. 1—480 (=Pt. 13—24).	1849.
	pp. 481—557 (=Pt. 25 and 26)	1850.
Vol. III.—	pp. 1—320 (=Pt. 27—34).	1851.
	pp. 321—616 (=Pt. 35—42).	1851.
Vol. IV.—	pp. 1—302 (=Pt. 43 to end).	1852.

For evidence see Wiegmann's Archiv. f. Naturg., 1849, ii, pp. 77 and 106; 1850, ii, p. 103; 1851, ii, p. 104; 1852, ii, p. 263; 1853, ii, p. 94.—B. B. WOODWARD.

INVESTIGATIONS ON THE VARIATION AND LIFE-HISTORY OF BRITISH LAND AND FRESHWATER MOLLUSCS.

A Committee, consisting of Messrs. J. R. B. Masefield, F. Taylor, R. J. Welch, and A. E. Boycott, has been appointed by the Council of the Conchological Society of Great Britain and Ireland for the purpose of conducting a collective investigation of phenomena connected with the variation and life-history of British Land and Freshwater Mollusca. The object of the investigation is to inquire into points liable to general uncertainty and to local or other variation, and into the diffusion and dispersal of species, by collecting the results of the individual experience of many naturalists. A certain small number of subjects for investigation will be published each year, and it is hoped that an abundance of replies will be received, so that the results may be thoroughly representative. The following five subjects have been selected for 1901:

(1) How far is the smell of "garlic" constantly associated with *Hyalina alliaria*? under what circumstances and at what seasons of the year is it most noticeable? does *H. alliaria* seem to escape destruction by other organisms more than the rest of the genus? is the smell of "garlic" found in other species and under what circumstances?

(2) Have you in any case found any species or variety of land snail constantly associated with any particular plant?

(3) Is any preference shown by (1) *H. aspersa*, (2) *F. rufescens* for the neighbourhood of human habitations and buildings? if so, what explanation do you consider the most probable?

(4) What localities produce the largest specimens of *Anodonta*? Describe the nature of the water, soil, geological formation, etc., and give the dimensions and, if possible, the weight.

(5) In the genus *Helix*, where not indigenous, when and how were any of the species introduced? It is desired to put on record as far as possible the date of introduction of any species into any given locality, both from abroad into the British Isles and from one part of the country to another.

The locality for which each answer is recorded should be carefully given, with any details of geological formation, altitude, vegetation, etc., etc. which may seem desirable. All returns should reach the Secretary (A. E. Boycott, The Grange, Hereford), by September 1st, 1901.

PROCEEDINGS OF THE MIDLAND MALACOLOGICAL SOCIETY.

24TH (ANNUAL) MEETING, DECEMBER 7TH, 1900.

The President in the chair.

Professor Ludwig Plate of Berlin was unanimously elected one of the six honorary members on the recommendation of the Council.

The Annual Report of the Council and the Treasurer's Statement were read and adopted.

The Secretary reported that as no amendments had been received to the Council's nominations, the following would constitute the Council and Officers for 1901:—

President—Walter E. Collinge.

Treasurer—H. H. Bloomer.

Hon. Secretary—H. Overton.

Librarian and Curator—Guy Breeden.

Other members of the Council—Messrs. Breeden, H. Willoughby Ellis, F. J. Partridge, and Bromley Peebles.

The President's Address was postponed until the February meeting.

EXHIBITS.

By Mr. Overton: A very fine collection of shells of *Helix hortensis*, also *H. obvoluta* from Ditcham, Hampshire.

By Mr. Breeden: Shells of *H. hortensis* from various localities.

By Mr. Partridge: Varieties of *H. hortensis*.

By the President: Specimens of *Veronicella gilsoni*, ClIge., from the Fiji Islands.

ANNUAL REPORT, 1900.

In presenting their Third Annual Report your Council have to record another year's work of an extremely satisfactory character.

During 1900 only one new member has been elected, and death has removed from our Society the veteran student of the Mollusca—Mr. G. Sherriff Tye.

Eight meetings have been held, at which five papers have been read. The exhibits have been plentiful, and often of great interest.

The financial condition of the Society stands as follows: there is a balance due to the Treasurer of £2. os. 3d., and the outstanding subscriptions amount to £2.

Numerous additions to the Library have been made, the number of works and pamphlets now numbering 85. A commencement has been made with the Collection of British Molluscs, and donations have been received from the President, and Messrs. Bloomer and Overton.

Your thanks are due to the Council of the University of Birmingham, and Prof. Bridge, for the facilities they have so kindly given in permitting our meetings to be held in the Zoological Department.

CURRENT LITERATURE.

Pilsbry, Henry A.—Tryon's Manual of Conchology, ser. ii, vol. xiii (pt. 52), pp. 177—253, pls. 49—72. Philadelphia: Academy of Natural Sciences.

Dr. Pilsbry continues and completes his account of the genus *Amphidromus*, Alb.

An Appendix to the volume contains the following important corrections, etc. *Bothriembryon physodes* (Menke), 1848, replaces Reeve's name *physoides*. *Placostylus shongii* (Less.). According to Mr. Suter this name is incorrect, and should stand *hongii*. *P. fibratus* (Martyn). Mr. Charles Hedley points out that the locality of the original is Ile Amère or Botany Island.

Simpson, C. T.—Synopsis of the Naiades, or pearly freshwater mussels. Proc. U.S. Nat. Mus., 1900, vol. xxii, pp. 501—1044, pl. xviii.

The appearance of Mr. Simpson's valuable synopsis marks a distinct advance in the history of the study of this large and difficult group of Pelecypoda. Coming, as it does, from so distinguished an authority, who has had unrivalled facilities for dealing with this interesting group, it claims more than passing attention.

The introduction first gives a brief sketch of the different classifications from that of Lea (1836) to the author's own in 1896. Apart from the work of Lea, Troschel, and Pelseneer, very little attention has been paid to the anatomy of the group. The author in his earlier paper (Proc. U.S. Nat. Mus., 1896, xviii), placed a great variety of forms under the generic name *Unio*, but since then from a study of the soft parts, he has come to the conclusion that it would be best to split up this genus, somewhat after the manner in which Pilsbry has treated the old group *Hellia*. This dismemberment is warranted by the following facts. Under ordinary conditions there is but little differentiation in the soft parts, but at the period when the ova pass into the gills a remarkable change is brought about in these organs. "In the *Anodonta edentula* of Say, short, horizontal ovisacs are developed, which run directly across the animal, and which at maturity break through the outer walls of the outer gills and pass with their young entire into the water. In the forms typified by *Unio anodontoïdes* the young are contained only in very distinct vertical or oblique ovisacs in the hinder part of the outer gills; in *U. crassidens, pictorum*, and the like, the embryos fill the entire outer gills, forming thick, smooth pads; in *U. melanocorus, trigonus, multiplicatus*, and allied forms, they occupy all four of the branchiæ throughout. In *U. phascolus* the smooth outer gills begin to be crimped as they are being filled with embryos, until when full, they become a series of marvelous folds. In *U. irroratus* several ovisacs in the center of the outer gills grow out to a great length, become filled with young, and are closely coiled. In *U. cornutus* a few central ovisacs develop so as to project below, in a long, straight flap. In all the South American and Australian Unios, so far as is known, the inner gills alone, as a rule, are filled with young, and this is probably the case with the species of the Ethiopian region and most of those of south-eastern Asia. After the young have passed out into the water the gills of all the species change back into their ordinary condition, and when not gravid there is great similarity in those of most of the species formerly classed as Unios."

It would seem that these peculiar evanescent characters, assumed when the gills act as marsupia, are quite constant, and further, are concomitant with certain minor shell characters, consequently the author thinks they may be used as a basis for the foundation of genera.

Von Ihering's discovery in 1893, showing that certain species on hatching from the egg commence life as a *glochidium*, with a bivalve shell capable of containing the animal, and others as a *lasidium*, with three segments, the middle one only having a single shell, the former being regarded as members of the *Unionidae*, and the latter as of the *Mutelidae*, is rightly regarded as the most important discovery that has yet been made in the study of the Naiades. Mr. Simpson's researches upon the gills and ovisacs must rank as the second most important, and we trust that at no distant date he will describe these changes in greater detail and illustrate the same.

In the past it has been claimed by certain malacologists that the Naiades were hermaphrodite, and by others that the sexes were separate, but from the recent careful researches of Sterki, Taylor, Kelly, and others, it would seem that in the more specialised *Unionidae*, viz. those having two forms of shell and the ovisacs situated in the hinder portion of the outer gills, the sexes are always separate; whilst in the more generalised, viz. those with one form of shell and the embryos occupying the entire gill, the sexes may or may not be separate.

The author recognises about 1000 species and 82 varieties of *Unionidae*, comprised in 61 genera, of these 553 species and 55 varieties belong to Nth. America and 101 to Sth. America. Of the *Mutelidae*, 117 species and 11 varieties are listed comprised in 11 genera.

With von Ihering's view that the primitive beak sculpture of the *Unionidae* was radial, Mr. Simpson is inclined to agree, further he believes "that the earlier Unios had the young contained in the inner branchial alone, and that there has been a gradual development from these primitive forms with simple, dull-colored, smooth

shells, those of the male and female being alike, with radially sculptured beaks, the *Endobranchs*, up to the highest forms of to-day, with concentric, doubly looped beak sculpture, with highly painted shells, in which those of the male and female are very different, with the young contained in distinctly marked ovisacs in the hinder part of the outer gills alone, the *Exobranchs*."

The past history of the Naiades is then treated of, and very interesting and valuable are the views set forth. The work of Rafinesque, Lamarck, and the so-called new school of France, is next reviewed, and a synopsis of the genera, etc., given in tabular form.

A running comment in the form of foot-notes is made upon the genera, species, etc., in the systematic portion. Many new names are introduced and radical changes made. Finally a bibliography containing nearly 2000 titles, and an index extending over 46 pp. concludes this valuable work.

Mr. Simpson has had no light task before him, for such a work as the present one must have entailed many years hard work, often of a very trying nature. It has been well done and handled in a masterly manner, and must for many years rank as the standard work, for it cannot fail, with its wealth of criticism, to prove indispensable to all who study the group. On all concerned in its production (excepting the binders, the stitching being abominable) it reflects the greatest credit.—W. E. C.

Baker, F. C.—The Gross Anatomy of *Limnaea emarginata*, Say, variety *mighelsi*, Binney. Bull. Chicago Ac. Sci., 1900, vol. ii, pp. 191—211, pls. i—vi.

The author has given an interesting account of the gross anatomy of this form, together with other useful notes. Respecting the wide range of variation in this species, a large number of figures of the variety *mighelsi* are given, out of which any one fond of making species could form a large number and several genera, but the animals show no such variation, indeed they are anatomically wonderfully uniform. The digestive system, generative organs, nervous, circulatory, respiratory, renal and muscular systems are described and figured.

Collett, O.—Pearl Oysters and Pearl Fisheries. Reprint from "Ceylon Observer," 1900, pp. 1—12.

This is an abstract of an interesting paper read by the author on October 27th, at a meeting of the Ceylon Branch of the Royal Asiatic Society. In addition to Mr. Collett's paper it contains remarks made by Capt. Donnan, Mr. R. H. Ferguson, Dr. Vandort and others.

Melville, J. Cosmo.—Descriptions of Two Species of *Cypraea*, both of the Sub-genus *Trivia*, Gray. Ann. and Mag. N. H., 1900 (s. 7), vol. vi, pp. 207—210, 4 figs.

C. (T.) galapagensis, n. sp., is characterised by a shining, enamelled callosity over the whole centre of the dorsal region, completely obliterating the sulcus (if such exists), a feature unknown in any other species of *Trivia*. Affinity exists between this species and *pulla*, Gask., and also *subrostrata*, Gray. Hab. Albemarle Is., Galapagos.

C. (T.) buttoni, n. sp. (Hab.—?) is a small, globular, straw-coloured species, with few ribs and no sulcus.

Wiegmann, Fritz.—Binnen-Mollusken aus Westchina und Centralasien. Zoologische Untersuchungen. 1. Die Heliciden. L'Ann. du Mus. Zool. d. l'Acad. Imp. Sci. St. Petersb., 1900, T. v, pp. 1—186, pls. i—iv.

The author here gives a careful, and fully illustrated, anatomical account of the *Helix* group, described in a previous volume by Dr. O. F. von Möllendorff. In all 36 species or subspecies are dealt with, comprised in 11 genera and 3 families. The greater portion of the work is devoted to the *Eulotidae*, and forms a valuable contribution to the anatomy of this family.

Monti, Rina.—Le Ghiandole Salivari dei Gasteropodi Terrestri nei diversi periodi funzionali. Mem. R. Ist. Lomb. di. sci. e lett., 1899, vol. xviii (x, d. ser. iii), pp. 115—133, tav. ix.

Miss Monti describes in some detail the structure of the salivary glands in *Helix pomatia* and *Agriolimax agrestis*. They consist of a fibrillar connective tissue stroma, and a parenchyma composed of large mucous, transparent, and granular cells. The resting and active stages are carefully compared with one another, emphasis being laid upon the fact that there are no signs of mitotic division.

Monti, Rina.—Sur la fine structure de l'estomac des gastéropodes terrestres. Archiv. Ital. Biol., 1899, T. xxxii, pp. 1—15.

The epithelium lining of the stomach consists of a series of mucous laden caliciform cells, and ciliated cylindrical cells. These are supported by fibrillar connective tissue, large connective tissue cells, pigment cells, muscle fibres, and bloodvessels lined with endothelium. Covering these come the layers of longitudinal and circular muscle fibres, the whole being enveloped in a connective tissue sheath, in which are a large number of cells analogous to those of the sub-mucosa.

Dall, W. H.—Synopsis of the Family *Tellinidae* and of the North American species. Proc. U.S. Nat. Mus., 1900, vol. xxiii, pp. 285—326, pls. ii—iv.

This valuable synopsis in addition to revising the North American species, includes descriptions of figures of species which have hitherto not been reported from the coast of the United States, or have not previously been figured. There are also descriptions and figures of the following new species: *T. georgiana*, *iheringi*, *americana*, *promera*, *flagellum*, *colorata*, *texanu*, *reclusa*, *puccifica*, *pristiphora*, *leucogonia*, *meropsis*, *amianta*, *pariana*, *maeneilii*, *suffusa*, *cerrosiana*, *panamensis*, *recurva*, *santarosae*, *phenax*, *Macoma phenax*, *extenuata*, *tageliformis*, *kraussci*, *sitkana*, *alaskana*, and *panamensis*. *T. (Angulus) carpenteri* is a new name for *A. variegatus*, Carp., and *T. (Oudardia) buttoni* for *A. modestus?* var. *obtusus*, Carp.

Dall, W. H.—Synopsis of the Family *Cardiidae* and of the North American species. Proc. U.S. Nat. Mus., 1900, vol. xxiii, pp. 381—392.

Simroth, H.—Über Selbstbefruchtung bei Lungenschnecken. Verhandl. d. Deutsch. Zool. Gesell., 1900, pp. 143—147, 5 figs. in text.

This is an interesting paper upon the morphology of certain parts of the generative organs of some molluscs, in which self-fertilization is known to occur. Two new genera are mentioned, viz. *Phrixolestes* and *Hyrcanolestes*, but no species.

Pilsbry, Henry A.—Lower Californian species of *Coelocentrum* and *Berendtia*. Proc. Acad. Nat. Sci. Phila., 1900, pp. 550—555, figs. 1—4.

The new forms are *C. minorinum* v. *gabbi*, n. var., *C. eisenianum*, n. sp. Comparing the genus *Berendtia* of Mabille with *Coelocentrum*, Dr. Pilsbry concludes that the former is evidently a tangent from the latter genus, "and distinguished from certain Lower Californian species of that genus solely by the reduction of the columella from a tube to a solid style, as in the genus *Eucalodium*."

Pilsbry, Henry A.—*Sonorella*, a new genus of Helices. Proc. Acad. Nat. Sci. Phila., 1900, pp. 556—560, pl. xxi.

This new genus is established for the reception of the "*Epiphragmophora*" *hachitina* of Dall, and is allied to *Ashmunella*. It agrees with this last genus in the absence of any trace of dart-sac or mucous glands, and generally in the form of the reproductive organs, free muscles and pallial organs. This forms the third American genus of *Belogona* established since 1895, the others being *Ashmunella*, Pils. and Ckll., and *Metostracon*, Pils.

Pilsbry, Henry A.—On the Zoological position of *Partula* and *Achatinella*. Proc. Acad. Nat. Sci. Phila., 1900, pp. 561—567, pl. xvii.

Dr. Pilsbry proposes to divide the Vasopulmonata into two groups, the *Orthurethra* and *Sigmurethra*. In the former series the ureter passes directly forward from the kidney, toward the anterior margin of the lung, a condition common to the Basommatophora, which have been generally considered ancestral to the Stylommatophora. In *Partula*, *Achatinella*, etc., this same condition obtains, and in the author's opinion indicates that such genera are members of an ancient and ancestral group lying at the base of the vasopulmonate phylum. In the latter series the ureter is abruptly reflexed from the apex of the kidney, passing to the posterior end of the pulmonary cavity. Thence an open groove or closed tube (secondary ureter or Darmharnleiter) continues across to the last fold of the gut, which it follows forward to the mantle-edge.

A rough tabulation of the various families belonging to these two groups is then given, and the anatomy of *Partula rosca*, Brod., and *Achatinella dolei*, Baldwin, described and figured. Dr. Pilsbry concludes that the *Achatinellidae* is apparently a group of great antiquity, the archaic pallial organs and male generative organs being associated with peculiarly specialised female organs.

Pilsbry, Henry A.—The Genesis of Mid-Pacific Faunas. Proc. Acad. Nat. Sci. Phila., 1900, pp. 568—581.

The author summarises this very interesting paper as follows: "The hypothesis of a late palaeozoic or early mesozoic mid-Pacific continent (upon the sunken heights of which the present island-masses, volcanic or coral, have been superposed) is advanced to account for the constitution of Polynesian land-snail faunas, which are shown to be (1) nearly homogeneous over vast areas, (2) composed of ancient types, with no admixture of the great series of modern families, and (3) not derivable from any tertiary or modern continental fauna or faunas in the sense Atlantic island faunas have been derived. The mollusca, land and marine, supply no evidence that this Pacific continent was ever connected with or faunally affected by the Americas, but emphatically deny any such connection."

Dupuis, P. et Putzeys.—Diagnosis de quelques coquilles nouvelles provenant de l'état indépendant du Congo. Ann. Soc. roy. Malac. Belgique, 1900, T. xxxv, pp. xii—xix, 17 figs.

The new species are *Ganomidos fraterculus*, *Perideriopsis fallsensis*, *P. moulouensis*, *Melania ponthiervillensis* and var. *spoliata*, *M. nyangweensis*, *M. depravata*, *M. nsendweensis*, *M. soror*, *M. consobrina*, and *M. kinshassaensis*.

Collinge, Walter E.—On the Anatomy of certain Agnathous Pulmonate Mollusks. Ann. and Mag. N. H., 1901 (s. 7), vol. vii, pp. 65—73. pls. i—ii.

The species described are *Rhytida greenwoodi*, Gray, *Paryphanta hochstetteri*, Pfr., *P. edwardi*, Suter, and *Schizoglossa novoseelandica* (Pfr.), em. Hedley.

Andreae, A.—Landschnecken aus Central-und Ostasien. Mitth. a. d. Roem.-Mus., Hildesheim, 1900, nr. 12, pp. 1—14, 1 Taf. u. 2 figs.

Prof. Andreae's paper contains four very interesting articles upon various species of molluscs from Central and East Asia. He first treats of the genus *Cuthaica*, Mildff., which is divided into the following subgenera: *Eucuthaica*, nov. (type *C. fasciola*, Drap. = *pyrrhozona*, Phil.), *Pliocuthaica*, nov. (type *C. pulveratrix*, v. Mart.), *Xerocuthaica*, nov. (type *C. krecitneri*, Hilb.), *Pseudiberus*, Ancey (type *P. tectumsinense*, v. Mart), and *Campylocuthaica*, nov. (type *C. przewalskii*, v. Mart.)

In the second article comparisons are instituted between various Asiatic and European genera.

The variation of *Campylocuthaica przewalskii*, v. Mart., is dealt with in the third article, followed by a note on the variation of *Campylaca frigida*, Jan.

A short comparison of certain Chinese and European land molluscan forms from alluvial deposits, concludes the series.

Sykes, E. R.—*Digesta Malacologica*. No. I. A Summary of the American Journal of Conchology. 1865—1872. pp. vii + 46. London: 1901. William Wesley and Son.

We heartily congratulate Mr. Sykes on the appearance of the first number of his "Digesta Malacologica," which deals with the 7 volumes of the 'American Journal of Conchology' (1865—1872).

The general arrangement is that adopted in the 'Zoological Record.' The date of publication of each of the 29 parts is given, together with the pagination and number of plates; 232 titles are quoted, followed by the two sections 'Biology' and 'Systematic.'

If sufficient support be forthcoming, Mr. Sykes hopes to deal with other periodicals such as the 'Zeitschrift für Malakozoologie,' 'Annals and Magazine of Natural History,' etc.

The value of such digests is obvious, and we trust malacologists will at least show their appreciation of the care and patience the author has expended, by quickly exhausting part i. It is a publication of great value and usefulness, and we wish its author every success with this and future issues.

Dall, W. H.—On a genus (*Phyllaplysia*) new to the Pacific Coast. *Naut.*, 1900, vol. xiv, pp. 91—92.

P. taylori, n. sp. found on floating sea-grass near Nanaimo, Vancouver Island.

Dall, W. H.—A new species of *Pleurobranchus* from California. *Naut.*, 1900, vol. xiv, pp. 92—93.

P. californicus, n. sp. from San Pedro.

Dautzenberg, Ph.—Description d'une espèce nouvelle du genre *Cyrena* provenant des Nouvelles-Hébrides. *Journ. de Conchyl.*, 1900, vol. xlviii, pp. 105—108, pl. v.

Cyrena ingens is the new species, characterised by its large size and solid shell.

Dautzenberg, Ph.—Description d'une espèce nouvelle appartenant au genre *Hemicardium*. *Journ. de Conchyl.*, 1900, vol. xlviii, pp. 5—8, pl. 1, fig. 3—6.

Hemicardium tegulatum, n. sp. is evidently nearly related to the *H. unedo* of Linné; the author has, however, carefully compared it with young and adult forms of the latter species, and finds certain well marked differences.

Baker, F. C.—A Revision of the Limnaeas of Northern Illinois. Trans. Acad. Sci. St. Louis, 1901, vol. xi, pp. 1—24, pl. i, and 13 figs. in text.

The author recognises nine species in Northern Illinois viz., *L. stagnalis*, L., *reflexa*, Say, *palustris*, O. F. Müll., *asperata*, Say, *eubensis*, Pfr., *columella*, Say, *humilis*, Say, *desidiata*, Say, and *calascopium*, Say. He is of opinion that a new classification is required, based upon anatomical characters; the present grouping by shell characters being totally unsatisfactory on account of the extreme variability of the individuals. In support of this statement, he points out that different forms of *L. emarginata*, Say, var. *mighelsi*, Binn., which he has recently examined, can be placed in all of the usually recognised subgenera, so-called (*Radix*, *Bulinnea*, *Limnophysa*, etc.). The typical *emarginata* is typical of *Limnophysa*, the var. *mighelsi* of *Radix*, whilst all the intermediate forms occur connecting the extremes.

Of the above mentioned nine species, descriptions are given in nearly all cases of the shell and animal, jaws, radula, distribution, and habitat, followed by critical remarks upon the synonymy, variation, etc.

Hedley, C.—Studies on Australian Molluscs. Pt. II. Proc. Linn. Soc. N.S.W., 1900, pp. 495—513, pls. xxv—xxvi.

The author continues his interesting studies on the lines laid down in part i. A large number of additions to the Australian fauna are recorded, in addition to the following new species: *Puncturella kesteveni*, *Liotia rostrata*, *L. phillata*, *Scalenostoma striatum*, *Leucotina helva*, *Diplommatina oreadis*. *Salinator*, nom. nov. is suggested for the group typified by *Ampullaria fragilis*, Lam., which will replace the *Ampullarina* of authors, not Sowerby. The *Mytilita inaequalis* of Dall, is probably the *M. gemmata* of Tate. It seems now definitely settled that the name *Nerita melanotrugus*, E. A. Sm., has priority over *N. saturata*, Hutt. The genus *Menon* proposed in the first part of these Studies (p. 90) would seem to be synonymous with *Chilentomia*, Tate and Cossmann, the former name is therefore withdrawn, but Mr. Hedley maintains that the genus must be included in the *Eulimidae* (where he placed *Menon*) and not in the *Rissiodae*.

Melville, J. Cosmo.—Description of *Bulimulus dukinfieldi*, n. sp., from Paraná, Brazil. Proc. Malac. Soc. Lond., 1900, vol. iv, p. 116, fig.

Woodward, M. F.—Note on the Anatomy of *Voluta ancilla* (Sol.), *Neptuneopsis gilchristi*, Sby., and *Voluntilithes abyssicola*, (Ad. and Rve.). Proc. Malac. Soc. Lond., 1900, vol. iv, pp. 117—125, pl. x.

Sowerby, G. B.—Descriptions of new species of Marine Mollusca collected by the late Otto Koch at the Island of Cebú, Philippines. Proc. Malac. Soc. Lond., 1900, vol. iv, pp. 126—129, pl. xi.

Wiegmann, Fritz.—Anatomische Untersuchungen von *Solaropsis*. Nachr. Deutsch. Malak. Gesell., 1900, pp. 178—184.

Wiegmann, Fritz.—Beiträge zur Anatomie. I. Anatomische Untersuchungen einiger mittel-italienischer Arten. Nachr. Deutsch. Malak. Gesell., 1901, pp. 8—16.

Möllendorff, O. von.—Ueber einige Nomenclaturfragen. Nachr. Deutsch. Malak. Gesell., 1900, pp. 161—178.

Nägele, G.—Einige Neuheiten aus Vorderasien. Nachr. Deutsch. Malak. Gesell. 1901, pp. 16—31.

Sterki, V.—New Pisidia. Naut., 1901, vol. xiv, pp. 99—101.

Bavay, A. et Dautzenberg, Ph.—Diagnoses de Coquilles nouvelles de l'Indo Chine. Journ. de Conchyl., 1900, vol. xlviii, pp. 108—122.

Descriptions of the following species are given: *Helix (Camaena) lavezzarii*, *H. (C?) vorounga*, *H. (Euhadra) fawceti*, *H. (Eulota) vignali*, *H. (Chloritis) marimberti*, *H. (C.) durandi*, *H. (C.) gereti*, *H. (Gancella) saurivonga*, *H. (G.) coudrini*, *Maerochlamys alluaudi*, *Eulimnius messengeri*, *Clausilia callistomella*, *C. gereti*, *Stenothyra messengeri*, *Cremnoconchus messengeri*, *Lithoglyphus tonkinianus*, *Melania reducta*, *Alycaeus (Dioryx) major*, *A. (D.) messengeri*, *A. (D.) compactus*, *A. (D.) vaubucnsis*, *A. (Charax) fraterculus*, *A. (C.) heudei*.

Pilsbry, Henry A.—Notes on certain mollusca of South-western Arkansas. Proc. Ac. Nat. Sc. Phil., 1900, pp. 449—459, figs.

Babor, J. F.—Bericht über die wissenschaftlichen Leistungen im Gebiete der Malakozoologie im Jahre 1892. Arch. f. Naturgesch., Jhg. 60, Bd. 2, pp. 514—545.

Ahting, K.—Über die Entwicklung des Bojanus' schen Organs und des Herzens von *Mytilus edules*. Zool. Anz., 1900, Bd. 23, pp. 529—533.

Ihering, H. von.—The Musculus cruciformis of the Order *Tellinaea*. Proc. Ac. Nat. Sc. Phil., 1900, pp. 480—481, 2 figs.

Guiart, J.—Nouvelle classification des Opisthobranches. Compt. Rendus, 1900, T. 52, pp. 425—426.

Willcox, M. A.—Hermaphroditism among the Docoglossa. Science, 1900, N.S. vol. xii, pp. 230—231.

Chiamenti, A.—Contribuzione allo studio della Malacofauna adriatica: Nota sulla famiglia delle *Veneridae* e delle *Petricolidae*. Riv. Ital. Sc. Nat., 1900, pp. 2—15.

Dautzenberg, Ph. et Durouchoux, P.—Faunule Malacologique des environs de Saint-Malo. La Feuille J. Nat., 1900, pp. 1—24.

Enumerates 183 species and a number of new varieties.

Meek, A.—On Mussel Cultivation on the Coast of Northumberland. Rpt. Northumberland Sea Fish. Comm., 1900, pp. 62—63.

Bulman, G. P.—The Marine Mollusca of Northumberland. *Ibid.*, pp. 78—82.

GENERAL REVIEWS.

Lehrbuch der vergleichenden Anatomie der Wirbellosen Thiere.
2 umgearb. Aufl. 1 Lief. Mollusca. Von Prof. Arnold Lang. Bearbeitet von Dr. Karl Hescheler. pp. viii + 509, Mit 410 Abbildungen. Jena: 1900. Gustave Fischer.

We welcome a second edition of Prof. Lang's valuable text-book on the comparative anatomy of the Mollusca. Although there are grave faults, which have received their full share of adverse criticism, the work remains the most complete and up-to-date epitome of Molluscan morphology yet published. In the edition before us Dr. Hescheler has generally revised the text, and incorporated the results,

put forward by different workers, since the previous edition. The wealth of illustrations, the many diagrammatic figures, the useful Bibliography, and the index to the species of molluscs treated of, in addition to the general index, all tend to make this work a valuable aid in the laboratory.

The forcible objection, raised by Prof. E. Ray Lankester, against this work in 1895 (cf. *Nature*, 1895, p. 289) still holds good. It is unfair, in our opinion, to use the observations of other workers without acknowledgment. The size of the work need not be necessarily enlarged to admit of this, for a very little extra space only would be necessary, and this might very easily have been obtained by omitting such figures as 89 and 90 (p. 82, shell of *Triton*, from Parker and Haswell), and the, often needless, repetition of other figures.

This work has enjoyed a good reputation in the past, and the present edition can only enhance the same.—W. E. C.

Text-book of the Embryology of Invertebrates. By Dr. E. Korschelt and Dr. K. Heider. Translated by Matilda Barnard. Revised and edited by Martin F. Woodward. Vol. iv, pp. xi+594. London: 1900. Swan Sonnenschein and Co., Ltd.

The volume before us forms the final part of Prof. Korschelt and Heider's well known and valuable "Lehrbuch." It is now over seven years since the original work appeared and much has been added to our knowledge of the development of the Mollusca, Tunicata, and Cephalocorda, of which phyla the present volume treats. The task of revising and re-editing such a work is no easy one, and we think Mr. Woodward would have been well advised if he had attempted to re-write it. Almost all that could be done to amplify and bring up to date the section on the Mollusca, by foot-notes, fresh paragraphs, and certain alterations in the text, has been done; and although these are very often far too brief, and sometimes lack clearness, they certainly tend to make the work a valuable resumé of our knowledge upon the embryology of the Mollusca, and one which every student will find of great assistance.

The Tunicata and Cephalocorda have not been so carefully revised as the Mollusca.

The work will prove of great service to senior students, and those who desire a concise and systematic account of molluscan embryology.—W. E. C.

Text Book of Vertebrate Zoology. By J. S. Kingsley. pp. viii+439. London: 1900. George Bell and Sons.

Professor Kingsley's work is intended to supplement lectures and laboratory work, and to place in concise form the more important facts and generalisations concerning vertebrate animals.

The work is divided into two parts, the first treating of the morphology of vertebrates, based upon embryology, whilst the second presents an outline classification, a subject which, the author thinks, "has been too much ignored in College work." Part one is carefully written and should prove very useful to certain classes of students, although there are some points which require re-writing, e.g. no useful purpose can be served by referring to the remains of the pronephric duct in the male Ichthyopsidian, as the "hydatid of Morgnani," or by using the term "Wolffian (Leydig's) duct" for the mesonephric duct. Throughout the terminology requires revision.

The illustrations, of which many are new, are all excellent.—W. E. C.

EDITOR'S NOTES.

The Manchester Museum has recently received by presentation from Surgeon Colonel S. Archer, a beautiful specimen of *Pleurotomaria udansoniana*, Cr. and Fisch., obtained in Barbados. This is the fifth known specimen of this fine species.

At the December meeting of the Midland Malacological Society, Professor Ludwig Plate, of Berlin, was elected an Honorary Member.

From Mr. T. Van Hyning of Des Moines, Iowa, U. S. A., we have recently received an interesting Catalogue of recent and fossil Mollusca for sale or exchange.

The Council of the Zoological Society has given instructions for the publication of an Index-Volume to the new generic names mentioned in the 'Zoological Record,' Vols. xvii—xxxvii (1880—1900).

The Volumes previous to Vol. xvii. have been indexed in the 'Nomenclator Zoologicus' of Scudder, published by the Smithsonian Institution in 1882. The contemplated Index-Volume of the 'Zoological Record,' in order to increase its usefulness, will include names omitted from Scudder's list and from the volumes of the 'Zoological Record.' Thus zoologists may have at their disposal (in the 'Nomenclator Zoologicus' and the new Index together) a complete list of all the names of the genera and subgenera used in zoology up to the end of 1900.

It is earnestly requested that anyone who knows of names omitted from Scudder's 'Nomenclator,' or from the volumes of the 'Zoological Record,' will forward a note of them, together, if possible, with a reference as to where they have been noticed or proposed, so that the new list may be made practically complete. Such information should be addressed to the Editor of the 'Zoological Record,' 3, Hanover Square, London, W. ; or to C. O. Waterhouse, Esq., British Museum, Natural History, S. Kensington, London, who is engaged in compiling the list.

A Conchological Exchange Club, with head-quarters at Birmingham, has recently been founded.

THE
JOURNAL OF MALACOLOGY.

No. 2.

JUNE 29TH, 1901.

VOL. VIII.

CLAUSILIA MIMICKED BY A MICROLEPIDOPTERON.

By DR. H. SIMROTH,

Leipzig.

THE examples of mimetic mollusca are constantly being augmented. Some imitate stones, leaves, and seaweed, others snakes or parts of Ascidians, *Gorgoniidae*, *Acteniidae*, etc. But the cases in which animals of other classes imitate molluscs are comparatively rare. The best known are those of *Psyche helix*, a Lepidopteron, and of *Helicopsyche*, a *Phryganida* whose larval cases have the form of a *Helix* shell. I have added a further case,¹ another Lepidopteron, a *Coleophorida*, imitating a *Clausilia*. The larval case had the form of the Gastropod shell, the spire being represented by transverse lines. The larvae and the *Clausiliae* were feeding upon the lichens of the same rock, so that a bird's eye would confound them and spare both.

In the present note I wish to record a further very interesting example of this kind.

When visiting with Dr. Heymons of Berlin the "doline"* of St. Canzian in the Karst mountains north of Triest, I found a small object adhering to the limestone wall, which for the moment I took for a *Clausilia*, Dr. Heymons did also. The mimetic impression was perfect in the dorsal view (Figs. A and B), a little, dark greyish-brown shell,

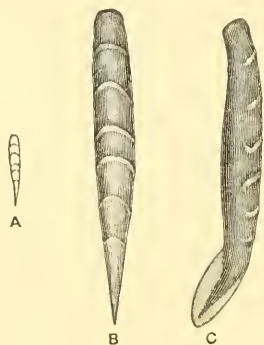
¹ SB. Nat. Gesell. Leipzig, Bd. xiii—xiv, p. 45.

* "Dolines" are the characteristic funnel-shaped hollows of the Karsts.

with six curved transverse lines, as if there were seven whorls without the little ones of the straight upper end. The mouth was narrowed as in *Clausilia*. Every stripe was composed of two lines, a darker and a clearer whitish one, giving one the impression of a *Clausilia*, whose sutures were filled up with powdery limestone as is usual in these localities.

The latero-ventral view (Fig. C) is entirely different, the transverse lines being restricted to the dorsal side. The tail-end is compressed and curved downwards; being narrow when looked at dorsally but considerably larger when seen laterally; for there are two flaps with a slit between them for the exit of the perfect insect after metamorphosis.

I think it is clear that the whole arrangement is very effective and likely to deceive small birds frequenting the rocks for feeding upon insects. Larger birds, such as pigeons for instance, would take shells such as *Clausilia*, but not so the *Sylviae*, *Turdidae* and others, preferring the objects in question.



A Coleophoride Lepidopteron imitating *Clausilia*. A. Natural size. B. Dorsal view enlarged. C. Lateral view.

Although it is clear that this mimetic character is of protective value to the larvae, it is very difficult to account for its origin. When the larva enlarges its case, does its build circle after circle by its salivary glands, in the manner the silkworm forms its cocoon? If so, we could understand the darker rings as being added at varying intervals. The explanation of the interruption of the rings on the ventral side is more difficult. I think before we attempt to explain the growth, etc., of this interesting structure, we must first investigate the manner in which the larva produces it. Probably it is not in the same manner as that which takes place in the formation of the cocoon in the silkworm.

NOTE SUR UNE LIMNÉE DE LA FAUNE PROFONDE DU LAC LÉMAN.

PAR LE DR. EMILE ANDRÉ.

Université-Genève.

LES naturalistes qui ont étudié la faune profonde du lac Léman, y signalent trois espèces de Limnées, qui toutes trois dérivent d'espèces littorales ou d'espèces vivant dans les eaux des environs du lac. A ces trois espèces, nous devons en ajouter une quatrième, qui a été draguée par M. le Dr. Penard dans le Petit-Lac, au large de Bellerive, à une profondeur de 40 mètres environ. Cette espèce est la *Limnaea* (*Gulnarina*) *auricularia*, L., var. *contracta*, Kobelt.

Elle diffère des individus de la faune littorale par ses dimensions plus faibles (hauteur 19 mm., largeur 16 mm.) et par la plus grande fragilité de sa coquille. Deux faits nous font considérer cette Limnée, non pas comme un individu amené accidentellement dans les grands fonds du lac, mais comme une espèce appartenant normalement à la faune profonde : 1. lorsqu'elle a été ramenée à la surface, son poumon était plein d'eau (il l'était encore lorsque le Dr. Penard m'apporta l'animal) ; 2. les excréments qu'elle a rendus étaient composés de ce limon impalpable, caractéristique pour les grandes profondeurs des lacs.

Cette Limnée présentait en outre d'autres particularités curieuses qu'on observe pas chez les *L. auricularia* du littoral. Ses téguments étaient teintés en rose-saumon, toutes les parties du moins qui ne sont pas recouvertes par la coquille. Elle sécrétait constamment un mucus très abondant, coloré également en rose-saumon. L'abondance de ce mucus était telle qu'il formait sur toute la paroi du cristalliseur dans lequel vivait la Limnée, une couche de plusieurs millimètres d'épaisseur. Examiné au microscope ce mucus se montre parfaitement homogène. Il est coagulable par l'alcool et ce dernier liquide en dissout la matière colorante. L'alcool, ainsi teinté en rose-saumon, se décolore au bout de quelques jours, sous l'action de la lumière probablement.

Nous avons débité en coupes cette Limnée et nous avons constaté que, dans les téguments, les glandes mucipares et les glandes calcaires étaient très développées, en nombre et en dimensions. En outre, sur les côtés du pied et sur toute sa longueur, au dessous de la couche glandulaire tégumentaire, on remarque un dépôt très important de corpuscules calcaires. Ceux-ci sont incolores, translucides, sphériques ou irréguliers ; les plus grands atteignent 0.12 mm. de diamètre. Ils sont contenus, non pas dans des cellules, mais dans la masse musculo-conjonctive du pied.

THE ANATOMY OF THE BRITISH SPECIES OF THE GENUS SOLEN. Pt. i.

By H. H. BLOOMER.

(Plates ii—iii.)

IN working at the anatomy of the various British species of the genus *Solen*, I was somewhat surprised to find that, while *S. ensis* and *S. siliqua* are in their structure very similar to each other, they differ very materially from *S. marginatus*, the latter exhibiting many points of interest. Apart from this, *Solen* also presents many interesting features when compared with other types of the Pelecypoda. Further, on looking through the literature, I have failed to find any work dealing fully with the anatomy of the genus. Menegaux¹ has described at length the circulatory system, and Pelseneer,² Barrois,³ Lang,⁴ Faussek⁵ and others, have made reference to other portions of the anatomy, but have not dealt systematically with it.

There are four species of *Solen* recognised as British, viz., *S. ensis*, L., *S. siliqua*, L., (*S. marginatus*, Pult. and Don. or *S. vagina*, L.), and *S. pellucidus*, Penn. In the latest classification, *ensis* and *siliqua* are placed in the genus *Ensis*, Schum., *pellucidus* in the genus *Cultellus*, Schum., leaving only one species, *marginatus* or *vagina*, in Linné's genus *Solen*. I purpose dealing with this question in a later paper.

It is my intention in the present paper to deal with the external characters, the musculature, and the alimentary canal of the first three species, and in a future contribution to complete the anatomy of the same, and the whole of the anatomy of *S. pellucidus*.

I desire to express my thanks to the Council of the Birmingham Natural History and Philosophical Society for the grant they have made me towards defraying the expenses in connection with this work; also to Mr. Walter E. Collinge for the kindly advice he has extended to me.

EXTERNAL CHARACTERS.

Solen ensis, L. (Pl. ii, fig. 2).

S. ensis is an elongated animal, measuring in length from six to seven times the measurement from the dorsal to the ventral surface at

1. Recherches sur la circulation des Lamellibranches Marins, pp. 170, Besançon, 1890.
2. Introduction à l'étude des Mollusques, 1894.
3. Revue biol. du Nord de la France, 1890, T. ii, pp. 209—229, 299—311, 351, 356.
4. Text book of Comparative Anatomy, 1896, pt. ii.
5. Trudui St Peterb. Obshch., xxviii, pp. 213—270, 2 pls.

its widest part. It curves a little dorsally, is bilaterally symmetrical, and is enclosed ventrally by the concrescence of the edges of the mantle lobes, with the exception of the apertures at the anterior and posterior ends, and a fourth aperture situated nearly at the centre of the ventral surface.

The periostracum passes from the outside of the shell to the edges of the mantle lobes, to which it adheres.

The pallial muscles form a deep band along the margin of the mantle lobes, and at the anterior end, surround the pedal aperture, through which the foot is protruded. At the posterior end the muscles assume a more circular condition, and give rise to the siphon containing the afferent and efferent chambers.

On separating and turning back the left mantle lobe, it is seen that the foot projects from nearly the centre of the ventral surface of the animal and proceeds in an anterior direction. A little anterior to the foot is the mouth, and in the front of the mouth the broad anterior adductor muscle (Pl. ii, fig. 2, *A.A.*). On each side of the visceropedal mass are the labial palps, and commencing between and passing posterior to them, are the two pairs of gills which extend to the siphon. The anus opens into the cloacal chamber from a free portion of the rectum, behind the posterior adductor muscle.

The siphon consists of two separate chambers, the upper one the exhalent, the lower one the inhalent. The free portions of the siphonal chambers are short, and separate from each other, both are encircled with a fringe of pale tentacles, and at the distal end of each chamber are two flaps forming the valve.

The fourth aperture is an elliptical opening which narrows very much at the inside edge of the mantle lobes; around the inside of it, but near the outer edge, is a row of tentacles, those on the one side alternating with those on the opposite side. The tentacles and surface of the lobes bordering the opening are of a lighter or paler colour. On the inside of each mantle lobe is a groove passing dorsally from this aperture towards the foot, and in it lie the distal portions of the labial palps.

Solen siliqua, L. (Pl. ii, fig. 3).

This species very closely resembles *S. ensis* in its external characters, only it is larger, and quite straight along its dorsal surface.

Solen marginatus, Pult. and Don. (Pl. ii, fig. 4).

Externally this species exhibits many points of difference when compared with *S. ensis*. It is shorter, and, like *S. siliqua*, straight along its dorsal surface. The pallial muscles are more strongly developed, while at its anterior end in the muscular part of the mantle

lobes which encircle the pedal aperture, is a groove, in which the constricted part of the shell lies, from which character arises the name of the species. The most important feature, however, appears to be the non-existence of the fourth aperture, and of the labial grooves on the inside of the mantle lobes. The diminution in the length of the animal, when compared with *S. ensis* and *S. siliqua*, is seen to be in the portion anterior to the foot. Just in front of the mouth, the muscular portion of the ventral integument terminates abruptly, and with the lips formed by the fusion of the labial palps, projects anteriorly. The anterior adductor is not so broad as in the two preceding species. It is also observable through the transparent ventral integument, that the liver does not project anterior to the mouth. The foot is larger, and has a more massive appearance.

The siphon is much longer than in *S. ensis*, and in one piece, though it shows clearly that at one time it was two distinct siphons. Both internally and externally, the chambers exhibit a transverse and longitudinal ribbing, and the free end of each is encircled with a row of tentacles.

The periostracum passes from the outside of the shell to the mantle lobe, to which it firmly adheres, and then forms a free border, particularly so at the anterior and posterior ends.

The bases of the two inner gills are joined and enclose the cloacal chamber for the greater portion of its length, whereas in *S. ensis* and *S. siliqua*, I have found in the course of examination of a large number of specimens, they are not so connected.

MUSCULATURE.

Solen ensis, L. (Pl. ii, fig. 1 and Pl. iii, fig. 5).

i. *The Pallial Muscles*.—The muscles along the edge of the mantle lobe, or the muscles of the pallial edge (Pl. ii, fig. 1, *Pal. M.*), form a deep and thick band. They are composed of closely arranged bundles, running in a ventral direction, at right angles to the mantle edge, and become closer as they approach the line of concrescence of the two lobes, where the thickness is further increased by another band of muscles traversing each lobe parallel to the pallial edge. The mantle lobe attains its maximum thickness just ventral to the line of its adherence to the shell. At the anterior end, the pallial muscles form a circular growth enclosing the pedal aperture (Pl. ii, fig. 1, *Pal. M.*), and have two lateral portions, which are free and to a considerable extent close the aperture on the withdrawal of the foot. The circular muscular arrangement is the same at the posterior end, where, how-

ever, its continuity is more complete, and it is also more developed, forming the proximal end of the siphon.

Along the whole dorsal surface of the animal is a muscular integument (Pl. ii, fig. 1, *Int. D.*), consisting of transversely crossed muscles; these are further crossed and intertwined with longitudinal muscles of the raised and fluted portion along the median line. The integument is joined to the pallial muscles of the anterior and posterior ends, and is also connected with the posterior adductor and retractor muscles, the dorsal portion of the foot, and the teeth of the hinge of the shell valves. Behind the posterior adductor muscle it is much more developed and is attached laterally to the valves, in consequence of which it appears as a continuation of the posterior adductor muscle.

The anterior adductor muscle (Pl. ii, fig. 1, *A.A.*), is an extremely broad plate of muscles, extending from a position a little anterior to the mouth to the pallial muscles, bordering the pedal aperture, to which it is united.

The posterior adductor muscle (Pl. ii, fig. 1, *P.A.*), is also plate-shaped, but is not nearly so wide as the anterior adductor. It is connected on its anterior side with the retractor pedis posterior (Pl. ii, fig. 1, *P.R.P.*), while on the opposite side it joins the circular muscular growth supporting the siphon. Over and connected with it, runs the dorsal muscular integument.

ii. *The Pedal Muscles.*—The foot is a narrow and elongated body, somewhat flattened laterally with a tendency to be keeled ventrally and grooved dorsally. In it are three kinds of muscles. The first consisting of longitudinal, the second of circular and semicircular, and the third of transverse and oblique muscles, the whole being enclosed in a muscular integument. When examined in detail, there are seen on each lateral side two groups of longitudinal muscles (Pl. ii, fig. 1, and Pl. iii, fig. 5, *Lo.M.*) which traverse the whole length of foot, and between each of these groups is a semicircular band, passing from the dorsal to the ventral surface (Pl. ii, fig. 5, *Sem.M.*). Bordering the dorsal and ventral surfaces of the pedal cavity, are two rows of bundles of transverse muscles (Pl. ii, fig. 1, and Pl. iii, fig. 5). The ends of these bundles spread out and their fibres pass between the inner longitudinal muscles, to the inner sides of the bands of semicircular muscles, while from the outer sides of these bands, muscular fibres or oblique muscles (Pl. iii, fig. 5, *Ob.M.*) pass in greater numbers, between the outer longitudinal muscles to the muscular integument. Towards the distal end of the foot these semicircular muscles gradually come together, first ventrally, then dorsally, and eventually form

a continuous circular band. Afterwards they and the transverse muscles, which become irregular in their distribution, fray out, and the whole form a network of muscular fibres.

At the proximal and posterior end of the foot is the retractor pedis posterior muscle (Pl. ii, fig. 1, *P.R.P.*), which, prior to its attachment to the valves of the shell, bifurcates and forms the right and left muscles.

At the anterior end of the proximal portion of the foot are the retractor pedis anterior muscles (Pl. iii, fig. 1, *P.R.A.*, *P.R.A'*). Each of these is a long rounded muscle passing from the foot along the ventral integument, and on leaving this, the muscle bifurcates, the two portions then passing through the liver and dorsal integument to the shell. The posterior bifurcation is the shorter one and it passes directly to the valve. The anterior one is much longer, and passes in an oblique direction over part of the anterior adductor muscle to the valve. At its junction with the foot, the fibres spread out and pass directly on the inside of the longitudinal muscles to the ventral and ventrolateral surfaces.

On each side of the foot a muscular band (Pl. ii, fig. 1, *P.P.*) runs along the anterior ventral integument, in close proximity to the anterior retractor pedis, to the anterior adductor muscle to which it is attached, but has no connection with the shell. Possibly this represents the protractor pedis anterior, as I have been unable to trace any other muscle likely to correspond to it.

The dorsal part of the foot has also on each side, a slight muscular connection (Pl. ii, fig. 1, *P.El.*) with the muscular dorsal integument, but it has no attachment to the shell, and so far as I have been able to ascertain, this is all that remains of the muscle representing the elevator pedis.

Solen siliqua, L.

The muscular system in every way resembles that of *S. ensis*, and does not call for any special comment.

Solen marginatus, Pult. and Don. (Pl. ii, fig. 4).

In comparison with *S. ensis*, the muscles in this species are much more powerfully developed. The pallial muscles are wider and thicker, and at the posterior end, the circular portion carrying the siphon is considerably wider and more strongly built. The anterior adductor muscle is not nearly so broad, while the posterior adductor is normal. The free portion of the retractor pedis anterior is much shorter, the bifurcated parts lie much closer together, and the fibres crossing the foot pursue a more posterior direction, and pass underneath instead of over the longitudinal muscles, and are embedded in the muscular

integument of the foot. On the ventral integument there is only a very slight trace of the muscle connecting the foot with the anterior adductor muscle.

The arrangement of the muscles of the foot is similar to that in *S. ensis*, only they are much more powerfully developed, and passing posteriorly, spread out sooner into the muscular network, as noticed in the distal portion of the foot of *S. ensis*.

THE ALIMENTARY CANAL.

Solen ensis, L.

The fore-gut and the greater portion of the mid-gut and liver lie anterior to the visceropedal mass, which, in its distal portion, contains the caecum of the crystalline style, and the posterior portion of the left lobe of the liver.

The mouth (Pl. ii, fig. 2, *M.*) opens externally as a transverse slit of the body integument on its ventral surface. Its situation is anterior to the foot, but posterior to the anterior adductor muscle, and between the lips formed by the fusion of the labial palps. The outer palps give rise to the anterior or upper lip, and the inner ones to the posterior or lower lip. (Pl. ii, fig. 2, *A.L.*, *P.L.*).

The oesophagus (Pl. ii, fig. 2, *Oe.*) is short, slightly curved, and soon widens into the stomach on its antero-ventral surface.

The stomach is an irregularly shaped sac, divided into several parts, while the right lateral half differs from the left half.

For the sake of convenience, it is proposed to use the following terms for the different divisions: oesophageal—for the antero-ventral portion, cardiac—for the portion dorsal to the oesophageal, and pyloric—for the posterior portion.

The left oesophageal portion (Pl. iii, fig. 6, *Oe. St.*) is somewhat muscular, with a few slight folds of its walls, and is bordered by a muscular ridge (Pl. iii, fig. 6, *M.R.C.*), culminating at the postero-dorsal edge with a more muscular papilla (Pl. iii, figs. 6 and 11, *M.P.*). From the base of this papilla two other muscular ridges diverge, dividing the remaining portion of the side into three parts. The middle portion occupies a ventro-lateral position, adjoining the oesophageal part, and in a narrow and deep cavity. (Pl. iii, fig. 6, *Cav.*). At its distal end it receives the small bile duct (Pl. iii, figs. 6 and 11, *Cav.*). It is separated from the pyloric portion by the muscular ridge passing ventrally (Pl. iii, fig. 6, *M.R.P.*), whereas the ridge running in a dorsal direction (Pl. iii, fig. 6, *M.R.C.*) divides the cardiac from the pyloric portion. The former is a large, deep, pocket-shaped lobe lying dorsal

to the oesophageal part, and projecting anteriorly to it. The pyloric portion is not so deep, or so large, and rises at its posterior end.

The right side of the oesophageal portion is smaller than the left side, but is likewise bordered by a slight muscular ridge (Pl. iii, fig. 7, *M.R.O.*). The remaining portion of this side is large, but is not divided in the same manner as the left half into cardiac and pyloric portions. At the anterior lateral end, just above the cardio-oesophageal ridge, it receives the large bile duct (Pl. iii, fig. 7, *B.Dt.*), and, at its posterior end on its ventral side, the intestine leaves it (Pl. iii, fig. 7, *In.*). The posterior end of the pyloric portion of the stomach contracts to form the caecum (Pl. iii, fig. 7, *C.C.*) containing the crystalline style. The caecum is of considerable length extending in a postero-ventral direction through the proximal portion of the foot.

The crystalline style (Pl. iii, fig. 7, *C.S.*) is a long rod of a light brown colour, traversing the whole of the caecum and the centre of the stomach, in a course tending from the left to the right side, to the anterior wall of the cardiac portion, where it generally has a hooked termination.

A transverse section of *S. siliqua* shows the epithelium (Pl. iii, fig. 10, *Ep.C.*) of the caecum to be very characteristic, and in marked contrast to that of the adjoining intestine. It consists of long regular columnar cells, with the nuclei generally situated nearer to the free end than the proximal one. The nuclei are so regularly placed that they appear to form a continuous ring around it. The cells stain deeply at the free end, and carry a dense mass of long cilia. A section through the anterior part of the caecum shows a curious growth in the end lying near the intestine, where there is a fibrous mass (Pl. iii, fig. 10, *x*) coming from the caecal wall; this afterwards gradually disappears.

After the intestine leaves the stomach, it proceeds to the foot where it makes a large number of closely lying convolutions (Pl. ii, fig. 2, *C.In.*), then describing a semi-circular course round the base of the caecum, containing the crystalline style, and between the transverse pedal muscles (Pl. ii, fig. 2, *T.P.M.*), it passes along the dorsal side of the caecum, on which it forms three large loops, and shortly afterwards another one, then at the postero-dorsal part of the stomach, it turns, and as the rectum (Pl. ii, fig. 2, *R*) pursues a straight posterior course, passing through the pericardium, and encircled by the ventricle. (Pl. ii, fig. 2, *V.*) It continues over the posterior adductor muscle (Pl. ii, fig. 2, *P.R.P.*), and enters the cloacal cavity, where, having become free, it terminates at the bi-lobed anus. (Pl. ii, fig. 2, *A.*)

The folding and exact position of the folds vary somewhat in different specimens, but this is probably due to the extent of the contraction or distension of the proximal part of the foot.

When the intestine leaves the stomach, the wall on the one side is invaginated, and forms the typhlosole, which extends along the convoluted part of the intestine (Pl. ii, fig. 2, *C.In.*) near to where it passes the distal end of the caecum containing the crystalline style.

The typhlosole commences with a slight invagination of the wall of the intestine, this gradually increases in size and flattens out (Pl. iii, fig. 8, *Ty.*); at the same time, its walls become folded, and the width across the base is diminished. Towards its termination, it decreases in size and ends in the folded walls of the intestine.

The typhlosole is lined with ciliated epithelium, and the inside of it is filled with connective tissue. A transverse section of *S. siliqua* (Pl. iii, fig. 9, *Ty.*) across one of the first convolutions show the typhlosole of the one fold to be joined by connective tissue to the typhlosole of the opposite fold, without any divisional wall.

The tricuspid body, or the flèche tricuspidé, in the specimens examined, occupied the posterior portion of the stomach, with branches radiating from the muscular papilla into the lobes, and undoubtedly reminds one of what Fischer⁶ described as a body shaped like the screw propeller of a boat.

The digestive gland or liver (Pl. ii, fig. 2) is a large organ lying around the stomach, and covering the greater portion of it. The right lobe (Pl. iii, fig. 12, *R.L.*) spreads over the right and anterior sides, and projects over the anterior adductor muscle, while the left lobe (Pl. iii, fig. 12, *L.L.*) covers the left and ventral sides and projects posteriorly for some distance under the caecum of the crystalline style. The large bile duct, with branches ramifying the right lobe (Pl. iii, fig. 12, *B.Dt.*), enters the cardiac part of the stomach on the right antero-lateral side, and the small bile duct, though of no inconsiderable size, ramifies the left lobe (Pl. iii, fig. 12, *B.Dt'*), and enters the small middle cavity situated between the cardiac and pyloric portions.

Solen siliqua, L.

The alimentary canal (Pl. ii, fig. 3.) is in all its important points similar to that of *S. ensis*, but differs somewhat from it in detail.

The oesophagus is straighter. The stomach is similar to that in *S. ensis*, but the divisions are more pronounced. The cardiac

portion (Pl. iii, figs. 13 and 14, *C.St.*) does not project so far anteriorly, nor does the posterior end of the pyloric portion rise so much dorsally. The muscular papilla is more central, and the folds of the stomach are more distinct. (Pl. iii, fig. 13).

The intestine leaves the pyloric portion more posteriorly, and is joined for some distance to the caecum of the crystalline style by connective tissue. This, however, appears to be subject, in some specimens, to some slight variation where a small portion of the liver interposes between them. The intestine after it has passed round the distal end of the caecum of the crystalline style, assumes a larger number of folds, and in some specimens it presents a very folded condition. (Pl. ii, fig. 3).

Solen marginatus, Pult. and Don.

The alimentary canal of *S. marginatus* (Pl. ii, fig. 4), presents many points of difference when compared with either *S. ensis* or *S. siliqua*.

The mouth (Pl. ii, fig. 4, *M.*) is situated some distance anterior to the stomach, and not ventrally as in the before-mentioned species. The lips formed by the labial palps are directed forwardly (Pl. ii, fig. 4, *A.L.*, *P.L.*). The oesophagus is longer and proceeds posteriorly to the oesophagael portion of the stomach (Pl. iii, figs. 15 and 16). The stomach (Pl. ii, fig. 4, *St.*) lies in a more posterior position over the distal end of the foot, and whilst retaining the characteristic divisions as described in *S. ensis*, presents several striking modifications. The muscular wall (Figs. 15 and 16, *M.R.O.*), dividing the oesophagael from the cardiac portion, is much more developed and very muscular, and projects a considerable distance into the stomach, thus separating the anterior part of these divisions from each other. The caecum of the crystalline style, which is of greater length, leaves the pyloric portion on its ventral surface, curves and passes in an anterior direction near the ventral wall of the pedal cavity. (Pl. ii, fig. 4, *C.C.*).

The intestine (Fig. 4, *C.In.* and *In.*) pursues a course similar to that of *S. ensis*, and is for a long distance joined with connective tissue to the caecum of the crystalline style, both in going, and in returning along it, and afterwards forms only two or three small folds on the dorsal surface of the caecum, before passing into the rectum.

The liver surrounds the stomach and oesophagus, but a large part of it is situated ventrally to the stomach, and extending backwards, encloses a portion of the proximal parts of the intestine and caecum of the crystalline style. (Pl. ii, fig. 4).

REFERENCE LETTERS.

<i>A.</i>	Anus.	<i>Ob. M.</i>	Oblique Muscles.
<i>A. A.</i>	Anterior adductor muscle.	<i>Oc.</i>	Oesophagus.
<i>A. Ao.</i>	Anterior aorta.	<i>Oc. St.</i>	Oesophageal portion of stomach.
<i>A. L.</i>	Anterior lip.	<i>P. A.</i>	Posterior abductor muscle.
<i>B. Dt.</i>	Large bile duct.	<i>P. El.</i>	Muscle representing elevator pedis.
<i>B. Dt'.</i>	Small bile duct.	<i>P. L.</i>	Posterior lip.
<i>Caz.</i>	Small cavity receiving the small bile duct.	<i>Pal. M.</i>	Pallial muscles.
<i>C. C.</i>	Caecum of crystalline style.	<i>Pal. M'.</i>	Muscles of pallial edge enclosing pedal aperture.
<i>C. In.</i>	Convolved portion of intestine.	<i>P. P.</i>	Muscle representing protractor pedis.
<i>Cc. P.</i>	Cerebro-pedal connective.	<i>P. St.</i>	Pyloric portion of stomach.
<i>Cc. V.</i>	Cerebro-visceral connective.	<i>P. R. A. P. R. A'.</i>	Bifurcated parts of retractor pedis anterior.
<i>Con. T.</i>	Connective tissue.	<i>P. R. P.</i>	Bifurcated parts of retractor pedis posterior.
<i>C. S.</i>	Crystalline style.	<i>R.</i>	Rectum.
<i>C. St.</i>	Cardiac portion of stomach.	<i>Sem. M.</i>	Semicircular muscles.
<i>Ep.</i>	Epithelium.	<i>Si.</i>	Exhalent chamber of siphon.
<i>Ep. C.</i>	Ciliated epithelium.	<i>Si'.</i>	Inhalent chamber of siphon.
<i>Ep. Col.</i>	Columnar epithelium.	<i>St.</i>	Stomach.
<i>F.</i>	Foot.	<i>T. P. M.</i>	Transverse pedal muscles.
<i>In.</i>	Intestine.	<i>Ty.</i>	Typhlosole.
<i>Int. D.</i>	Dorsal integument.	<i>V.</i>	Ventricle.
<i>L.</i>	Liver.	<i>X.</i>	Fibrous mass of the caecum of the crystalline style.
<i>L. L.</i>	Left lobe of liver.		
<i>Lo. M.</i>	Longitudinal muscles.		
<i>M.</i>	Mouth.		
<i>M. P.</i>	Muscular papilla.		
<i>M. R. O.</i>	Muscular ridge separating the oesophageal from the cardiac portion of the stomach.		
<i>M. R. C.</i>	Muscular ridge separating the cardiac from the pyloric portion of the stomach.		
<i>M. R. P.</i>	Muscular ridge separating the small cavity receiving small bile duct, from pyloric portion.		

EXPLANATION OF PLATES II AND III.

- Fig. 1. *Solen ensis*. Muscular system. $\times \frac{2}{3}$.
- Fig. 2. do. View from the right side showing alimentary canal, &c. $\times 2$.
- Fig. 3. *Solen siliqua*. View from the right side showing alimentary canal,
- Fig. 4. *Solen marginatus*. View from the right side showing alimentary canal, &c. $\times 2$.
- Fig. 5. *Solen ensis*. Transverse section of the animal showing the liver, stomach, oesophagus, musculature of the foot, &c. $\times 1\frac{1}{2}$.
- Fig. 6. do. Longitudinal section of the stomach, showing the internal structure of the left side. $\times 4$.
- Fig. 7. do. Longitudinal section of the stomach, showing the internal structure of the right side. $\times 4$.
- Fig. 8. *Solen siliqua*. Transverse section through intestine, showing the posterior portion of the typhlosole. $\times 12$.
- Fig. 9. do. Transverse section through a convolution of the intestine showing the fold of the typhlosole. $\times 13$.
- Fig. 10. do. Transverse section through the anterior portion of the caecum of the crystalline style and intestine, showing the columnar epithelial lining of the former, and the ciliated epithelial lining of the latter. $\times 45$.
- Fig. 11. do. Transverse section of the stomach passing through the muscular papilla and small bile-duct. $\times 8$.
- Fig. 12. *Solen ensis*. Semi-diagrammatic view of the ventral portion of stomach, showing bile-ducts and their ramifications in the lobes of the liver.
- Fig. 13. *Solen siliqua*. Longitudinal section of the stomach showing the internal structure of the left side. $\times 4$.
- Fig. 14. do. Longitudinal section of the stomach showing the internal structure of the right side. $\times 4$.
- Fig. 15. *Solen marginatus*. Longitudinal section of the stomach showing the internal structure of the left side. $\times 3$.
- Fig. 16. do. Longitudinal section of the stomach showing the internal structure of the right side. $\times 3$.



ANATOMY OF SOLEN.



ANATOMY OF SOLEN.

NOTES ON SOME KNOWN SPECIES OF
 PLECTOPYLIS, AND DESCRIPTION OF A NEW
 VARIETY OF PLECTOPYLIS PLECTOSTOMA, BENS.

By G. K. GUDE, F.Z.S.

SINCE concluding my series of articles on the genus *Plectopylis* in "Science Gossip" I have received from various sources a number of shells of this group.

From Mr. E. Boubée of Paris I have received a specimen of *P. jovia*, Mab., and one of *P. schlumbergeri*, Morlet, and from Mr. W. F. Webb, of Albion, N.Y., one specimen of *P. villedaryi*, Ancy; three species, the armature of which I had not hitherto examined. These materials enable me to supplement my remarks on these structures in "Science Gossip," 1897, N.S., vol. iv, pp. 138, 139, and to add figures of the plates, folds, and denticles *in situ*.

A comparison of these three species has shown that they are very closely allied, and that there is no difference of diagnostic value between the armatures. They differ, however, in external aspect sufficiently to rank as separate forms. *P. jovia* is the largest of the three, while *P. villedaryi* is the smallest, *P. schlumbergeri* being intermediate in size. The latter may also be distinguished by the raised flexuous ridge on the parietal callus, being much less developed than in the other two species, where this process assumes a tongue-shaped form.

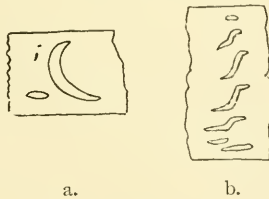
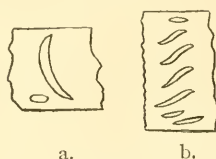


Fig. 1.—*Plectopylis jovia*.

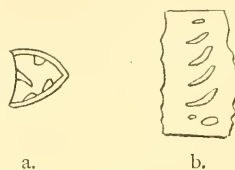
a. Parietal armature. b. Palatal armature.

In *P. jovia* the palatal folds numbers 2, 3, 4 and 5 are more vertical, and their extremities more angularly deflected, than in *P. schlumbergeri*, while the parietal plate in the former is stronger and more curved than in the latter.

Fig. 2.—*Plectopylis schlumbergeri*.

a. Parietal armature. b. Palatal armature.

Plectopylis schlumbergeri, as already stated, is intermediate in size between *P. joria* and *P. villedaryi*, and the flexuous ridge on the parietal callus is much more depressed. The figure of the anterior view of the armature given by me in "Science Gossip," 1897, N.S., vol. iv, p. 138, copied from the Journal de Conchyliologie is unsatisfactory, and I am pleased to be able to figure these structures *in situ*.

Fig. 3.—*Plectopylis villedaryi*.

a. Embryonic armature.
b. Palatal armature of mature shell.

My specimen of *P. villedaryi*, does not possess the upper denticle in front of the parietal plate, shown in Mr. Pilsbry's figure in the Manual of Conchology, 1893 (2), vol. viii, pl. 43, fig. 39, copied by me *t. c.*, p. 139, fig. 60b.

My shell was found to contain two embryos. As no embryonal armature had hitherto come under my observation, I was surprised to find that even at this early age, the creature is provided with rudimentary barriers. I have given a figure of the aperture of one of these embryos (Fig. 3a.).

The armature here simply consists of four short denticles: one on the parietal wall, the other three on the outer wall—one above and two below the periphery; all four are situate at the aperture.

***Plectopylis lepida*, Gude.**

Ann. and Mag. Nat. Hist., March, 1900 (s. 7), vol. v, p. 313.

Hab.—Tinh-Tuc, Tonkin.

This species is now figured for the first time. The vertical palatal folds overlap the parietal plate, leaving scarcely any room for

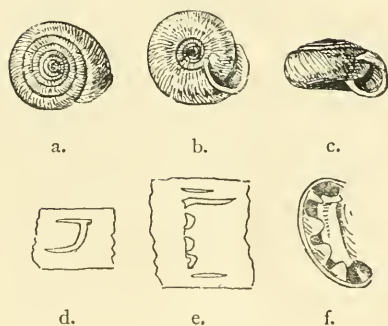


Fig. 4.—*Plectopylis lepida*.

- a. b. c. Shell, natural size.
 d. Parietal armature. e. Palatal armature.
 f. Posterior view of parietal and palatal armature.

the animal to emerge. The species is unique among its allies in having two horizontal palatal folds above the three vertical folds. In this respect it shows a certain affinity with the Burmese *P. achatina* and its allies; and this affinity is further evidenced by the fact that the three vertical folds are united by a low ridge; the sinuses between these folds would only have to be filled in, to constitute the single vertical plate characteristic of the group of *P. achatina*.

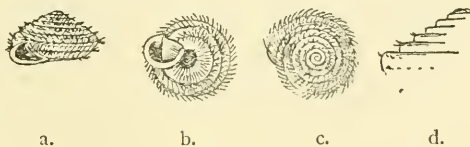


Fig. 5.—*Plectopylis plectostoma* v. *exserta*.

- a. b. c. Shell, natural size.
 d. Outline of the spire, enlarged.

***Plectopylis plectostoma* var. *exserta*, n.v.** Figs. 5a—d.

Differs from the type in the peripheral keel being exserted. The shell is also larger and more solid. More than thirty specimens were received from a native collector. Figure 5d shows the outline of the spire enlarged.

Major diam. 10.5, minor 9.75; alt. 7 mm.

Hab.—Khasi Hills, Assam. *Type* in my collection.

NOTE ON THE ANATOMY OF AMPHIDROMUS PALACEUS, MOUSS.

BY WALTER E. COLLINGE.

(Plate iv.)

DURING the past few years considerable attention has been given to the anatomy and classification of the different species of *Amphidromus*. Wiegmann¹ has described in great detail the structure of *A. adamsi*, Rve., *A. porcellanus*, Mouss., and *A. contrarius*, Müll., and later² that of *A. porcellanus*, Mouss., and *A. sinistralis*, Rve. Jacobi³ has given a valuable account of two Malayan species—*A. chloris*, Rve., and *A. interruptus*, Müll., while Pilsbry⁴ has recently written on the sub-genus *Beddomea*, Nev., shewing its affinities to *Amphidromus*.

Some short time ago I received from Mr. H. Rolle of Berlin, two examples of *A. palaceus*, Mouss., from Java, of which I am now able to give a short account of the internal structure.

Fulton⁵ and Pilsbry⁶ both assign this species to the "Group of *A. javanicus*," none of the species of which, have as yet been anatomically described.

A. palaceus differs from all the above mentioned species in many characters, but particularly in the form and structure of the generative organs and free muscles.

The Generative Organs.—(Pl. iv, figs. 3—5).—The vestibule is small, beyond it is the vagina, a long, wide tube, the internal walls of which are thrown into a series of longitudinal plications, with short, fine transverse folds connecting them (Pl. iv, fig. 5). At the point where the receptacular duct and free-oviduct enter the vagina, it dilates to form a wide sac. The penis is a somewhat short, bulbous sac, and distally gives place to a long, densely coiled tube, the epiphallus, which penetrates the distal wall of the penis and terminates in a bluntly ending, fleshy papilla (Pl. iv, fig. 4,

1. Zool. Ergebnisse einer Reise in Niederländ. Ost. Indien, 1893, Bd. ii, pp. 191—210, T. xiv—xv.
2. Abhandl. d. Senckenb. naturf. Gesell., 1898, pp. 289—557, T. xxi—xxxii.
3. Archiv für Naturgesch. Berlin, 1895, pp. 293—318, T. xiv.
4. Proc. Malac. Soc. Lond., 1901, vol. iv, pp. 158—162, pl. xvi.
5. Ann. Mag. N. H., 1894 (ser. 6), vol. xvii, pp. 66—69, pls. v—vii.
6. Man. Conch., ser. ii, 1900, vol. xiii, p. 134.

f. p.); beyond the epiphallus there is a long flagellum, the extreme distal portion of which is folded upon itself, and forms a globose sac, with a short fleshy appendix (Pl. iv, fig. 4, *ap.*). Internally the wall of the penis is seen to consist of a series of muscular folds, which form a fringe distally around the fleshy papilla. Around the base of the papilla is a deep groove, from which arise a series of very fine grooves coming up on all sides towards the somewhat crescent-shaped opening (Pl. iv, fig. 4). The retractor muscle of the penis is short, and inserted on the right side towards its middle. The receptacular duct enters the vagina to the left of the free-oviduct. It is a long, wide tube, gradually tapering and terminating in the ovoid receptaculum seminis. In life the duct is richly pigmented and coiled around the common duct, so that the receptaculum seminis lies at the side of the albumen gland. Internally the lower portion shows a rich folding of the wall, which gives place to a series of longitudinal folds distally. The free-oviduct is very short. The common duct is closely wound upon itself for the greater part of its length. The albumen gland is small. The hermaphrodite gland is somewhat fan-shaped, with a fairly large, twisted duct.

The Free Muscles. (Pl. iv, figs. 1, 2, 6).—The buccal retractor consists of three more or less fused bands, inserted on the ventral side of the buccal cavity (Pl. iv, figs. 1, 2, 6). It is not united to the ocular retractors, which are free. The right ocular anteriorly consists of the superior and inferior oculars, and then fuses with the pedal muscles, and is continued posteriorly as two bands. The left ocular anteriorly is similar to the right one, posteriorly it is continued as a single band. Lying between the two oculars and dorsal to them (in dissection) is the large columella muscle. The retractor of the penis has already been mentioned, it arises from the diaphragm.

The Pallial Region. Pl. iv, fig. 7).—The kidney is a long, narrow, ribbon-like body measuring 47 millim. in length, and varying from 4.5 millim. to 5.5 millim. in breadth. The pericardium is 9 millim. in length.

Compared with the species which have so far been anatomically described, the following features seem to characterize *A. palaceus*.

1.—In the general form of the generative organs there are minor features, and more important ones in the form and structure of the penis and epiphallus.

2.—The form and position of the free muscles.

3.—The general characters of the kidney, ureter, etc.

EXPLANATION OF PLATE IV.

Amphidromus paluccus, Mouss.

- Fig. 1. Lateral view of the buccal mass and oesophagus. $\times 1\frac{1}{2}$.
 2. Ventral view of the same. $\times 1\frac{1}{2}$.
 3. The generative organs. $\times 1\frac{1}{2}$.
 4. Penis dissected to show the fleshy papilla and internal wall.
 5. Vagina dissected to show the internal structure.
 6. Retractor muscles.
 7. Portion of the pallial complex. $\times 1$.

REFERENCE LETTERS.

<i>alb. gl.</i>	Albumen gland.	<i>pr.</i>	Prostate.
<i>an.</i>	Anal aperture.	<i>p. r.</i>	Pedal retractors.
<i>ap.</i>	Appendix.	<i>p. v.</i>	Pulmonary vein.
<i>au.</i>	Auricle.	<i>r.</i>	Rectum.
<i>b. c.</i>	Buccal cavity.	<i>r. ap.</i>	Renal aperture.
<i>b. r.</i>	Buccal retractor.	<i>r. d.</i>	Receptacular duct.
<i>c. m.</i>	Columellar muscle.	<i>r. m.</i>	Retractor of penis.
<i>ep.</i>	Epiphallus.	<i>r. o. r.</i>	Right ocular retractor.
<i>fl.</i>	Flagellum.	<i>r. s.</i>	Receptaculum seminis.
<i>f. ov.</i>	Free-oviduct.	<i>s. d.</i>	Salivary duct.
<i>f. p.</i>	Fleshy-papilla.	<i>s. gl.</i>	Salivary gland.
<i>h. d.</i>	Hermaphrodite duct.	<i>T.</i>	Superior ocular retractor.
<i>h. gl.</i>	Hermaphrodite gland.	<i>t.</i>	Inferior ocular retractor.
<i>k.</i>	Kidney.	<i>ur.</i>	Ureter.
<i>l. o. r.</i>	Left ocular retractor.	<i>v. d.</i>	Vas deferens.
<i>æ.</i>	Oesophagus.	<i>v.</i>	Vestibule.
<i>ov.</i>	Oviduct.	<i>ve.</i>	Ventricle.
<i>p.</i>	Penis.	<i>v.g.</i>	Vagina.
<i>pc.</i>	Pericardium.	<i>w. p. c.</i>	Wall of pulmonary cavity.

DESCRIPTION OF TWO NEW SPECIES OF
MICROPARMARION FROM THE ANDAMAN ISLANDS:

A CORRECTION.

By WALTER E. COLLINGE,

The University, Birmingham.

By a regrettable error, the two new species of *Microparmarion* (*M. möllendorffi* and *M. andamanica*) described in this Journal in March last (p. 16) were stated to have come from the Andaman Islands. Dr. O. F. von Möllendorff, however, writes me "they came from Annam, where Mr. Roebelen collected them. A distinct locality was not given, but they are from the Mekong valley." (*in litt.* April 6th.)

Unfortunate as the name of the second species is, it appears better to allow it to remain.

PROCEEDINGS OF THE
MIDLAND MALACOLOGICAL SOCIETY.

25TH MEETING, FEBRUARY 15TH, 1901.

The President in the chair.

PAPER READ.

“On the Anatomy and Systematic Position of the Genus *Apera*., Heyn.”
By the President.

EXHIBITS.

By Mr. Bloomer: Shells of *Helix arbustorum* from Nevin.

By Mr. Breeden: Shells of *H. arbustorum* from Dudley Castle, Brodrip, Lynton and Doncaster.

By Mr. Overton: Shells of *H. arbustorum* from Dudley, Dover, Canterbury and the Isle of Wight.

By the President: Specimens of various species of *Atopos*.

26TH MEETING, MARCH 8TH, 1901.

The President in the chair.

EXHIBITS.

The President showed and explained some sections illustrating the various glands met with in the integument of molluscs.

By Mr. Breeden: Shells of *Helix cantiana* from Portsdown, Ingleton and Lewes; also shells of *H. cartusiana* from Dover, Newhaven and Lewes, Sussex.

By Mr. Overton: Shells of *H. cantiana* from Deal, Dover, Canterbury and Bridlington; also shells of *H. cartusiana*, and *H. terrestris* var. *grisca* from Dover.

27TH MEETING, APRIL 12TH, 1901.

The President in the Chair.

PAPER READ.

“Note on the Anatomy of *Amphidromus pulaccus*, Mouss.”
By Walter E. Collinge.

EXHIBITS.

By Mr. Overton: Two interesting shells of *Limnaea palustris*. The first was an elongated form (30·5 × 11·5 mm.) collected in Sutton Park, the second a dwarfed, turreted form (12·5 × 7·5 mm.) from Sandwich. Both had five whorls, the latter specimen being easily contained in the mouth of the former.

By the President: A small collection of marine shells from the Shetlands and Firth of Forth.

CURRENT LITERATURE.

Meisenheimer, J.—Entwicklungsgeschichte von *Dreissensia polymorpha*, Pall.
Zeit. f. wiss. Zool., 1900, Bd. lxxix, pp. 1—137, Tfn. i—xiii, u. 18 fign. im Text.

In this work the author presents us with another of those exhaustive treatises on cell-lineage, for which the younger continental and American zoologists, following the lead of Prof. E. B. Wilson, are becoming so noted.

Dr. Meisenheimer, who has already given us the results of an investigation on the cell-lineage of the Pulmonata, taking *Limax* as an example, now deals with the Lamellibranchia, basing his conclusions upon a detailed study of the cleavage exhibited by the fertilized egg of *Dreissensia*, a particularly happy selection since this form belongs to an undoubted lowly division viz. the Filibranchia. *Dreissensia* is further interesting, for it alone of our fluviatile bivalves retains a free swimming Trochophore larva, a fact which is usually interpreted as indicating a comparatively recent incursion into freshwater, whereas in the other genera which have been similarly investigated (*Cyclus* by Stauffacher, and *Unio* by Lillie and others), the stage corresponding to this is almost wanting.

Unfortunately the results to be derived from such an investigation as the above, are hardly commensurate with the toil which it involves, since the results arrived at by the now numerous investigators in this field are so uniform. We, consequently, cannot help wishing that Dr. Meisenheimer had directed his attention and marvellous patience towards some other group of animals less known, in this respect, than the Mollusca.

With regard to the conclusions deduced from a study of this nature, we think a word of warning should be offered to those who have never attempted to trace back the ontogenetic history of any adult organ beyond its first definite appearance as a cell-complex, back to the earliest divisions of the egg, back even to one of the four primary blastomeres. These zoologists will hardly realize the difficulties and uncertainty which beset the attempts to identify a given cell in the different cleavage stages, and consequently they will be inclined to accept without hesitation the conclusion which investigators in this field put forward, their acceptance of these deductions will be still more readily given, if they study the beautiful figures in the monograph before us, where they will find each cell carefully lettered and its history traced, as if its existence had been followed continuously in a single specimen. This, however, is not the case, and when we consider the enormous difficulties in homologizing these cells, each having to be identified anew at every stage, since it is impossible to keep a live egg under observation for any time, it will be apparent that these numbers merely signify a certain observer's interpretation of the cells at a given stage, and consequently the conclusions cannot be unhesitatingly accepted, their main value lying in the fact that for the most part they are in accord with those of other workers in the same field of inquiry.

Dr. Meisenheimer, as we have implied above, treats in great detail with the cleavage of the fertilized egg, and the subsequent fate of the derived blastomeres, and in this his observations differ in no vital respects from those of all former workers. He then traces the formation of the Trochophore and its organs. Here he is at variance in many points with most of the earlier observers, since he finds that in *Dreissensia*, as in *Limax*, the primitive kidney is of ectodermal origin, and his figures in this respect appear to be most conclusive.

One of the most interesting observations from a phylogenetic standpoint, is to be found in his account of the origin of the nervous system, where distinct pleural ganglia are seen to arise in the embryo from the post-velar ectoderm, and therefore quite distinct from the cerebral ganglia, with which, however, they eventually fuse, since the latter arise as usual from the apical plate of the velum.

A most radical change in our ideas will be necessary if Dr. Meisenheimer is correct in his interpretation of the origin of the adult kidney and heart, for he would derive these organs in *Dreissensia* as in *Limax* from the ectoderm, whereas all other

observers trace them to the mesoderm. We do not think that our author's observations on this point will meet with general acceptance, especially as his figures are by no means conclusive. The origin of one of these organs, the heart, has been traced so conclusively to the mesoderm in so many invertebrates, that we do not think a couple of isolated cases like these, even supposing them to be correct, can invalidate it.

Our author traces the origin of all the remaining organs in the same detailed manner, but unfortunately, as it appears to us, he loses sight of the broader features of the homology and morphology of the organs in the study of the origin of their component cells. We cannot help thinking that ontogenists are tending to lose their powers of discrimination, so far as features of phylogenetic significance are concerned, in the minutiae of the ontogeny of the individual. The true study of phylogeny can only be based upon a combination of comparative morphology and embryology, certainly not upon the study of embryology alone. In this respect, we think, Professor Sedgwick was right in his vigorous attack upon von Baer's hypothesis that ontogeny recapitulated phylogeny, though he possibly carried his onslaught upon the law of recapitulation too far, but that such a warning was necessary we see daily in the ever increasing detailed ontogenetic works, and the phylogenetic conclusions based thereon.

Dr. Meisenheimer concludes with a careful comparison of the Trochophore of *Dreissensia* with those of other Mollusca and Annelida, but even here we cannot help thinking that he has been led astray in concluding that the Trochophore is of such great phylogenetic importance. He himself states that he formerly held the reverse view, and, we think, if he had not restricted himself so much to ontogeny, he would still regard this interesting and undoubtedly important larval form as having less phylogenetic significance than he now assigns to it.

Unfortunately owing to the iniquitous system at present in vogue, all the cream has been skimmed off this paper by the publication of no less than three preliminary communications, two of them being illustrated. Personally we utterly fail to understand why anyone should wilfully set to work to spoil his own work in this way, and can only express the pious wish, that the time will come when that horror the preliminary communication shall trouble us no more.—M. F. WOODWARD.

MacMunn, C. A.—On the Gastric Gland of Mollusca and Decapod Crustacea: its Structure and Functions. *Phil. Trans. Roy. Soc.*, 1900, B. vol. 193, pp. 1—34, pls. 1—4.

The objects of this investigation, the author states, were "to determine (1) the form in which entero-chlorophyll and the associated pigments occur in the glandular epithelium of the gastric gland; (2) the nature of the bodies with which the pigment is associated * * *; (3) how this pigment is formed in the gland; and (4) if not actually formed there, how does it get into the glandular epithelial cells;" finally the relation (if any) of Chaetopterin to entero-chlorophyll, and the general histology of the gland are discussed.

From an examination of *Ostrea*, *Patella*, *Aplysia*, *Helix*, *Limax*, and *Arion*, the author shows that there is a complete absence of glycogen, that the colouring matters are taken up from the intestine and accumulated in the gland, which is capable of storing fat and pigment, and has also an excretory function.

The author discusses in some detail the results of spectro-photometric observations, and other points mentioned above.

Balch, F. N.—List of Marine Mollusca of Coldspring Harbor, Long Island, with descriptions of one new Genus and two new species of Nudibranchs. Proc. Boston Soc. N.H., 1899, vol. 29, pp. 133—162, pl. i.

The author enumerates 83 species comprised in 63 genera. The new forms are *Polycerella davenportii* related to *P. emertonii*, Verrill, and *Corambella* (*gen. nov.*) *depressa* closely allied to *Corambe sargassicola*, Bgh., and *C. testudinaria*, H. Fisch.

André, E.—Organes de défense tégumentaires des *Hyalinia*. Rev. Suisse de Zool., 1900, T. 8, pp. 425—433, pl. 32.

The author here describes and figures certain curious structures found in the skin of different species of *Hyalinia*, to which the name of phylacites is given. Each phylacite is enclosed in a parent-cell or phylacoblast, and consists of a transparent body composed of a transparent and more or less granulose substance, enclosing a round, ovoid or sometimes fusiform vesicle, in which are a number—3 to 21—of round or ovoid refractive spherules. The phylacoblast at first closely resembles ordinary connective tissue cells, but when the development of the phylacite is complete, the protoplasmic contents and nucleus disappear. The expulsion of these bodies is very rapid. In certain features they resemble nematocysts and are probably defensive. The chemical composition remains uncertain.

Möllendorff, O. von.—Neue und kritische Landschnecken von Japan und den Liukiu-Inseln. Nachr. d. Deutsch. Malak. Gesell., 1900, pp. 33—45.

Dr. von Möllendorff describes the following as new: *Gastrodontella japonica*, g. et. sp. n. *Bulininus* (*Subzebrinus*) *nipponicus*, *Clausilia* (*Stereophaedusa*) *eurystoma*, Marts., subsp. *brachyptycha*, *C.* (*Megalophaedusa*) *fulloni*, Sykes, subsp. *clavula*, *C.* (*Heniphaedusa*) *breviluna*, *C.* (*H.*) *omicensis*, *Cassidula plecotrematoides*, subsp. *japonica*, *Diplommatina* (*Sinica*) *minutissima*, and *Georissa japonica*.

Möllendorff, O. von.—Zur Binnenmollusken-Fauna von Annam iv. Nachr. d. Deutsch. Malak. Gesell., 1900, pp. 45—50.

The following are new: *Lamprocystis annamitica*, Mlldff., subsp. *subrubella*, *Xestina denserugata*, *X. tenera*, *X. pharangenensis*, *Amphidromus rhodostylus*, *A. metabletus*, subsp. *pachychilus* and *insularis*, and *A. haematostoma*.

Dautzenberg, Ph.—Croisieres du Yacht *Chazalie* dans l'Atlantique. Mollusques. Mém. Soc. Zool. de France, 1900, T. xiii, pp. 145—265, pl. ix—x.

The author enumerates 444 species, of these three quarters are from the Antilles and the northern coast of South America, 44 have been collected from Cape Blanc and the Bay of Lévrier, 32 from the islands of Branco, Maderia, Teneriffe, 7 from the pelagic fisheries, while the excursions on land have furnished about 40 land and freshwater species.

The following species are new: *Plecochilus dalmasi*, *Drilla rhodochroa*, *D. chazalici*, *D. claudoni*, *D. jousseauvici*, *Phos chazalici*, *Modulus guernei*, *Lucapinella versluysi*, *Chlamys* (*Aequipecten*) *bavayi*, *Pecten chazalici*, *Nucula dalmasi*, *Leda chazalici*, *Tellina* (*Tellinella*) *versluysi*.

EDITOR'S NOTES.

In the March issue (p. 32) we stated that a specimen of *Pleurotomaria adansoniana*, Cr. & Fisch., obtained in Barbados by Surgeon-Col. S. Archer, had been presented by him to the Manchester Museum. We find, however, that we were wrong in stating that this was presented by the finder. The Museum is indebted, for this valuable specimen, to the generosity of Mr. R. D. Darbishire.

THE
JOURNAL OF MALACOLOGY.

No. 3.

SEPTEMBER 30TH, 1901.

VOL. VIII.

NOTICE SUR LE PROFESSEUR DE
LACAZE-DUTHIERS.

PAR A. VAYSSIÈRE,

*Professeur de Zoologie à l'Université de Marseille,
Conservateur du Muséum (Zoologie).*

LA France vient de perdre le 21 Juillet dernier, en la personne du Professeur de Lacaze-Duthiers, un de ses savants les plus éminents.

Né à Montpezat (Lot-et-Garonne) le 19 Mai 1821, après avoir terminé ses études classiques, Félix Joseph Henri de Lacaze-Duthiers vient faire de la Médecine à Paris. Une fois Docteur, il abandonna cette carrière pour se consacrer à l'étude des Sciences naturelles sous la direction de l'illustre zoologiste Henri Milne-Edwards.

Vers 1849 il passe son doctorat es-sciences naturelles avec une thèse remarquable sur "L'armure génitale femelle des Insectes," et en 1854 il est nommé professeur de Zoologie à la Faculté des Sciences (Université) de Lille.

En 1862 Lacaze-Duthiers est chargé de poursuivre des recherches sur la reproduction du corail, et après un séjour d'un an le long des côtes de l'Algérie, surtout à la Calle, il publie son "Histoire Naturelle du Corail," magnifique travail accompagné de nombreuses planches coloriées sur l'organisation et le développement de ce zoophyte."

Avant de commencer ses recherches sur le corail, Lacaze-Duthiers avait étudié l'anatomie de divers types de Mollusques: Histoire de l'organisation et du développement du Dentale (1857); Histoire anatomique et Physiologique du Pleurobranche orangé (1859); de l'Haliotide (1859); de l'Anomia (1854); des Vermets (1860); ainsi que divers travaux sur les Tuniciers.

Après sa mission en Algérie il dirige toutes ses recherches scientifiques dans cette double voie : Etudes sur les divers types de Coralliaires des nos côtes, et études sur divers mollusques terrestres, marins ou des eaux douces. Après 1870 il a publié entr'autres travaux sur les Mollusques : Otocystes ou capsules auditives des Mollusques Gastéropodes aquatiques (1872) ; Etudes anatomiques de l'Aspergillum (1883) ; de la Testacella (1888) ; du Magillus . . .

En 1864 il avait été chargé de suppléer Valenciennes au Museum de Paris. L'année d'après, à la mort de ce dernier, il le remplace en qualité de professeur administrateur de la Section de Malacologie.

Mais son activité professorale pouvait difficilement s'exercer au Museum, aussi dès 1868 il abandonne cet Etablissement pour prendre une place vacante de professeur de Zoologie à la Sorbonne.

Ses nombreux travaux lui valurent l'honneur en 1871 d'être nommé Membre de l'Académie des Sciences en remplacement de Longet.

C'est à cette époque que Lacaze-Duthiers conçut l'idée de fonder une Revue Scientifique et de faire créer une station de Zoologie marine.

La revue qu'il a fondé en 1872 et qui porte la nom d' "Archives de Zoologie Expérimentale" constitue une des principales publications françaises de Zoologie ; elle contient surtout des travaux du Maître et de ses élèves.

C'est en 1873 que Lacaze-Duthiers put ouvrir à Roscoff un laboratoire de Zoologie Marine sur les côtes de la Manche, station dans laquelle il menait fréquemment tous ses élèves, mais sa situation géographique en faisait surtout un Laboratoire d'été ; aussi désirait-il créer un autre laboratoire sur un point qui put permettre des recherches scientifiques en Hiver. En 1881, il arrêta son choix sur le petit port de Banyuls (Pyrénées Orientales) à l'entrée duquel il a établi une station très bien installée.

On peut dire que Lacaze-Duthiers fut le véritable créateur de nos stations marines en France, car le laboratoire de Concarneau (Bretagne) que Coste avait créé vers 1855, avait plutôt le caractère d'un établissement de pisciculture et ce sont ses successeurs seulement (Pouchet, Filhol) qui ont élargi plus tard le cadre des recherches poursuivies en ce point.

L'influence de Lacaze-Duthiers sur le marche des études de Zoologie marine pendant ces vingt-cinq dernières années a été considérable ; tous ses travaux personnels sont d'une exactitude telle dans les moindres détails anatomiques, qu'ils pourront longtemps servir de base à tous les naturalistes qui s'occuperont des mêmes sujets.

MALACOLOGICAL NOTES.*

By E. R. SYKES, B.A., F.L.S.

6.—On a new species of *Helicina* from Kangean Island.*Helicina rollei*, n. sp.

T. depresso-conica, solidiuscula, leviter lineis incrementi notata, aurantiaca vel straminea, apice acuto; anfr. 5 planiusculi, ultimus valde carinatus, antice non descendens; apertura obliqua, angulato-ovalis; columella brevis, excavata, basi extrorsum valde angulata; peristoma crassiusculum undique reflexum; callus basalis tenuis. Operculum non vidi.

Diam. max. 15·5; alt. 6·5 millim.

Hab.—Kangean Island, north of Bali (comm. H. Rolle).

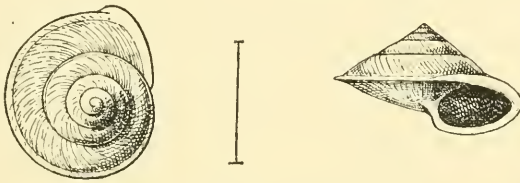


Fig. 1.—*Helicina rollei*, n. sp.

This interesting shell recalls in form and colour, *H. amaliae*, Kobelt. It is however much more depressed, the spire much more pointed, the lip is much more reflexed and the denticle at the base of the columella more marked. In this last respect it resembles *H. agglutinans*, Sby., but here again the lip is in *H. rollei* much more expanded and reflexed and the upper margin does not descend in front.

7.—The value of the name *Ctenopoma*.

The name *Ctenopoma* was first used in a generic sense by Peters in 1844 (SB. Ak. Berlin, 1844, p. 34) for an African fish. Subsequent reference to it in Ichthyology may be found so far back as 1855 in

* See ante, p. 20.

Heckel (SB. Ak. Berlin, 1855, Bd. xvii, p. 168) and Peters (Wiegman Arch., Bd. xxi, i, p. 247).

The earliest publication of the name that I can trace in Mollusca was by Pfeiffer (Malak. Blätt., Bd. iii, p. 58) in 1856, where he states that the name was communicated to him by Shuttleworth and gives as the type *Cyclostoma rugulosum*, Pfr. Subsequently Pfeiffer (Mon. Pneum. Suppl. I, p. 102) refers to it as "Shuttleworth in litt. 14 Sept., 1852."

If these facts be correct the name cannot stand in Mollusca and I therefore propose, taking *C. rugulosum*, Pfr., as the type, to replace *Ctenopoma*, Pfr. non Peters, by

RHYTIDOPOMA, nom. nov.

8.—Note on *Cecina manchurica*, A. Ad.

This genus and species were characterised by Adams (Ann. Nat. Hist., ser. 3, vol. viii, p. 308) in October, 1861, without any figure. Authentic examples have come into my hands, and I take this opportunity of illustrating the form.



Fig. 2.—*Cecina manchurica*, A. Ad.

It may be noted, while dealing with this species, that the note by Dr. Moellendorff (Nachr. Deutsch. Malak. Ges., 1900, p. 153) that *Blanfordia japonica*, A. Ad. "niemals diagnosticirt, sondern nur abgebildert worden," is inaccurate. The species, as also *B. bensoni*, was described in the same paper as *Cecina*, under the generic term *Tomichia*.

NOTE UPON TROPHON UMBILICATUS, TENISON WOODS.

By HENRY SUTER,
Auckland, New Zealand.

A short note on *Murex octogonus*, Q. and G., and *M. umbilicatus*, T. Woods, by Mrs. Agnes F. Kenyon,¹ induced me to study the specimens at my disposal, and I wish here to publish a short account of the results arrived at.

The literature I was able to consult reveals the following facts: *Trophon umbilicatus* was described by Tenison Woods in 1875,² from specimens obtained on the east coast of Tasmania. He says that at one time he considered it to be a Tasmanian variety of *T. hanleyi*, Ang.

Bednall in 1886,³ classed it under *Murex octogonus*, Q. and G., and he has no doubt of the identification of the S. Australian shell with *M. octogonus*. He also states quite correctly, "In New Zealand the species attains twice the size it does in these waters."

The same shell had already been described by A. Adams in 1853,⁴ under the name of *Murex scalaris*, which name, however, is preoccupied by Brochi for a fossil shell. T. Woods was no doubt not cognisant that the species had already been described.

In his "Catalogue," Brazier⁵ gives the synonyms and localities for *M. umbilicatus*, T. Woods, which are repeated in the Proc. Linn. Soc., N.S.W., 1894 (2 ser.), vol. viii, pp. 116, 117, where he states: "There is not the slightest connection between *M. octogonus*, Q. and G. and *umbilicatus*, T. Woods; the former is a large shell with very fine lirae between the longitudinal lirate ribs; the latter is a much thicker and smaller shell with a large umbilicus margined with rounded imbricated scales."

Dr. Verco⁶ enumerates *Murex umbilicatus*, T. Woods, and remarks that "Tryon in his Manual, vol. ii, p. 155, has placed it in *Urosalpinx*, which he describes as having a purpuroid operculum. But this species has a muricoid operculum, and belongs to the genus *Murex*. It was formerly confounded with *M. octogonus*, Q. and G."

¹ Proc. Malac. Soc. Lond., 1900, vol. iv, p. 39.

² Papers and Proc. Roy. Soc. Tasmania, 1875, p. 135.

³ Trans. and Proc. Rep. Roy. Soc. Sth. Aust., 1884-85 [publ. 1886], vol. viii, p. 64.

⁴ Proc. Zool. Soc., 1853, p. 71.

⁵ Catal. Marine Shells of Australia, 1893, part iii.

⁶ Trans. Roy. Soc. Sth. Aust., 1895, p. 96.

The same author, in 1896,⁷ published a note upon *Murex umbilicatus*, T. W., in which he explains that Tryon proposed the name *M. angasi* as a substitute for *scalaris*, not knowing its identity with *M. umbilicatus*, and mentions that Brazier sent a specimen to H. Adams, who said it was identical with that named *M. scalaris* by his brother. Dr. Verco further gives a good figure of the shell (*l. c.* Pl. vii, f. 4).

Pritchard and Gatliff⁸ in their "Catalogue of Marine Shells of Victoria," reproduce part of the synonymy, and observe, "Considerable confusion has surrounded this species of wrongful identifications, etc."

This is about the curriculum vitae of the species.—Returning to Mrs. Kenyon's note the following passage is difficult to understand: "*Murex octogonus*, Q. and G. One very fine specimen, showing that Mr. Brazier erred in considering *M. octogonus* to be identical with *M. umbilicatus*." Where Mr. Brazier does consider the two identical is unfortunately not stated, but on reading the foregoing quotations Mrs. Kenyon will, I hope, be convinced that Mr. Brazier took just an opposite view. It was Mr. Bednall who took the view assigned to Mr. Brazier.

After comparing a good many examples from Hauraki Gulf, and also a few from South Australia, I have come to the conclusion that *M. umbilicatus*, T. Woods, is absolutely nothing more than a *variety* of *M. octogonus*, Q. and G. I have a number of specimens of both before me in which there is decidedly no other difference to be found, but that in the var. *umbilicata* there is a more or less open umbilicus present, which of course causes the spines round the base to spread much further out. Mrs. Kenyon says that in *M. octogonus* the shell is much more fusiform and turreted. I measured six specimens of each and the result is as follows: In *M. octogonus* the proportion of breadth to length was found to be 1 : 1.8, and in the var. *umbilicata* it varied from 1 : 1.7 to 1 : 1.21, the mean being 1 : 1.8.

The sculpture in *M. octogonus*, Q. and G., varies greatly according to the locality and the depth in which the molluscs live. Shore specimens in New Zealand average the size of my specimens from South Australia, about 20-25 millim. in length, but when we get specimens from deeper water, say 10-20 fathoms, the shells are much larger, up to 50 millim. in length. This also applies to the var. *umbilicata*. The same conditions also influence the sculpture of the shell. Deep water specimens are almost always beautifully ornamented with prickly spines on the varices and round the base, but shore

⁷ *Ibid.*, 1896, p. 231.

⁸ *Trans. Roy. Soc. Victoria*, 1898 (n.s.), vol. x, p. 254.

specimens have shorter spines, which often become obsolete, the shells becoming almost devoid of all ornamentation, being simply spirally grooved and longitudinally costate; this is Hutton's var. *espinosa* of *M. octogonus*. This great variability in size and sculpture, and the presence or absence of an umbilicus, have, no doubt, been at the bottom of all the confusion. I must not forget to mention that of my three specimens from South Australia received as *M. umbilicatus*, T. Woods, one only has an umbilicus, the two others show no trace of it; otherwise they are alike.

ON THE ANATOMY OF THE VITRINA IRRADIANS OF PFEIFFER.

By WALTER E. COLLINGE.

(Plates v and vi.)

THE mollusc which forms the subject of the present communication, has at different periods, and by different writers, been relegated to various genera. Originally described by Pfeiffer¹ in 1852 as a member of the genus *Vitrina*, it was placed by Theobald² in that heterogeneous genus *Helicarion*; as a member of this genus it was treated of (or at least its shell) by Nevill³, Clessin⁴, Tryon⁵, and others. In 1898 Lieut-Col. Godwin-Austen⁶ intimated that he proposed to describe a new subgenus for its reception, to which he gave the name *Ratnadicipia*, and in the following year⁷ he gave a diagnosis and some brief notes on the anatomy of the generative organs. The jaw and radula were shown to be of the type seen in *Hemiplecta*, and the male organ (only partially described) was compared with that of *Euplecta*, *Nilyiria*, and *Ariophanta*, and thought to be allied to the two latter.

1 Proc. Zool. Soc., 1852, p. 156.

2 Supp. Catal., p. 24.

3 Hand-list of Gastrop., 1878-85, p. 15.

4 Nomencl. Helic., 1881, p. 31.

5 Man. Conch., 1885 (ser. 2), p. 176, pl. 40, fig. 33.

6 Proc. Malac. Soc. Lond., 1893, vol. iii, p. 253.

7 Moll. of India, 1899, vol. ii, pt. ix, pp. 93-96, pl. lxxxv, figs. 1-8a.

In connection with my studies on the Asiatic slug-like molluscs, I have had occasion to examine the internal structure of many genera of Indian molluscs, and as these are as yet very imperfectly understood, I cannot, in the present instance, do better than place on record the results obtained.

I have pleasure in expressing how greatly indebted I am to the kindness of Mr. Oliver Collett, who has sent me many choice examples of this species, as of many other Cingalese genera.

RATNADVIPIA, Godw.-Aust.

Ratnadvipia, G.-A., Proc. Malac. Soc. Lond., 1899, vol. iii, p. 253;
Moll. of India, 1899, vol. ii, p. 95.

Animal slug-like, with the mantle bordering the shell on all sides, postero-laterally produced into tongue-like extensions. Dorsum flattened behind visceral hump, posteriorly sharply keeled. Caudal mucous pore large. Foot-sole not divided into median and lateral planes. Viscera does not extend into posterior portion of body, which is solid. Intestinal tract rather short, exhibits four loops. Generative system with well developed penis-sheath, containing evertible penis: diverticulum, epiphallus, and kalk-sac present. Receptaculum seminis sessile. Dart-sac and large dart-gland,* no calcareous dart, but short, blunt, muscular papilla.

Shell thin, with few whorls, body whorl large.

I see no objection to the name proposed by Lieut.-Col. Godwin-Austen, excepting that it should rank as a distinct genus. The incomplete description given by this author, and the still more incomplete figures, give one very little idea of the form and structure of the internal parts, and consequently the affinities, of this very interesting genus. I propose, therefore, to describe the anatomy in some detail.

The foot-sole varies much in different specimens; in some it is perfectly smooth, exhibiting no trace of a median groove, while in others a well-defined median groove is present, with raised lateral portions.

Godwin-Austen thinks (l. c. p. 95) that this indicates that a similar contraction prevails in life, and perhaps points to an arboreal habit of the animal. This median groove is never present in specimens of *Girasia*, preserved in alcohol, he further points out, a

* The term "dart-gland" refers to the large, almost solid portion, shown on plate v, fig. 2, *d. gl.* with a transverse section on plate vi, fig. 10.

statement which I can confirm after an examination of a large number of specimens in my own collection.

As Simroth^s has pointed out, the terminology employed by Godwin-Austen for the mantle-lobes is somewhat confusing. I have tried to use it, but find it unsatisfactory. The mantle comes round the shell on all sides, being produced posteriorly on each side into tongue-like extensions, a further and similar extension is present on the right side.

Ratnadvipia irradians, Pfr.

(Pls. v and vi, figs. 1—13.)

Vitrina irradians, Pfeiffer: Proc. Zool. Soc., 1852, p. 156.

Helicarion irradians, Theobald: Supp. Catal., p. 24.

Ratnadvipia irradians, Godw.-Aust.: Moll. of India, 1899, vol. ii, p. 93, pl. lxxxv, figs. 1—8a.

Animal steel-grey, the head and dorsum variable, sometimes being almost yellow or even blue. Mantle lobes surround the shell on all sides, postero-laterally produced into tongue-like extensions. Dorsum sharply keeled. Peripodial groove deep, and well defined. Rugae large. Caudal mucous pore large, but not extending to foot-sole. Foot fringe bluish-grey. Foot-sole yellow, not divided into median and lateral planes. Usually there is a median groove, with oblique lines running from the foot fringe.

Length (in alcohol) 72 millim., breadth of foot-sole 7.5 millim.

Shell thin, but not transparent, whorls few, body whorl large, lip produced on the right side.

Hab.—Kandy, 1500 ft. Ceylon. (O. Collett).

The Alimentary Canal (Pl. v, fig. 1).—The intestinal tract is thrown into four loops, the third being somewhat short. Posterior to the crop the intestine exhibits three constrictions (Fig. 1), a feature constant in all but one of the seven specimens dissected. The stomach is fairly large and completely surrounded by the lobes of the "liver." The remaining parts call for no special mention.

The Generative Organs (Pls. v and vi, figs. 2—11).—Externally the generative orifice leads into a small vestibule into which the dart-sac opens anteriorly, the vagina in the middle, and the penis posteriorly.

The vagina is a long tube-like duct with its internal walls plicated (Fig. 3, *vg.*). At its posterior end it receives the globular, sessile

receptaculum seminis, and the free-oviduct. The latter is of considerable length, and just beyond its middle it expands and forms a thick-walled cavity, beyond which it is continued as a tube. The whole of its internal walls are richly plicated, the plicae taking various forms as shown in Fig. 3. The penis is a large, muscular organ with a diverticulum. Its internal structure is very interesting, and presents many points difficult of interpretation. Commencing at the vestibule as a fairly uniform tube, it expands distally into a somewhat bulbous head, beyond which is the diverticulum, a blindly ending tube, while to the left side is an epiphallus,* somewhat S-shaped, and tube-like at first, but becoming more globose at the point where it meets with the vas deferens. In one, the largest, of the seven specimens dissected, the epiphallus exhibited the form shown in Fig. 6. When dissected (Fig. 4) a thick, muscular penis-sheath is seen, whose internal walls are studded with numerous, minute, fleshy, knob-like processes, enclosed by this sheath is the evertible penis (Figs. 4 and 5), which is also covered with fleshy, knob-like processes. It has a narrow neck, expanding terminally into a globular head, while passing through the whole of its length is a fine canal. The diverticulum is a hollow, blindly ending sac, with smooth, muscular walls; as it reaches the evertible penis the lumen of the cavity narrows and becomes continuous with the canal passing through the penis (Fig. 4, *div.*). The epiphallus has also richly plicated walls for part of its length, the plicae being somewhat moniliform; the walls of the last bend, the kalk-sac, are almost smooth and the cavity is filled with a mass of minute, white, calcareous granules, while from the base of the cavity, in the two largest specimens, a long, hollow spicule, measuring about 6.5 millim., in length, arises. (Fig. 7). At first sight, this body reminds one of a dart, for basally it expands slightly, and is firmly implanted in the muscular tissue at the base of the sac. Clustered around it are large numbers of the white, calcareous granules. When examined under the microscope, these granules are seen to vary greatly in size, shape, and composition, and seem to be most numerous in fully matured animals. The largest are biconvex (Fig. 6a) and when viewed under a high power ($\frac{1}{12}$ th water immersion), they are seen to contain certain definite contents (Fig. 6a); still more numerous are smaller oval granules (Fig. 6b), while a few perfectly spherical granules, of various sizes, are also present (Fig. 6c). When pressure was brought to bear upon the cover glass, the large biconvex

In specimens measuring 36 to 50 millim. this organ was very short.

granules (Fig. 6a) and the spherical ones (Fig. 6c), were ruptured, and it was clearly evident that they contained some substance very like protoplasm, for it readily stained with magenta (50% Al. sol.), Grenacher's carmine, and other stains, whilst a denser portion (? a nucleus) took the stain much more readily. Treated with dilute hydrochloric acid (5 and 10 per cent.), all the granules excepting the largest of the spherical ones, were dissolved, these latter remaining unchanged even when treated with strong hydrochloric acid.

The question naturally arises, what is the function of the spicule and granules?: to which at present, I am unable to give any satisfactory answer. We know that no calcareous matter is required for the spermatozoa, and it seems out of the question to suppose that they are transferred from here to the dart-sac, nor is it any more likely that they are in any way connected with the formation of the spermatophore. It is important to point out that in the specimens in which these bodies were either present in only small numbers or absent altogether from the kalk-sac, large numbers of the spherical granules only were found in the receptaculum seminis. This fact would lead one to suppose that they had been transferred with the spermatozoa.

When examining a specimen of *Nilgiria tranquebarica*, in which the spermatophore was only partially formed, I thought that possibly the spicule found in *Ratnadripi*a might also be a spermatophore in the process of formation, but a more careful examination of a second example, the one figured, convinced me that this is not so. The two found were present in fully matured animals measuring (in alcohol) 72 and 76 millim. in length, respectively, further in both cases the spicule was firmly implanted at its basal end in the substance of the wall of the kalk-sac, and only by very careful teasing was it separated from the surrounding tissue.

The retractor muscle of the penis is inserted into the apical portion of the diverticulum (Fig. 2, *r. m.*). The vas deferens is long, and in life lies upon the vagina and free-oviduct. The dart-sac and gland (Fig. 2, *d. s.*, *d. gl.*) form a large organ lying upon the floor of the body cavity, the distal end of the gland extending to the extreme posterior portion. In some cases it is recurved forward owing to its great length. Usually it exhibits the sharp bend shown in Fig. 2, but this is not always present, it may be almost straight. Attached to the distal end is a short muscle, which arises from the ventral wall of the body cavity.

In none of the specimens dissected was any calcareous dart found, but at the distal end of the somewhat baggy dart-sac, a blunt, fleshy

papilla was present, reminding one very much of the condition obtaining in certain Indian species of *Nilgiria*, only there was no trace of the "*virgula amatoria*."

Serial sections were made of both the gland and dart-sac, which proved very interesting. Below I give descriptions of the transverse sections. Externally the gland is seen (Fig. 10) to be covered by a thin muscular sheath (*m.s.*), beneath which is a thick layer of large, ovoid and circular gland cells (*gl.c.*), with radiating muscle fibres intervening. In the section from which the drawing is made, there are twenty-eight of these bundles of radiating fibres, they do not, however, traverse the whole length of the gland, but in longitudinal median sections are seen to be irregularly arranged at varying intervals, somewhat in the same manner as the medullary rays are in the stem of a plant. They extend from the outer side of the lining epithelium (*l.ep.*) up and into the large gland cells. Internal to this glandular tissue are bundles of longitudinal muscles, followed internally by a ring of circular muscle fibres (*c.m.f.*). The central portion of the gland consists of a loose connective tissue, with small, round cells scattered throughout, bounded on its inner face by the small, cuboid, lining epithelial cells, which are arranged in a wavy outline and bound a small, central cavity. A somewhat similar structure has been indicated by Weigmann⁹ in *Xesta cincta*, Lea, and *X. halmaherica*, Strub.*

A similar section through the dart-sac exhibits the following structure: externally there is a layer of fairly large, cuboid epithelial cells (Fig. 11, *e.p.*) with muscle fibres and connective tissue below, then a series of small, rounded cells, scattered amongst more connective tissue. The dart consists of an external layer of muscle, connective tissue and small cells, followed by a layer of circular muscle fibres, then a mass of tissue similar to that in the dart-gland, bounded by cuboid epithelial cells, which enclose a small, central cavity.

The common duct is folded twice, and the prostatic portion stands out conspicuously. The hermaphrodite duct is closely coiled, and the gland is small and somewhat pyriform (Fig. 2, *h.gl.*).

The Free Muscles (Pl. vi, fig. 12).—The buccal retractor divides anteriorly into two branches, each of which again divides, the four muscle bands being inserted on the ventral side of the buccal cavity. The oculars are similar on both right and left sides, the inferior and superior being separate for over half the length. From the former a

⁹ Abhandl. d. Senckenb. naturf. Gesell., 1898, T. xxv, fig. 23, T. xxvi, fig. 8.

* Semper also gives good figures.

short labial muscle is given off, while from the superior ocular, the short pedal muscles arise. The columellar muscle is small, and divided into four main branches.

The Pallial Region (Pl. vi, fig. 13).—The kidney is short, being only a little over twice the length of the pericardium. The ureter arises from the left anterior side of the kidney, it is very wide, and forms a conspicuous V-shaped tube. Unlike the condition obtaining in some of the Indian species of *Nilgiria*, the kidney does not extend to the side of the rectum, but terminates bluntly before the bend of the ureter. The pulmonary cavity is comparatively small.

Affinities.—So little detail is known of the anatomy of what at first sight appear allied genera to *Ratnadripta*, that it is difficult to institute comparisons. I have examined the internal structure of different species of *Nilgiria*, to which genus the one under discussion is probably nearly related, but until I have worked out the same in greater detail, and know the anatomical position of *Nilgiria*, I prefer to reserve any expression of opinion.

For Explanation of Plates and Reference Letters, see next page.

EXPLANATION OF PLATES V AND VI.

Ratnadvipia irradians. Pfr.

- Fig. 1. Intestinal tract.
 Fig. 2. Generative organs. $\times 1\frac{1}{2}$.
 Fig. 5. Dissection of the vagina and free-oviduct to show the internal walls.
 Fig. 4. Dissection of the terminal ducts of the male generative organs, showing evertible penis, lumen of the diverticulum and plicae of the epiphallus.
 Fig. 5. Terminal ducts of the male generative organs of a young specimen, showing the penis everted, and the short epiphallus. $\times 2\frac{1}{2}$.
 Fig. 6. Terminal ducts of the male generative organs of a fully matured specimen, showing variation in the epiphallus.
 Fig. 7. Spicule from the kalk-sac. $\times 4$.
 Fig. 8 *a-d*. Calcareous granules from the kalk-sac.
 Fig. 9. Dart-sac opened to show the fleshy dart.
 Fig. 10. Transverse section of the dart-gland.
 Fig. 11. Epithelial layer of the dart-sac.
 Fig. 12. The free muscles.
 Fig. 13. The pallial complex. $\times 1\frac{1}{2}$.

REFERENCE LETTERS.

<i>alb. gl.</i>	Albumen gland.	<i>m. s.</i>	Muscular sheath.
<i>an.</i>	Anal aperture.	<i>oc.</i>	Oesophagus.
<i>b. c.</i>	Buccal cavity.	<i>ov.</i>	Oviduct.
<i>b. r.</i>	Buccal retractor.	<i>p.</i>	Penis.
<i>car.</i>	Cavity of dart-gland.	<i>pc.</i>	Pericardium.
<i>c. m.</i>	Columellar muscle.	<i>pr.</i>	Prostate.
<i>c. m. f.</i>	Circular muscle fibres.	<i>p. r.</i>	Pedal retractors.
<i>cr.</i>	Crop.	<i>p. v.</i>	Pulmonary vein.
<i>d.</i>	Dart.	<i>r.</i>	Rectum.
<i>d. gl.</i>	Dart-gland.	<i>r. ap.</i>	Renal aperture.
<i>d. s.</i>	Dart-sac.	<i>rm.</i>	Radial muscle fibres.
<i>ep.</i>	Epiphallus.	<i>r. m.</i>	Retractor muscle.
<i>epi.</i>	Epithelium.	<i>r. s.</i>	Receptaculum seminis.
<i>f. ov.</i>	Free-oviduct.	<i>st.</i>	Stomach.
<i>gl. c.</i>	Gland cells.	<i>T.</i>	Superior ocular retractor.
<i>h. d.</i>	Hermaphrodite duct.	<i>t.</i>	Inferior ocular retractor.
<i>h. gl.</i>	Hermaphrodite gland.	<i>ur.</i>	Ureter.
<i>int. 1-4</i>	Loops of intestine.	<i>vg.</i>	Vagina.
<i>k.</i>	Kidney.	<i>v. d.</i>	Vas deferens.
<i>k. s.</i>	Kalk-sac.	<i>w. d. s.</i>	Wall of dart-sac.
<i>l.</i>	Labial muscle.	<i>w. p. c.</i>	Wall of pulmonary cavity.
<i>l. o. r.</i>	Left ocular retractor.		





WE^o del ad nat
Fig^s 10 & 13 F.J.P del ad nat

A.C. Hutch, Lith^r London

ANATOMY OF RATNADVIPIA.

NOTE ON THE ANATOMY OF APERA BURNUPI, E. A. SMITH.

By WALTER E. COLLINGE.

IN 1897¹ I briefly described some parts of the internal organs of *Apera burnupi*, E. A. Sm., and later² I have given a similar description of *A. natalensis*, Collge. Both these specimens had been in alcohol for some years, and I pointed out how difficult it was to make out the form of the various organs owing to their exceedingly brittle nature. Recently I have been able to examine a further specimen of the former species, and I find that my earlier description is incorrect in one very important feature, viz. the male generative organs. In the specimen previously examined I was unable to trace any distinct penis, and so far as I could interpret the form of the terminal ducts, the vas deferens seemed to open into the vestibule, the anterior portion dilating slightly, and this I termed the penis (Cf. op. cit., pl. v, fig. 6 p.).

In the specimen now examined I find a well developed penis, which opens into the vestibule on the right side. It is a long, muscular organ, gradually becoming larger distally and then tapering to a blunt point. The vas deferens joins it on the inner side, nearly at its distal end as a bulbous sac, and attached to the left side of this sac is a small diverticulum (Fig. 1, d.), possibly the homologue of the flagellum common to many *Testacellidae*. Passing then closely along the inner or left side of the penis to the region of the vestibule, the vas deferens makes a turn backward and here becomes slightly dilated. The retractor muscle of the penis is very long, measuring 14.5 millim. in the present specimen, whose total length is about 52 millim. It takes its origin from the mid-dorsal body-wall, and is inserted in the penis at its extreme distal end.

The condition of the male organ is probably similar in *A. natalensis*, where I was unable to find any penis in the type specimen.

In their beautiful work on the land mollusca of the Celebes, the Sarasins express the opinion that *Apera* is an ancestral form of *Atopos*, Simr., and that both genera are nearly related to the *Testacellidae*. While admitting that *Apera* is closely allied to this family, I am inclined

¹ Ann. Mag. N. H., 1897 (s. 6), vol. xx, pp. 221-225, pl. v.

² Ann. Sth. Afr. Mus., 1900, vol. ii, pp. 1-8, pls. i, ii.

to regard the Testacellid resemblances of *Atopos* as independently acquired, in fact I think when we know more of their minute structure, it will probably form a very interesting example of parallelism in evolution.

In the three specimens of *Apera* which I have examined, I have seen nothing which might be compared with the spider-glands of Simroth, which have been described as common to *Atopos*, while the pallial complex, pedal gland, and generative organs are totally different.

Further, the above authors are, in my opinion, incorrect in stating that Heynemann was wrong in supposing that the orifice near the right upper tentacle was common to the male and female organs.

I venture to appeal to malacologists and others in South Africa, for more examples of *Apera*, in order that anatomical investigations at present in hand may be carried out.

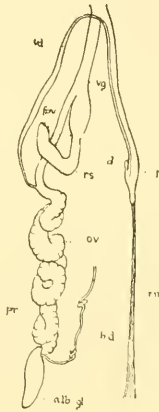


Figure of the Generative Organs of *Apera burnupi*, E. A. Smith.

<i>alb. gl.</i>	Albumen gland.	<i>p.</i>	Penis.
<i>d.</i>	Diverticulum.	<i>r. m.</i>	Retractor muscle.
<i>f. ov.</i>	Free-oviduct.	<i>r. s.</i>	Receptaculum seminis.
<i>h. d.</i>	Hermaphrodite duct.	<i>r. d.</i>	Vas deferens.
<i>ov.</i>	Oviduct.	<i>vg.</i>	Vagina.

ON THE GENUS ASHMUNELLA, PILS. & CKLL.

By C. F. ANCEY.

WITH ANATOMICAL NOTES,

By R. MURDOCH.

(Plate vii.)

THE genus *Ashmunella* was established by Messrs. H. A. Pilsbry and T. D. A. Cockerell,¹ for the reception of some shells, externally difficult to separate from *Polygyra*, and especially from the group generally known as *Triodopsis*. The form and texture of the shell, form of the aperture, and teeth when present, do not furnish a single character that would separate them from *Polygyra*. Strangely enough the soft parts differ anatomically, and the geographical distribution is peculiar. All the species are confined to the boundaries of New Mexico and Arizona. These, say Pilsbry and Cockerell, "fairly define a region of arid plains from which rise numerous mountain ranges, upon whose summits the humidity refused by the dry and warmer air of the plains is precipitated. Upon the elevations thus set apart by the circumstance of a moister and colder climate, the snails inhabiting the region are chiefly found. And standing island-like in a waterless sea, the mountains exhibit to a considerable extent the peculiarities of insular faunas, each range having its own special assembly of forms, specific or varietal, in addition to a series of species common to ranges over the greater part of the region." These mountains are the home of *Ashmunella*, a genus which occurs in New Mexico from the latitude of Santa Fé to the White Mountains (Sierra Blanca), and westward to S.E. Arizona.

The authors above cited state that the shell offers no characters different from *Triodopsis* or *Mesodon* sections of *Polygyra*, and that "it is helicoid, depressed and umbilicated, dull coloured, not banded so far as known, with lunate aperture and reflexed peristome: parietal tooth, when present, simple, not v-shaped or biramose."

My observations are quite in accord with the above, but, in my opinion *Polygyra mearnsii*, Dall, and *P. levettei*, Bland, probably are members of the genus and hitherto the most toothed forms known. They belong to the same region, and their soft parts being unknown, I am inclined to place both species in this group, rather than in the

¹ Proc. Acad. Nat. Sci. Phila., 1899, p. 138.

true *Polygyra*; and with all due deference to the opinion of Messrs. Pilsbry and Cockerell, who referring to *A. thomsoniana*² state that "the species differs widely from *Polygyra levettei*, which is not an *Ashmunella*, but apparently a true *Polygyra*." If I am correct, that is if we must include in *Ashmunella* *P. levettei* and *P. mearnsii*, the shell diagnosis has to be modified in regard to the parietal tooth. In the latter species there are two converging lamellae, not united at their inner ends into a Λ , the basal lamella stouter and its outer extreme bent towards the umbilicus.

CATALOGUE AND SHELL CHARACTERS OF ASHMUNELLA.

Ashmunella mearnsii (Dall).

Polygyra mearnsii, Dall: Proc. U. S. Nat. Mus. 1896, p. 343, pl. xxxii, figs. 7, 8, 11.

Shell depressed, 5-whorled, of a pinkish brown colour, with more or less conspicuous incremental lines; spire nearly flat; sutures very distinct; periphery rounded, but nearer the upper surface of the whorl; base rounded with a compressed appearance; umbilicus deep and narrow; body whorl slightly descending at the termination, and constricted behind the reflected lip of a very oblique aperture; peristome somewhat flexuous, united over the body by a distinct callus; the body with two converging lamellae, and the basal part with two distinct clear-cut lamellae transverse to the lip; outer lip broad, receding, with a similar lamella set on somewhat obliquely and more deeply within the aperture.

Alt. 5.5; diam. max. 15, min. 11 millim.

Loc.—Huachuca Mountains, Arizona; Hachita Grand Mountain, S.W. New Mexico, altitude 8,000 to 9,400 feet (Dr. Mearns); Organ Mountain, New Mexico (Prof. Townsend).

Ashmunella levettei (Bland).

Triodopsis levettei, Bland: Ann. N. Y. Ac. Sci., 1881, ii, p. 115.

Polygyra levettei, Bland: Dall, Proc. U. S. Nat. Mus., 1896, p. 341.

Shell larger than *mearnsii*, with 7 whorls, less depressed, and a single oblique tooth on the parietal wall.

Loc.—Said to occur in Santa Fé Canyon, near Santa Fé, New Mexico, but not again found there since its discovery by Levette. (Specimens sent from this locality by the late J. H. Thomson are not

² Nautilus, 1899, vol. xiii, p. 50.

levettei, but *thomsoniana*, Anc.). Near Tucson, Arizona (Cox); Fort Huachuca, Arizona (Fisher); Huachuca Mountains, Arizona, near the summit of the higher peaks (Mearns).

Ashmunella thomsoniana (Ancey).

Triodopsis levettei, Bland var. *thomsoniana*, Ancey: Conch. Exch., 1887, ii, p. 64.

Triodopsis levettei, Bland var. *orobaena*, Ancey: Loc. cit. supra. (This is but an individual modification of *thomsoniana*, and not a true variety).

Shell depressed, in form closely resembling *A. pseudodonta*, but with an acute denticle within the outer lip and a single hardly bifid basal tooth; there is no notch as in *pseudodonta*, but a distinct basal tooth, in some specimens it is simple or nearly so, while in others it is bifid, in the latter case the tubercle nearest the umbilicus is less raised than the outer one; whorls $5\frac{1}{2}$, the last deflected at its termination; surface shining, with faint incremental striae; spire depressed, but not flat.

Alt. 7.5; diam. 12.14 millim.

Loc.—Santa Fé Canyon, New Mexico (Thomson, also Ashmun).

Ashmunella thomsoniana (Ancey), var. **porterae**, Pils. and Kll.

Nautilus, 1899, vol. xiii, p. 49.

Shell corneous, shining, with distinct lines of growth and minute spiral incised lines; umbilicus broadly exposing the penultimate whorl; whorls $5\frac{1}{2}$ —6; lip ochreous-tinged above and at the edge, the teeth white; parietal tooth well-developed, outer tooth long, basal tooth always bifid.

Diam. max. 14 to 16.5 millim.

Loc.—Beulah, Upper Sapello Canyon, New Mexico (Miss W. Porter and Miss H. Blake).

Ashmunella pseudodonta (Dall).

Polygyra pseudodonta, Dall: Proc. U. S. Nat. Mus., 1896, No. 1111, p. 343.

Similar to *A. ashmuni* in size and form, but with the whorls slightly flattened above and below, and of a yellowish-straw colour instead of livid brown; the spiral striations less sharp and largely obsolete. The aperture with a narrow reflected lip, pink or whitish; on the internal edge of the basal part is a slight callosity, which is divided by a narrow sulcus in the direction of the coil of the shell; within the aperture and nearly midway between the outer and pillar

lips is a small, low, simple, short, oblique parietal tooth or ridge, with the outer end nearer the pillar.

Alt. 5.5 to 7; diam. 13.5 to 15 millim.

Loc.—White Oaks, New Mexico, at an altitude of 7,500 feet (Ashmun).

Nearly allied to *A. thomsoniana*, but wanting the denticle within the outer lip, and with the basal edge notched, not toothed.

Ashmunella pseudodonta, Dall subsp. **capitanensis**, Ashmun and Ckll.

Nautilus, 1899, vol. xii, p. 131.

Shell depressed, shining, dark horn colour or even reddish; the usual striae distinct, but not sharp, spiral impressed lines visible with a lens; whorls $5\frac{1}{2}$, rounded; aperture oblique, semilunar; lip expanded, broad, reflected, strongly tinged with pinkish or coffee colour, edentulous, except that the basal part bears within a distinct but slight callus, which is more or less livid; parietal denticle either rudimentary or distinct, but never large; umbilicus broad, exposing the penultimate whorl.

Alt. 8 to 10; diam. max. 17 to 18.5, min. 14.5 to 15 millim.

Loc.—Near Baldonado Springs, Capitan Mts. (Sierra Capitana), Lincoln Co., New Mexico, altitude 8,200 feet (Ashmun).

Ashmunella ashmuni (Dall).

Polygyra ashmuni, Dall: Proc. U. S. Nat. Mus., 1896, No. 1111, p. 342.

Differs from *A. chiricahuana* in size, being only 14 mm. in greatest diameter and 7 mm. in height; also the surface when strongly magnified is seen to be covered with sharp, delicate, spiral, incised lines with wider interspaces. The number of whorls is but slightly less, if at all different. If the element of actual size be ignored, the figure given by Dall of *A. chiricahuana* will equally well represent the species in question. A careful scrutiny of a series of *A. chiricahuana* shows that incised lines occur quite frequently in some individuals, so that the species under discussion may only represent a dwarf race of it with more emphatic sculpture. I fully share Dall's opinion.

Loc.—Bland, New Mexico, altitude 8,000 feet (Ashmun).

Ashmunella chiricahuana (Dall).

Polygyra chiricahuana, Dall: Proc. U. S. Nat. Mus., 1895, p. 2, also 1896, vol. xviii, p. 341, pl. xxxii, figs. 9, 10, 12.

Shell depressed, thin, polished, and of a dark brownish colour; whorls $5\frac{1}{2}$, sculptured only with fine incremental lines; sutures distinct, whorls moderately rounded; periphery rounded, the termination of

the last whorl constricted behind the lip and somewhat descending ; umbilicus deep and narrow, showing a part of the penultimate whorl near the aperture ; aperture oblique, with a narrow strongly reflected lip of a livid whitish colour ; the pillar and outer lips connected in fully matured specimens by a smooth callus ; the outer lip is flexuous, receding near the periphery, and more vertical near the base. The aperture is destitute of teeth, but, sometimes (in Jemez mountain specimens) there is an obsolete parietal denticle and occasionally an obscure thickening on the basal edge, in one specimen from this locality the edge is flexuous within, recalling that of *A. pseudodonta*, but not notched.

Alt. 7·7 ; diam. max. 18, min. 14·8 millim.

Loc.—Fly Park, Chiricahua Mountains, Arizona, at an elevation of 10,000 feet (Fisher) ; Jemez Mountains and Jemez Sulphur Springs, S.W. of Santa Fé, New Mexico, alt. 8,000 to 10,000 feet (Ashmun) ; near Tucson, Arizona (Cox).

The specimens from Chiricahua Mountains which may be regarded as typical, are rather more elevated and perhaps a trifle more tightly coiled than those from New Mexico, and are entirely destitute of teeth. Those from near Tucson are large, much depressed, more yellow, and the examples before me with pale varices marking stages in the growth of the shell ; the whorls appear to be slightly less in number, and the aperture is edentulous. It seems to be at least a local race and I name it var. *varicifera*. Further investigation may perhaps prove that it is distinct.

Ashmunella altissima (Cockerell).

Nautilus, 1898, vol. xii, p. 76.

Shell with $5\frac{1}{2}$ whorls, pale yellowish-brown ; sutures moderately deep ; spire flattened and low, periphery rounded ; apical whorls nearly smooth, and with little sculpture as far as the middle of the penultimate whorl, after which the shell becomes distinctly and strongly obliquely ribbed, the ribs near the aperture being particularly strong, the last whorl has about 48 of these ribs ; umbilicus narrow and deep ; aperture obliquely semilunar ; the peristome subcircular, except where interrupted by the parietal wall, strongly thickened, recurved with a sharp edge, yellowish white, and without teeth ; no parietal denticle.

Alt. 6 ; diam. max. 12, min. 10 millim.

Loc.—Highest summit of White Mountains (Sierra Blanca), Lincoln Co., W. New Mexico, alt. 11,092 feet (Townsend).

Much smaller and flatter than *A. rhyssa*, with the aperture more narrow and the last whorl less evenly rounded.

Ashmunella miorrhysa (Dall).

Polygyra miorrhysa, Dall : Nautilus, 1898 (Nov.), vol. xii, p. 75.

Shell depressed, dark brown; about $5\frac{1}{3}$ rounded whorls, the periphery somewhat rounded above the middle of the last whorl; sutures distinct; umbilicus small, deep, narrowing rapidly towards the apex. The surface polished, with microscopic revolving striae, and fine, slightly irregularly distributed, oblique transverse ridges. Aperture subcircular, with a reflected, white peristome continued over the body by a thin, translucent callus; the reflected peristome has an obscure thickening inside the peripheral part, and another more distinct inside the base; within the aperture is a small, oblique, white parietal tooth.

Alt. 8.5; diam. 15.5 millim.

Loc.—Eagle Creek, Sierra Blanca, Lincoln Co., New Mexico, alt. 7,500 to 8,500 feet (Ashmun, also Townsend).

Ashmunella rhyssa (Dall).

Polygyra rhyssa, Dall : Nautilus, 1897 (May), vol. xi, p. 2.

Shell dark yellowish-brown; whorls 6, rounded and the sutures rather deep; the spire low but not flattened; nuclear whorls nearly smooth, the others rather coarsely obliquely striated, the last fourth of the last whorl with rather sharp, elevated riblets with wide interspaces and a marked constriction behind the reflected peristome. The entire surface more or less distinctly finely spirally striate; the periphery somewhat above the middle of the last whorl; umbilicus small and deep; aperture subcircular and oblique, with a reflected and rather solid peristome, a small obscure thickening on its basal part and a light wash of callus over the body; slightly within the aperture is a small, oblique, elongated parietal denticle.

Alt. 9; diam. max. 17, min. 14 millim.

Loc.—Sierra Blanca, W. New Mexico (Ashmun).

Ashmunella rhyssa, Dall var. **hyporhyssa**. Ckll.

Nautilus, 1898, vol. xii, p. 77.

Like *rhyssa* in size and form, but, the umbilicus wider exposing the penultimate whorl; the sculpture finer, consisting of striae rather than riblets.

Alt. 9; diam. max. 15, min. 12.66 millim.

Loc.—Lower slopes of Sierra Blanca, New Mexico, above head of Ruidoso Creek, in aspen belt, altitude about 9,500 feet.

The following forms of the variety are also recorded by Cockerell³

³ Nautilus, 1900, vol. xiv, p. 72.

from Cloudcroft, Sacramento Mountains, New Mexico.

Edentata.—Lacking, like the following, the parietal tooth, shell horn-colour or pale greyish-brown.

Rufescens.—Shell deep ferruginous or chestnut colour, lip tinged with pink.

Alba.—Shell creamy white. The first albino reported in *Ashmunella*.

The present paper was written and ready for publication, when another form of *A. thomsoniana* was discovered and described as follows by T. D. A. Cockerell:⁴

“*Ashmunella thomsoniana cooperae*, n. var.—Shell with max. diam. from 13 to 15 millim., but usually of the smaller size; basal tooth single, occasionally slightly double; umbilicus narrower than in the type or var. *porterae*, exposing less of the penultimate whorl; genitalia as in *porterae*, with the same long (22 mm.) spermoetheca, and double insertion of the penis retractor.

Hab.—Las Vegas Hot Springs, 1900, 1901. Discovered by Miss Mary Cooper; later taken in quantity by Miss Cooper and Miss Maud Ellis. The locality is in the Transition Zone, at about 7,000 feet altitude; *porterae* belongs to the Canadian Zone, about 1,000 feet higher. This is not a very distinct form, conchologically; but it is worth calling attention to as a species of *Ashmunella* in the marking, probably derived from the *porterae* form rather than from the true *thomsoniana*.”

I can add nothing to this, the form now being unknown to me.

ANATOMICAL NOTES,

By R. MURDOCH.

Ashmunella pseudodonta (Dall).

(Pl. vii, figs. 1—7.)

THE specimens from which the following notes are taken were collected by the Rev. E. H. Ashmun, and received in alcohol in a good state of preservation. The locality given is White Oaks, New Mexico, at an altitude of 7,500 feet.

EXTERNAL FEATURES.

The upper surface is covered with fine granules, somewhat irregularly arranged and darkish in colour. The foot-sole is whitish and rounded above. There are no pedal grooves. The mantle has an

⁴ Op. c., 1901 (July), vol. xv, p. 35.

even and slightly reflexed margin, with a small lappet at the respiratory pore. Tentacles black, the inferiors appear to be very small; labial projections well marked and triangular in outline. Generative orifice a little below and slightly posterior to the right tentacle.

INTERNAL ANATOMY.

The Jaw and Radula (Pl. vii, figs. 1, 2).—The jaw is arcuate, stout, with five or six slightly unequal, broad ribs in the middle area and the ends with a number of small riblets. The dentition has the formulae varying from 25—1—25 to 27—1—27. The central teeth with stout mesocones, having well developed cutting points and small right and left side cusps; laterals with meso- and ectocones, the latter small and the basal plates produced on the outer sides. From laterals to marginals the change is gradual, the latter have the mesocones bifid, and as they proceed outward the basal plates become shorter with frequently two outer thorns, and occasionally three from the splitting of a thorn.

The Alimentary Canal (Pl. vii, fig. 3).—The buccal mass has the usual shape; enveloping the oesophagus are two salivary glands, intimately united along their inner edges, which gives to them the appearance of a single gland with two ducts, the latter empty into the buccal cavity in the usual position. The stomach forms a comparatively large elongated sac, its posterior end is curved forward and receives the right and left bile ducts. The intestine passes forward until arriving at the posterior margin of the kidney, when it curves to the right and then back through the folds of the liver, after which it again passes forward, and terminates in a long, narrow rectum; it thus divides the left lobe of the liver into three irregular shaped lobules, from each of these lobules is a bile duct, but all unite to form a single duct before opening into the stomach.

The Pallial Organs, etc. (Pl. vii, fig. 3).—The kidney is long and narrow, in length nearly four times its width, slightly more than two and a half times the length of the pericardium, and rather more than half the length of the pulmonary chamber. The ureter arises from the left anterior side of the kidney, follows the right margin, on which it partially rests, back to the posterior end, then curving to the right it forms a narrow tube and proceeds forward parallel with the rectum, terminating a little in front of the respiratory orifice. The great efferent vessel is conspicuous and runs direct to the auricle, its numerous branches collect the blood from the right anterior corner, middle area, and greater portion of the right side of the pulmonary chamber; alternately with the efferent branches are the afferent vessels

and branches. The venation on the right side and right anterior corner, is much more strongly marked than on the left, in the latter it is minute and widely separated. There is also a small, left, posterior efferent vessel, the branches from which are exceedingly minute, this runs forward following the margin of the pericardium, and enters the auricle at the same point as the greater vessel. On the right of the pericardium is another small vessel, which proceeds from the kidney and apparently enters the auricle with the other vessels; it appears to be the final channel for the blood received by the kidney, from the several efferent branches which enter its right margin.

Compared with *Helix aspersa*, Müll., the above species presents no marked difference in the form of the stomach, track of the intestine, division of the left lobe of the liver and track of the ureter, the efferent vessels proceeding direct to the auricle are also the same. The branching and rebranching of the tributary vessels differ as might be expected, and the venation throughout the left region is strongly marked in *H. aspersa*. This latter species differs in the kidney being short and subtriangular in shape, it has a length of less than twice its width, only twice the length of the pericardium, and less than half the length of the pulmonary chamber. It has also a large efferent branch with several tributaries, on the left of the great efferent vessel, which unites with the latter close to the pericardium. In *A. pseudodonta* there are no conspicuous branches on the left side, the first is slightly better defined than those immediately following, but its junction with the greater vessel is considerably anterior to the pericardium.

The arterial system I failed to follow with sufficient exactness to give a detailed description; the great arteries apparently follow a course similar to those in *H. aspersa*; the nervous system is also, as regards the position and union of the several ganglia, very similar.

The Free Muscles.—The penis retractor is attached to the diaphragm, as usual. The right and left bands which supply the foot and tentacles unite posteriorly, but, their junction is anterior to the point where the buccal mass retractor coalesces with them, the latter forms a comparatively wide, shallow trough, immediately before its attachment to the buccal mass. The right ocular retractor passes between the terminal ducts of the generative organs.

The Generative Organs (Pl. vii, figs. 4—7).—The penis is short and stout, somewhat abruptly contracted. The epiphallus is a long, slender tube, the vas deferens opening into it a little below the apex. The retractor muscle of the penis has a double attachment, it is inserted in the lower third of the epiphallus, and from there continued free to the penis, to which it unites in the form of a thin sheath. The

portion of the epiphallus between the upper and lower insertions of the muscle exceeds the latter in length, and remains in a free loop when the muscle is pulled out straight. A specimen in which the penis is everted, shews the eversible portion slightly more than equals the difference in length between the epiphallus and muscle. The internal wall of the penis (Fig. 5) exhibits three large plications and several smaller threads, these are continued within the epiphallus, where they are smaller and finely convoluted. The hermaphrodite gland is embedded in the right lobe of the liver, and consists of four small masses of follicules, which from the arrangement of their ducts are seen to be paired. The hermaphrodite duct is convoluted, and at its junction with the albumen gland there is a minute club shaped appendix (Fig. 4, *ap.*). Cross sections of the latter (Fig. 6) shew two tubes within this body, one of which is minute, and the other well marked and lined with ciliated epithelial cells, the apex forms a small chamber lined with epithelium, and into this cavity both tubes open. In this and the following species, the so-called appendix branches from the hermaphrodite duct partly within the albumen gland, and externally, has the appearance of springing direct from the latter organ (Fig. 7). Small as it is, the hermaphrodite duct on separating from the appendix, is very much less in diameter, and forms an exceedingly fine tube enveloped in a thin muscular membrane, which is attached to the prostate, the base of the albumen gland, and also partially envelopes the appendix. No spermatozoa were noticed within the appendix, neither were they abundant in the convolutions of the hermaphrodite duct. The free-oviduct is short, and exhibits a slight contraction immediately below the point from where the receptaculum seminis arises. There is no indication of any accessory organs, or any evidence of degeneration; a simple, slight introversion of the walls produces the above mentioned contraction. The internal walls have the usual small, longitudinal folds. The receptaculum seminis is of medium length, slightly enlarged above and attached to the uterus by a delicate membrane.

Ashmunella thomsoniana (Aucey), var. **porterae**, Pils. and Ckll.

Of this species there is but a single example of the animal, from Beulah, Upper Sapello Canyon, New Mexico.

The anatomy has been worked out by Pilsbry,⁵ but, unfortunately, I am unable to refer to this paper.⁶

⁵ Proc. Acad. Nat. Sci. Phila., 1900, p. 108.

⁶ Pilsbry simply says (*loc. supra cit.*) "Genital system similar to that of *thomsoniana*, except that it is larger, with a double insertion of the penis retractor muscle" (C. F. Aucey).

INTERNAL ANATOMY.

The dentition gives the formula 26—1—26 or 11—15—1—15—11, in transverse, nearly straight rows; the form of the teeth is very similar to that of the preceding species. The jaw is strong, arcuate, with fourteen or fifteen ribs which denticulate the margins, those in the middle area are strongly developed, but towards the ends they become weak and indistinct.

The Generative Organs (Pl. vii, fig. 8).—The penis is of medium length, slightly contracted in the middle, with the posterior portion less robust; continuing as the epiphallus, which is about three times the length of the penis, the vas deferens opens into it a little below the apex. The retractor muscle is inserted in the lower third of the epiphallus, and differs from that in the preceding species in that it has but a single attachment. The internal wall of the penis exhibits several fleshy plications, which are continued into the epiphallus and are delicately convoluted. The receptaculum seminis forms a narrow tube shortly after branching from the free-oviduct, with an expanded apical portion. It extends almost to the base of the albumen gland. Internally the walls of the lower portion are studded with small granules, while those of the free-oviduct have the usual plications. Other organs are similar to those of the preceding species.

In addition to the shell characters, the external features of the animal, the jaw and dentition are the same as *Polygyra*; on the other hand the generative organs resemble the Epiphallogonous Helices. Pilsbry and Cockerell assign *Ashmunella* to the Belogona group, regarding it as having lost by degeneration the dart-sac and associated mucous glands. In cases such as this it would be of special value could we determine the group to which it is allied, by organs totally uncorrelated with the generative organs. Pilsbry⁷ states that the pallial organs supply facts for phylogenetic research not less in importance than those derived from the generative organs, and supports the statement with comparative measurements of a number of genera, all of which are included in the Epiphalloгона. The characteristic feature in the above group is the long, ribbon-like kidney, which is from four to ten times the length of the pericardium, and extends to as much as three-fourths of the total length of the lung. *A. pseudo-lonta* is seen to differ considerably from the above, and apparently does not belong to the group, but a knowledge of the Belogona Euadenia is required before accepting this evidence as conclusive.

⁷ Proc. Malac. Soc. Lond., 1901, vol. iv, p. 161.

It may perhaps not be out of place to add the measurements of the pallial organs of a few other species: *Helix subaperta*, Ancey. Kidney in length, twice its width, nearly twice the length of the pericardium, and scarcely half the length of the lung. *Helix (Otaia) constantinae*, Forbes. Kidney in length, four times its width including the ureter, and twice the length of pericardium. The rectal portion of the ureter, in the form of a groove. *Helicella zaccarensis*, Kob. Kidney in length, nearly four times its width, rather more than twice the length of the pericardium, and about half the length of the lung. *H. (Trochula) zitounica*, L. and B. Kidney in length, nearly four times its width, considerably less than twice the length of the pericardium, and nearly half the length of the lung. The rectal portion of the ureter, in the form of a groove. *Leucochroa candidissima*, Drap. Kidney scarcely twice the length of the pericardium and considerably less than half the length of the lung. *Helix (Levantina) hierosolyina*, Boiss. Kidney in length, nearly four times its width, two and three quarter times the length of the pericardium, and less than half the length of the lung. The rectal portion of the ureter in the form of a groove.

NOTE BY C. F. ANCEY.—Mr. Murdoch had no access to the paper published by H. A. Pilsbry, under the title: "Note on the Anatomy of the Helicoid genus Ashmunella," in the Proc. of the Ac. of Natural Sciences, Philadelphia, 1900, pp. 107—109. From this I extract the following data concerning *Ashmunella thomsoniana* typical.

... "The single specimen secured extruded its penis in drowning, and I found it impossible to retract it. It is notable that only the lower and wider portion is everted, not the tapering upper part, which is probably epiphallic.

"The general proportions of the genitalia are as in var. *porterae*, the spermatheca being long, decidedly over half the length of the penis + epiphallus, in both forms. The lower insertion of the penis retractor muscle in var. *porterae* seems to be wanting in *thomsoniana*.

"The jaw is strongly arcuate with seven moderately strong, separated, distinct ribs.

"Radula with 27·1·27 teeth, similar to those of *A. hyporhyssa*, the tenth of the thirteenth transitional, outer ten margins, with the inner cusps bifid."

Pilsbry adds (p. 108): "The tridentate forms *thomsoniana* and *porterae* differ from the others in the greater proportionate length of the spermatheca."

2



R.M. del. anat.

A.S. Lith. Lith. I. caen.

ANATOMY OF ASHMUNELLA.

EXPLANATION OF PLATE VII.

Ashmunnella pseudodonta.

- Fig. 1. Jaw.
 Fig. 2. Teeth.
 Fig. 3. The Alimentary canal, pallial organs, etc.
 Fig. 4. Generative organs.
 Fig. 5. Cross section through the penis showing the internal plications.
 Fig. 6. Cross section through the appendix to the hermaphrodite duct.
 Fig. 7. Albumen gland, much enlarged, to show the natural position of the appendix, hermaphrodite duct, and the membrane enveloping the latter.

Ashmunnella thomsoniana var. *porterae.*

- Fig. 8. Generative organs.

REFERENCE LETTERS.

<i>alb. gl.</i>	Albumen gland.	<i>pc.</i>	Pericardium.
<i>ap.</i>	Appendix.	<i>r.</i>	Rectum.
<i>b. c.</i>	Buccal cavity.	<i>r. d.</i>	Receptacular duct.
<i>c. ep.</i>	Ciliated epithelium.	<i>r. m.</i>	Retractor muscle.
<i>h. d.</i>	Hermaphrodite duct.	<i>r. s.</i>	Receptaculum seminis.
<i>h. gl.</i>	Hermaphrodite gland.	<i>s. d.</i>	Salivary duct.
<i>int.</i>	Intestine.	<i>s. gl.</i>	Salivary gland.
<i>k.</i>	Kidney.	<i>ur.</i>	Ureter.
<i>l.</i>	Lung.	<i>ut.</i>	Uterus.
<i>oc.</i>	Oesophagus.	<i>v. d.</i>	Vas deferens.
<i>p.</i>	Penis.	<i>w. p. c.</i>	Wall of pulmonary cavity.

THREE NEW NUDIBRANCHS FROM CALIFORNIA.

By T. D. A. COCKERELL.

Coryphella cooperi, n. sp.

LENGTH about 20 millim.; foot narrow, posterior end long attenuate, anterior end produced into well-developed foot-tentacles at the sides, these curled backward, not half as long as oral tentacles; rhinophores as long (about 4 millim.) as oral tentacles, and similar to them, except that they are slightly verrucose; eyes very distinct, immediately behind rhinophores; branchial tufts in six pairs, the second largest; anterior tufts with about 28 papillae; the tufts are close together, and spreading, so that as the animal crawls they do not appear separate. Pellucid white with a decided pink tinge; a brilliant greenish-blue patch

between the first two tufts of branchiae, in the area just in front of and to the left side of the heart; a little of the same greenish-blue colour at the bases of the branchial tufts. Branchial papillae reddish-brown, greenish at base, apex white. The heart was observed to beat 86 times a minute.

Hab.—San Pedro, California, on mud flats in the harbour, at low tide, July 19 (W. P. and T. D. A. Cockerell). It occurred with *Hermisenda opalescens* (Cooper). Named after Dr. J. G. Cooper, who was the first to study the nudibranchs of California.

This species has the lingual dentition of *Coryphella*, and agrees in general type with *C. rufibranchialis*, except that the lower corner of the lateral teeth in *C. cooperi* is very much more produced. The median tooth has a large central denticle, and 7 to 10 long sharp denticles on each side; the lateral teeth are much produced at both ends, with the median portion of the inner face bearing a number (about 10) of small spines, of which the lower five are relatively large and the others very small.

In having a colour-patch in the region of the heart, *C. cooperi* resembles *Eolis olivacea*, but in that species the patch is bright pink.

Facelina stearnsi, n. sp.

Length about 30 millim.; foot narrow, posterior end long attenuate; colour of foot pale pink; foot-tentacles curled backward, short (about one-fourth length of oral tentacles), brilliant scarlet above; oral tentacles long (7 or 8 millim.), often curled backward, brilliant vermilion above, with white tips, otherwise pink; rhinophores about half length of oral tentacles, whitish at base, otherwise brilliant vermilion, except the extreme tips, which are white; the red portion which is somewhat broader than the basal, is very strongly annulated; eyes very distinct, just behind rhinophores; branchial papillae tapering, quite long, very pale greyish olivaceous, with the tips brilliant vermilion; branchiae in eight tufts on each side, so close as not to be readily distinguishable, anterior tufts very large, of about 28 papillae; sides of head speckled with vermilion; back white, no colour in region of heart. Teeth very much as in *Hermisenda opalescens*, with no lateral teeth. A long narrow central denticle, and four long lateral denticles, hardly half the length of the central one. The central denticle is longer and more slender than in *H. opalescens*.

Hab.—San Pedro, California, July 19, on mud flats at low tide with the last (W. P. Cockerell). Named after Dr. R. E. C. Stearns, who has contributed to the knowledge of Californian nudibranchs.

Thecacera velox, n. sp.

Length about 12 millim., narrow, general form of *T. pennigera*. White, marked with black stripes, appendages tipped with orange. Foot tentacles and oral tentacles both long, the first white with a purple-black line beneath, continuous with the lowest body-stripes; oral tentacles with the apical three-fourths bright orange. Rhinophores laminated, with a terminal finger-like process; apical third (including more than half of the laminated portion) bright orange. Rhinophore-sheath taking the form of a thickened tentacle, about as long as the rhinophore, lateral of the rhinophore and curling behind it; this pseudotentacle is purple-black above and white beneath, with the end broadly orange; the anterior lobe of the sheath, found in *T. pennigera*, is wholly wanting in *T. velox*. Appendages latero-posterior to branchiae formed as in *T. pennigera*, with the apical half orange (a small black spot beneath at the base of the orange), the upper side, from the base of the orange forward, with a broad purple-black stripe, these stripes passing forward and joining in the middle line of the back anterior to the branchiae, thence sending a short process forward, and another backward on to the median branchial plume, meeting the orange of its extremity. Branchial plumes three, about as in *pennigera*, bipinnate, the lateral ones with a purple-black patch and a little orange mark beyond; the middle one broadly orange at the end. Hind end of foot bright orange, the black bands stopping abruptly at the orange. The purple-black longitudinal stripes are a dorsal and two on each side; the dorsal begins very broadly on the front of the head, and thence narrows until it ends some distance before the branchiae; posterior to the branchiae it is continued, and goes nearly to the end of the foot. The subdorsal stripes are interrupted in the region of the branchiae, but otherwise are nearly entire. There are very short stripes in the area between the dorsal and subdorsal stripes, about the middle of the anterior part of the back. The lateral stripes border the narrow sole, and are continuous, but end before the subdorsal ones.

Hab.—La Jolla, San Diego County, California, among rocks at low tide, August 3, 1901 (Helen Blake). Very active when swimming with an undulating motion on the surface of the water. Described from a living specimen.

NOTES.

Limax nyctelius, Bgt., in Washington. On May 19, 1899, I found a number of *L. nyctelius*, alive and healthy, in the sheathing bases of the leaves of a date palm just imported from Orleansville, Algeria. This is of interest as indicating the habits of the slug, and the way in which it may be carried from one country to another; but the other palms of the same lot were sent to Arizona, where I afterwards saw them, and if there were any slugs upon them I am sure they could not survive.—T. D. A. COCKERELL.

Psammobia ferroensis var. pallida.—In the Journal of Conchology, 1901, p. 14, I see *P. ferroensis* v. *pallida*, Marshall. Is not this subsequent to *P. ferroensis* v. *pallida*, Ckl., Zoologist, 1887, p. 115? I presume they are identical, but I think Mr. Marshall must have overlooked my description.—

T. D. A. COCKERELL.

Conchological Society: Committee for Collective Investigation.—The following are the subjects for enquiry proposed for 1901—1902. Returns should reach the Secretary (A. E. Boycott, The Grange, Hereford) by September 1st, 1902.

i.—Do you find *Falloniu pulchella* and the form *costata* together or separately? in dry or moist situations? do intermediate forms occur? does each form seem to affect a particular kind of habitat?

ii.—Do *Tachea nemoralis* and *T. hortensis* occur together or separately? (1) in the same district? (2) in the same locality (hedgebank etc.)? is there any difference in the nature of the habitat most affected by each species?

iii.—Do *Clausilia rugosa* (*bidentata*) and *Balua perversa* occur together? what habitats are they found in?

iv.—Are there any constant differences between the radulae of (1) *Hyalina cellaria* and *H. allieria*, (2) *Limnaca peregra* and *L. auricularia*, (3) *Succinea putris* and *S. elegans*, (4) *Tachea nemoralis* and *T. hortensis*?

v.—Record the circumstances attending the periodical disappearance to which certain species, such as *A. glutinosa*, *H. fusca*, and *V. edentula*, are subject. How are such disappearances to be accounted for?

PROCEEDINGS OF THE MIDLAND MALACOLOGICAL SOCIETY.

28TH MEETING, MAY 10TH, 1901.

The President in the chair.

Various donations to the Library were announced, including a valuable series of works from Prof. L. H. Plate.

EXHIBITS.

The President exhibited and made some remarks upon various collections of shells from Tavoy, Amherst, and the Philippines.

By Mr. H. Overton: Decollated specimens of *Clausilia luminata* from Gloucestershire.

By Mr. Breeden: *Helix nemoralis* and varieties, and *Arion empiricorum* v. *bicolor* from Capel Curig.

29TH MEETING, JUNE 14TH, 1901.

The President in the chair.

EXHIBITS.

By Mr. Breeden: Shells of *Helix nemoralis* from Birdlip with curious malformation of the mouth, also specimens of *Planorbis carinatus* with the last whorl produced and growing ventrally.

By Mr. Linton: A living example of *Vivipara vivipara*, in which the sutures of the shell were deeply separated to form a shoulder to each whorl, also a shell of *Planorbis cornucopiae* m. *sinistrorsum*, and a beautiful series of malformed specimens of *P. spirorbis* from Tenby.

By the President: Sinistral examples of *Helix pomatia*, *aspersa*, *hortensis*, and *Linnaea peregra*; also malformed specimens of *Dentalium entalis* and *Ostrea virginica*.

30TH MEETING, JULY 12TH, 1901.

The President in the chair.

EXHIBITS.

By Mr. Overton: An interesting collection of land, freshwater, and marine shells from Oban and district.

By Mr. Linton: *Physa heterostropha* from South Staffordshire; also foreign Clausilias.

By the President: Various foreign Clausilias.

CURRENT LITERATURE.

Pilsbry, Henry A.—Tryon's Manual of Conchology, ser. ii, vol. xiv (pt. 53), pp. 1—64, pls. 1—15. Philadelphia: Academy of Natural Sciences.

In the present part Dr. Pilsbry completes the account of the genus *Amphidromus*, Alb., treating of the subgenera *Beddomia*, Nev., and *Pseudopartula*, Pfr.; then conveniently follow the following genera: *Draparnaudia*, Montr., with *D. crossi*, n. sp. from New Caledonia, which stands between *D. sinistrorsa*, Desh., and *D. lifuana*, Pils., this latter being a new name for the *D. theobaldianus*, Gass., preoccupied by Benson. The genus is perhaps most closely related to *Papuina* than to any other genus. A new subgenus (*Dolichculota*) of *Eulota*, Hartm., is described, the author here remarking that the anatomy, at present unknown, will probably be found to agree essentially with *Euhadra*. The type is *Bulinus formosensis*, H. Ad., but as the name is preoccupied in *Eulota*, it is suggested that if on examination of the anatomy a new one is required, it may be termed *E. elongata*. *Calycia*, H. Ad., and the somewhat unsatisfactory genus *Bocourtia*, Rochebr., follow.

Passing then to the American *Bulimulidae*, the subfamily *Odontostominae* is first dealt with. That the genera treated of are Bulimuline is unmistakably indicated by the exceedingly short kidney, and by the absence of accessory organs upon the penis. *Macrodonates*, Swains., is accorded generic rank, then follow *Ancus*, v. Marts., and *Odontostomus*, Beck, with the following sections: *Moricandia*, Pils. and Van., *Baliensis*, Jous., *Cyclodontina*, Beck, and *Odontostomus*, Beck, s. str.

Hedley, C.—Studies on Australian Mollusca. Part iii. Proc. Linn. Soc. N. S. W., 1900, pp. 721—732, pl. xlviii, and 8 figs. in text.

The following new species are described and figured: *Mathilda rosae*, *Leuconopsis inermis*, *Stenothyra australis*, *Iravadia australis*, *Callomphala globosa*, *Endodonta concinna*, *Chlamys fenestrata*. In addition to these, figures are given of many other species, particularly interesting amongst which is that of *Asaphis contraria*, Desh., a new and unexpected addition to the Australian fauna.

Hedley, C.—Some new or unfigured Australian shells. *Rec. Aust. Mus.*, 1901, vol. iv, pp. 22—27, 9 figs.

The new species are *Philobrya tutci*, *Periploma micans*, *Sarcpta? tellinaciformis*, and a new variety (*depressa*) of *Thersites gulosa*, Gld.

Kew, H. Wallis.—On the Pairing of *Limax maximus*. *Naturalist*, 1901, pp. 241—254, figs. 1—5.

In the present paper the author sets forth the various accounts which have been given by Lister (1678), Werlich (1819), Boch-Buschmann (1853), Purkyne (1859), Bladon (1858), Baudelot (1863), and Laurent (1895), together with those of Danial, Ashford, and Adams. Some hitherto unpublished and interesting notes of Tye, Standen, and the author are given, confirming and supplementing previous observations.

Vanatta, E. G.—New Marine Mollusks. *Proc. Acad. Nat. Sci. Phila.*, 1901, pp. 182—187, pl. v, part

Haminea zanzibarica (Zanzibar), *H. succinea*, Conr. var., *solidior* (West Indies), *Aplys sharpi* (West Indies), *Tornatina bermudensis* (Bermuda), *Lucina (Diraricella) daliana* (South Africa), *L. (D.) huttoniana* (Auckland, N.Z.), and *Venus (Anomalobcordia) malonei* (South Africa), are described and figured.

Pilsbry, H. A.—New species of Mollusks from South Africa and Burma. *Proc. Acad. Nat. Sci. Phila.*, 1901, pp. 188—190, pl. v, part

Vivipara henzadensis from Henzada, Burma, constitutes the type of a new subgeneric group of south-eastern Asia, in which the operculum is peculiarly modified. Dr. Pilsbry proposes the name *Idiopoma* for this group. *Ampullaria winkleyi* Henzada, and *Donax bertini* and *Fossarus capensis* (South Africa) are also new.

Pilsbry, H. A.—New Mollusca from Japan, the Loo Choo Islands, Formosa and the Philippines. *Proc. Acad. Nat. Soc. Phila.*, 1901, pp. 193—210.

The new forms are: *Eulota succincta* var. *amblytropis*, *E. sarygentiana*, *Lamprocystis spadix*, S. and B. var. *cinctus*, *Vitronoconus moellendorffi*, *Succinea ogasawarac*, *S. punctulispira*, *Columbella polynyma*, *Chrysolomus intersculptus*, Sby. var. *frater*, *Peristernia ustulata*, Rve. var. *luchuana*, *Echinella cumingi*, Phil. var. *luchuana*, *Turbonilla varicifera*, *Cantharidus (Phasianotrochus) hirasei*, *C. bisballeatus*, *Clanculus gemmalifer*, *C. microdon* var. *ater*, *C. hizencensis*, *Euchelus ruber*, A. Ad. var. *brunneus*, *Chlorostoma argyrostomum* var. *basilistratum*, *Acmacea heroldi* var. *signata*, *Patella luchuana*, *Onithochiton hirasei*, *Cryptoplax japonicus* and *rhodoplax* (sine descr.), *Petricola cyclus*, *Venus hirasei*, *Topes platyptycha*, *T. phenax*, *Donax kiuisuensis*, *Anatina impura*, *Lima hirasei*, *Arca (Scapharca) nipponensis*. Nearly all the specimens have been collected by Mr. Hirase, of Kyoto.

Pilsbry, Henry A.—The Anatomy of the sub-genus *Beddomea* and the Relationships of the genus *Amphidromus*. *Proc. Malac. Soc. Lond.*, 1901, vol. iv, pp. 158—162, pl. xvi.

From an examination of specimens of *Amphidromus (Beddomea) intermedius*, Rve., *albizonatus*, Rve., and *cratlanicus*, Pr., Dr. Pilsbry finds that they agree in their general anatomy with *Amphidromus* (s. s.), and he is not inclined to accord to *Beddomea*, G. Nev., more than sub-generic rank.

Pilsbry, Henry A.—Morphological and Descriptive Notes on the genus *Cryptoplax*. *Proc. Malac. Soc. Lond.*, 1901, vol. iv, pp. 151—157, pls. xiv, xv.

Pilsbry, Henry A.—Notes on the Recent Literature of Japanese Land-Snails. *Ann. Mag. N. H.*, 1901 (s. 7), vol. viii, pp. 1—9.

The author briefly discusses certain questions of distribution and classification, and gives a list of the species described since the beginning of 1900, together with the somewhat extensive synonymy established during that period. The total number of new species and varieties is 129, of which 22 are known to be synonyms, while possibly a half-dozen more are doubtful.

Baker, F. C.—The Digitations of the Mantle in *Physa*. Bull. Chicago Ac. Sci., 1901, vol. ii, pp. 225—228, pls. i, ii.

The author has examined the edge of the mantle which is reflected over the parietal wall, in various species of *Physa*, and finds the marginal digitations very uniform in those species whose shell exhibits little or no variation, while in those species subject to great variation, there is a corresponding variation in the mantle.

Baker, F. C.—Description of a new species of *Limnaea*. Ibid., pp. 228—230, figs.

L. woodruffi, from the southern part of Lake Michigan.

Gude, G. K.—A third report on Helicoid Land-shells from Japan and the Loo Choo Islands. Proc. Malac. Soc. Lond., 1901, vol. iv, pp. 191—201, pls. xix—xxi.

The main value of the report lies in the generic corrections and the figures, unfortunately these latter are not printed in the text but on a glazed paper. Two new varieties are described, viz. *Trishoplita goodwini* v. *carinata*, and *Eulota (Aegista) friedeliana* v. *tumida*.

Gude, G. K.—Description of a new species of *Chloritis* from the Loo Choo Islands. Ann. Mag. N. H., 1901 (s. 7), vol. viii, pp. 157—158, figs. 1—4.

C. oshimana, n. sp. resembles *C. cheratomorpha*, Tap., from New Guinea.

Smith, J. P.—The Larval Coil of *Baculites*. Amer. Nat., 1901, vol. xxxv, pp. 39—49, pls. A, B.

Until comparatively recently *Baculites* was supposed to be an ammonite that had reverted to the orthoceran form, but the discovery, in the Cretaceous beds of Dakota, of young examples possessing a larval coil attached to the straight shaft, was rightly interpreted as indicating the descent of this genus from a coiled ancestor. A recent find of numerous larval coils of *B. chicoensis*, has enabled the author to describe the ontogeny and phylogeny of the genus, and to illustrate the same.

Smith, J. Perrin and Weller, S.—*Prodromites*, a new Ammonite genus from the Lower Carboniferous. Journ. of Geol., 1901, vol. ix, pp. 255—266, pls. vi—viii.

In this new genus we have, the authors state, the oldest known and most complex ammonite yet described from strata older than the Permian. The new genus is founded partly on Miller's *Goniatites gorbyi*, of which corrected figures are given, and a new species *P. praematurus*.

Fischer, H.—Description d'une espèce nouvelle de *Melampus* provenant du Golfe de Gascogne. Journ. de Conchyl., 1900, vol. xlviii, pp. 66—69, figs. 1, 2.

Dr. Fischer now describes the specimen of *Melampus* previously referred to as *M. criguus*, Lowe (J. de Conchyl., 1899, p. 55, fig. 1), and proposes for it the name of *M. biscayensis*.

Nabias, B. de.—Noyau lobé des cellules nerveuses chez le Gastéropodes pulmonés aquatiques (*Limnaea stagnalis* et *Planorbis cornuus*). Action des anesthésiques généraux (Chloroforme). Soc. Scient. Stat. Zool. Arcachon, Trav. d. labor., 1899, pp. 36—38, 1 pl.

Murdoch, R.—On the Anatomy of some Agnathous Molluscs from New Zealand. Proc. Malac. Soc. Lond., 1901, vol. iv, pp. 166—173, pl. xvii.

The specimens described are *Rhytida greenwoodi*, Gray, *R. meesoni*, Suter, *Renea coresia*, Gray, *Schizoglossa novoseelandica*, Pfr., *Paryphanta hochstetteri*, Pfr., and *Natalina affra*, Fér.

Murdoch, R.—On the Anatomy of *Bulininus djurdjurenensis*, Ancey, from the Djurdjura Mountains, Kabylia. Proc. Malac. Soc. Lond., 1901, vol. iv, pp. 174—177, figs. i—vi.

GENERAL REVIEWS.

Land and Freshwater Shells: an Introduction to the study of Conchology. By J. W. Williams. cr. Svo. pp. 112, 34 figs. in text. 3rd and revised edition. London: 1901. Swan Sonnenschein and Co., Ltd.

We are pleased to welcome a further edition of this little handbook. The text of Chapters i—iii, treating of the anatomy and physiology of a snail and a freshwater mussel, have not been altered, excepting to make some slight corrections. In a remarkably small space they give a clear and intelligent survey of their subject.

Mr. J. W. Taylor has revised [?] the systematic part, and with Mr. Roebuck contributes an imperfect census of the distribution of the land and freshwater mollusca. We really cannot take Mr. Taylor's revision seriously nor the so-called census. Mr. Williams would have been well advised, if he had revised the systematic portion himself and entirely omitted the "census."

Our Country's Shells and how to know them. A Guide to the British Mollusca. By W. J. Gordon. pp. vii+152, with 33 pls. and figs. in text. London: [1901] Simpkin, Marshall, Hamilton, Kent, and Co., Ltd.

We have carefully examined and read through this book, looking for some redeeming feature, but our task has been in vain. It is such publications as this which act rather as hindrances than helps, to the collector and student of popular conchology.

Shell Life an introduction to the British Mollusca. By Edward Step. cr. Svo. pp. 414, 32 pls. and figs. in text. London: 1901. F. Warne and Co.

That there is an opening for a cheap and popular handbook treating of the Mollusca of this country few will deny, but it is absolutely necessary that the author of such, should be one possessing a practical acquaintance with his subject and the literature thereon. Mr. Step possesses neither of these qualifications, with the result that the present work is little more than a careless compilation.

Good use has been made of Mr. Cooke's interesting work (Mollusca, Cambridge Natural History), but where the author obtained the information that *Limax tenellus*, Nilss., was a British slug and that *Amalia carinata*, Risso, was the same as *A. marginata*, Drap., is more than we can tell, but such statements will serve to illustrate the general inaccuracy.

The almost entire absence of any references is a marked feature; as we have stated time after time in this paper such a practice is most reprehensible, no author is justified in making statements "as though he himself had investigated and was responsible for the accuracy of these statements in virtue of his own observations on the objects described, when all the time he is simply stating what this man and that man have seen, and he has not seen, though he omits to mention the name of those to whom he is indebted."

Most of the figures on the 32 plates are good, many in the text, however, are very poor.

 EDITOR'S NOTES.

We regret to have to record the decease of Mr. Thomas Rogers of Manchester, in his seventy-fourth year, who died on Helvellyn on May 30th, whilst making an ascent of the mountain.

As we go to press, we learn with deep regret that Mr. Martin F. Woodward, while on a zoological excursion to the west coast of Ireland, was drowned on the 15th instant.

THE
JOURNAL OF MALACOLOGY.

No. 4.

DECEMBER 30TH, 1901.

VOL. VIII.

ON SOME LAND SHELLS FROM BRITISH EAST
AFRICA.

By EDGAR A. SMITH.

THE specimens about to be described were collected by the late William Doherty near the present terminus of the Uganda Railway, between September 1900 and April 1901. The escarpment where they were obtained is at an elevation of 6500—9000 feet.

Ennea (Gulella) ugandensis, n. sp. Fig. 1.

Testa breviter pupiformis, tenuis, polita, pellucida, albida; spira cylindrica, superne obtuse conoidea; anfractus 8 leviter convexi, infra suturam anguste pellucido-marginati, et obsolete subplicati, vel crenu-



Fig. 1.—*Ennea (Gulella) ugandensis*, n. sp.

lati, microscopice spiraliter striati, lineisque incrementi obliquis parum distinctis sculpti, ultimus antice nec descendens nec adscendens, pone labrum tri-scribiculatus; apertura rotunde quadrata, longit. totius $\frac{1}{3}$

circiter aequans, dentibus pluribus munita; peristoma albidum, leviter incrassatum, expansum et reflexum, margine externo tridentato, basali dente unico parvo munito, columellari dente bifido, parietali dente lamelliforme superne labro fere juncto.

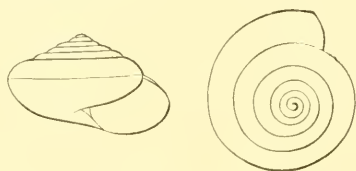
Longit. $10\frac{1}{2}$ millim., diam. $5\frac{1}{2}$; apertura cum perist. 4 longa, $3\frac{1}{2}$ lata.

Of about the same size and general appearance as *E. hanningtoni*, Smith, but somewhat broader, with a squarer aperture, a different columellar tooth and different teeth within the outer lip. These are three in number, the central being most prominent and the anterior one the smallest. The spiral striation is only visible under a powerful lens and is most observable upon the back of the body-whorl.

Martensia permanens, n. sp. Figs. 2, 3.

Testa depresso conoidalis, carinata, anguste perforata, supra pallide fusca, infra albida; spira breviter conica, ad apicem obtusa; anfractus $6\frac{1}{2}$ lente accrescentes, duo superiores leviter convexi, microscopicè spiraliter striati, coeteri convexiusculi, ad suturam carinati, oblique confertim et arcuatim costulato-striati, ultimus ad peripheriam acute angulatus, vel carinatus, antice haud descendens, infra fere laevis, lineisque tantum incrementi tenuibus sculptus; apertura oblique lunata; peristoma tenue, margine columellari ad insertionem breviter expanso et reflexo.

Diam. maj. 21 millim., min. $18\frac{1}{2}$; alt. 12.



Figs. 2 and 3.—*Martensia permanens*, n. sp.

There is a distinct difference in the colour of the upper and lower surfaces of this species. The former is of a pale brown tint varied with pale hair-like streaks in the direction of the lines of growth, whilst the latter is of an uniform pale or whitish colour. The minute spiral striation is limited to the protoconch, consisting of about two whorls. The keel or angulation of the body-whorl in adult specimens is not very sharp, but in young examples it is much more acute, as may be seen by the distinct carina which marks the suture.

Limicolaria dohertyi, n. sp. Fig. 4.

Testa ovato-pyramidalis, ad apicem obtusa, solida, imperforata, vel subrimata, saturate castanea, strigis albis irregularibus picta, lineis incrementi obliquis striisque spiralibus undique decussata; anfractus 7 convexi, sensim accrescentes, sutura pallida lineari sejuncti; apertura inverse auriformis, intus caerulescens, longit. totius $\frac{2}{3}$ adaequans; labrum tenue, arcuatum; columella incrassata, reflexa, sordide albida. Longit. 59 millim., diam. 28; apertura 23 longa, 13 lata.



Fig. 4.—*Limicolaria dohertyi*, n. sp.

This very interesting species is remarkable for its solidity and its pupoid form. The white stripes upon the deep chestnut ground are irregular and somewhat wavy, oblique, or zigzag in form. The three apical whorls are smoother than the rest of the shell, whitish or bluish and devoid of striping. One of the three specimens under examination is rimate, the two others being imperforate.

Named *dohertyi* as a tribute to the memory of the collector, the late William Doherty.

Buliminus bambuseti, Martens, var. Fig. 5.

Buliminus bambuseti, Martens: Sitz. Ber. Gesell. nat. Freunde Berlin, 1900, p. 118.

Testa ovata, supra acuminata, imperforata, vel vix rimata, saturate vel pallide fusca, solidiuscula, lineis incrementi obliquis striisque spiralibus tenuibus confertis minute decussata; anfractus $6\frac{1}{2}$ convexius-

culi, superiores duo laeves; ultimus magnus, inflatus, antice flavescens, oblique descendens, ad medium obsolete carinatus; apertura inverse auriformis, intus rufescens, longit. totius $\frac{1}{2}$ paulo superans; peristoma incrassatum, reflexum, pallidum, margine dextro curvato, columellari rectiusculo, supra leviter expanso.

Longit. $29\frac{1}{2}$ millim., diam. 18; apertura cum perist. 14 longa, 11 lata.



Fig. 5.—*Buliminus bambuseti*, Martens, var.

Dr. E. von Martens has kindly compared a specimen with his *B. bambuseti*, and he is of opinion, notwithstanding slight differences, that they belong to the same species. He noted that the present variety was a little larger, the last whorl rather more inflated, and the peristome paler, also that the faint angulation or ridge around the middle of the body-whorl was more distinct in the Uganda shell.

***Opeas crenulata*, n. sp. Fig. 6.**

Testa gracilis, subulata, pellucida, nitida, tenuis; anfractus 12 lente accrescentes, duo apicales laeves, convexi, coteri convexiusculi, oblique leviter striatuli, ad suturam minute crenulati, sutura leviter oblique sejuncti, ultimus brevis; apertura inverse auriformis, parva; peristoma tenue, margine columellari expanso et reflexo.

Longit. 12 millim, diam. 3; apertura $2\frac{1}{4}$ longa.



Fig. 6.—*Opeas crenulata*, n. sp.

Well characterised by the numerous short whorls and the minute plication at the suture. The form is somewhat variable, some specimens being more slender than others.

THE ANATOMY OF THE BRITISH SPECIES OF
THE GENUS SOLEN. Pt. II.*

BY H. H. BLOOMER.

(Plate viii.)

CIRCULATORY SYSTEM.

The circulatory system of *Solen* presents not a few difficulties. In the following account I have been guided very largely by the valuable work of Menegaux, but the whole system has been subjected to very careful investigation, particularly the venous system.

Venous System.—*Solen ensis*, L. (Pl. viii, fig. 17).

As in all the Pelecypoda, the venous system of *Solen* is very complicated and difficult to make out. There are no defined vessels conveying the venous blood from the tissues, but it finds its way through the lacunous parts of the animal and accumulates in the various sinuses.

Running along the elongated foot is a large canal, the homologue of the posterior pedal sinus of other pelecypoda (*P.S.*). It is nearly median and enclosed by the bundles of longitudinal and transverse muscles, leaving between them, openings by which the blood passes to it from the secondary sinus, the latter being situated dorsally (*A.P.S.*).

The posterior pedal sinus branches at the proximal end of the foot into anterior and posterior divisions, the latter following inferiorly the visceral mass, from which it receives the blood, and describing a curve terminates just opposite the viscero-renal orifices (*V.R.O.*). In the retraction of the foot the orifices open and allow the blood to pass through the kidneys (*K.*). The blood then accumulates in the pallial sinuses (*Pa.S.*), which are situated on the inner surfaces of the mantle lobes near to the line of their dorsal concrescence, and just behind the posterior adductor muscle (*P.A.*). The

* See ante, p. 36.

anterior division of the posterior pedal sinus bifurcates and communicates with the sinus lying over the anterior adductor muscle (*A. A. S.*), this sinus extends posteriorly over the viscera and laterally down the sides of the same.

The sinus of the visceroparietal ganglion (*V. P. S.*) is situated between the bifurcated parts of the posterior retractor pedis muscle and the posterior adductor muscle, and dorsal to the visceroparietal ganglion.

The venous system in the mantle does not possess well-walled passes, but being very lacunous and very soft it is capable of receiving an enormous quantity of blood. In its posterior part the venous blood mixes with the arterial, and collects in the pallial sinus. The siphonal tentacles exhibit large lacunae opening directly into the siphonal sinus (*Si. S.*). The afferent branchial vessel (*A. B. V.*) originates from the sinus of the visceroparietal ganglion (*V. P. S.*). The efferent branchial vessel (*E. B. V.*) conveys the arterial blood to the auricle (*Au.*), opening into it at the posterior end, and as the gills extend a little anterior to this part of the auricle, the vessel has consequently, one portion of it anterior and the other posterior to the point of junction.

Solen siliqua, L., and *Solen marginatus*, Pult. and Don.

There is nothing calling for comment in the venous system of these species.

The Heart.—This is typical of the Pelecypoda, a median fusiform ventricle and lateral triangular auricles.

Arterial System.—*Solen ensis*, L.

Arising from the anterior end of the ventricle is the anterior aorta (*A. Ao.*), it proceeds dorsally over the viscera and shortly gives off an artery which passes to the wall of the pericardium, from there to the sinus of the foot, and then to the kidney. The anterior aorta in its passage forward gives off various hepatic or gastric branches, and on reaching a position dorsal to the mouth it curves in slightly and then descends perpendicularly. At the point of incurving it sends off a branch to the anterior portion of the right lobe of the liver (*A. A. M.*), after leaving this organ, the branch passes over the anterior adductor muscle to the region of the hinge teeth of the shell; its further course has not yet been traced owing to the injury always caused to this part of the animal in its removal from the shell.

During the descent of the anterior aorta, a large artery is given off, the visceral artery (*A. V.*), which vascularises a large portion of the viscera. Two branches of it pass along the caecum of the crystalline style and cover the latter with their fine ramifications. The largest branches, however, pass on to the intestinal folds and terminate there.

The anterior aorta then turns anteriorly, at which point it gives rise to the pedal artery (*P. Ar.*) and later to the labial branches, and a branch to each bifurcated anterior retractor pedis muscle. It then passes underneath the anterior adductor muscle, vascularising this and finally dividing in the mantle into two branches. Menegaux is of opinion that it continues by the circumpallial, although he has not been able to trace the connection very clearly.

The pedal artery (*P. Ar.*) passes to the foot and buries itself in the tissues. It supplies the pedal ganglion, follows the length of the foot dorsal to the anterior pedal sinus, and gives off numerous alternating branches before dividing into two divisions at the extremity of the foot.

Arising from the posterior end of the ventricle is the posterior aorta (*P. Ao.*), which very shortly after leaving the ventricle forms the dilatation known as the bulbus arteriosus (*B. A.*). The latter is separated from the ventricle by a small valve, it is of considerable length, and extends to the posterior adductor muscle (*P. A.*), surrounding the rectum like a sheath and attached to it by small muscular columns.

From the bulbus arteriosus a small artery arises which passes to the dorsal part of the pericardium.

Near the posterior adductor muscle the posterior aorta divides into the two posterior pallial arteries (*P. P. A.*), one going to the right and the other to the left, and both passing underneath the muscle and communicating with the rectal lacunae, these two branches then open into the two pallial sinuses. They further communicate with the tissues surrounding these organs; sinking into the walls, they reach the connected marginal borders of the mantle lobes, passing round these, they enlarge very much and give off on the external surface numerous small branches, not a fused network, and finally return anteriorly to the level of the attachment of the dorsal integument to the shell. Owing to the damage sustained in the removal of the animal from the shell, as mentioned above, it has not yet been possible to trace any connection between the anterior and posterior aortae.

The branches of the posterior aorta are themselves true arteries, but the existence of an endothelium in them has not yet been demonstrated. In all cases these are walled canals exhibiting, laterally, orifices leading to the pallial lacunae. Everywhere in all the arteries of the mantle Menegaux states that he has found this character to exist.

In the Pelecypoda generally the arteries open into the lacunae, but in the visceral mass of the foot these are only fine ramifications,

which have their walls pierced with small holes. In the mantle these are large trunks which form lateral openings. This fact may be explained by the rapid displacement which the blood has to submit to at times. Besides this, in consequence of the respiratory function of the mantle, the blood must spread over as large a surface as possible.

S. siliqua, L.

The arterial system of *S. siliqua* is similar to that of *S. ensis*, and only differs from it in a few minor details which it is unnecessary to enumerate.

S. marginatus Pult and Don.

The arterial system of *S. marginatus* is somewhat different owing to the anterior portion of the animal being shorter than in the species *ensis* and *siliqua*. The anterior aorta is dorsal to the anterior end of the right lobe of the liver, before curving and proceeding in a ventral direction.

From the pedal artery arises a large branch which also vascularises the viscera and particularly the caecum of the crystalline style. The pedal artery being more superficial forms fewer branches, but at the point of the terminal curve of the intestine it gives off a large lateral branch which passes between the muscular bundles of the distal end of the foot.

EXPLANATION OF PLATE VIII.

Fig. 17. Semi-diagrammatic view of *Solen ensis* from the left side, showing the circulatory system.

REFERENCE LETTERS.

<i>A.</i>	Anus.	<i>M. L.</i>	Mantle lobe.
<i>Au.</i>	Auricle.	<i>P. A.</i>	Posterior adductor muscle.
<i>A. A.</i>	Anterior adductor muscle.	<i>P. Ao.</i>	Posterior aorta.
<i>A. Ao.</i>	Anterior aorta.	<i>P. Ar.</i>	Pedal artery.
<i>A. A. M.</i>	Artery of the Anterior adductor muscle.	<i>P. P. A.</i>	Posterior pallial artery.
<i>A. A. S.</i>	Anterior adductor sinus.	<i>P. P. S.</i>	Posterior pedal sinus.
<i>A. B. V.</i>	Afferent branchial vessel.	<i>Pa. S.</i>	Pallial sinus.
<i>A. P. S.</i>	Anterior pedal sinus.	<i>R.</i>	Rectum.
<i>A. V.</i>	Visceral artery.	<i>R. L.</i>	Right lobe of liver.
<i>B. A.</i>	Bulbus arteriosus.	<i>R. P. A.</i>	Retractor pedis anterior artery.
<i>C. C.</i>	Caecum of crystalline style.	<i>Si. S.</i>	Siphonal sinus.
<i>E. B. V.</i>	Efferent branchial vessel.	<i>St.</i>	Stomach.
<i>F. A.</i>	Fourth aperture.	<i>S. T.</i>	Siphonal tentacles.
<i>Iu.</i>	Intestine.	<i>V.</i>	Ventricle.
<i>K.</i>	Kidney.	<i>V. P. S.</i>	Viscero-parietal sinus.
<i>L. L.</i>	Left lobe of liver.	<i>V. R. O.</i>	Viscero-renal orifice.

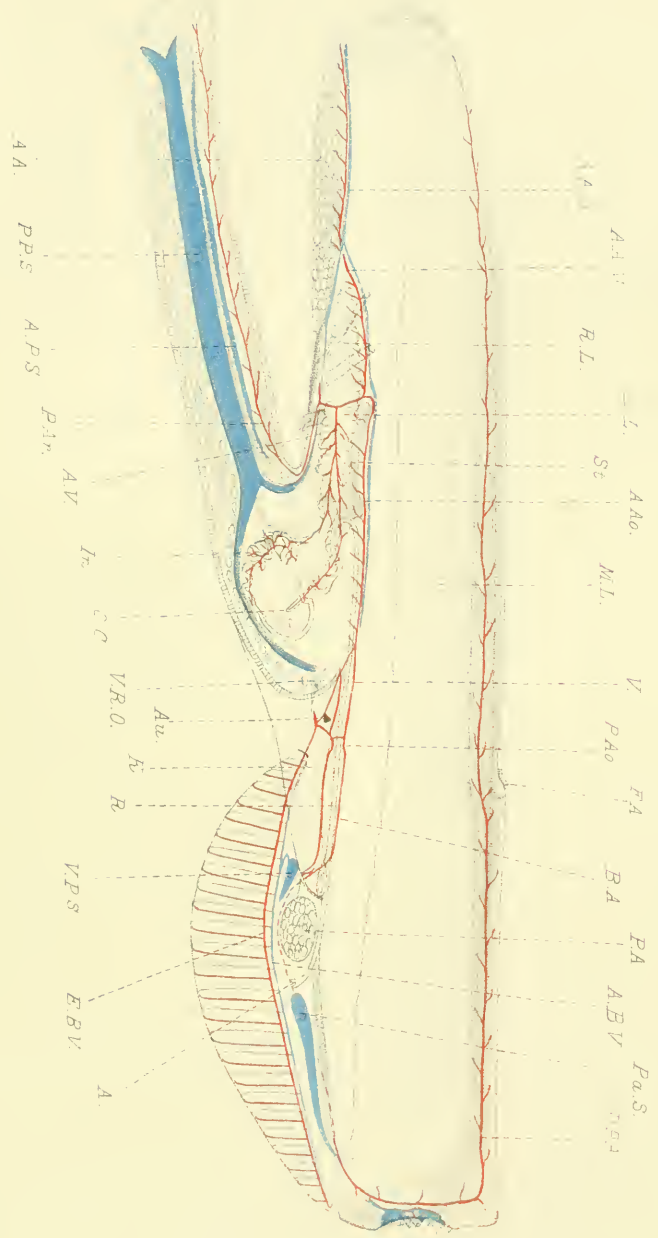


PLATE 12

PLATE 12

ANATOMY OF SOLEN

DESCRIPTIONS OF FIVE NEW SPECIES OF SHELLS.

By G. B. SOWERBY, F.L.S.

(Plate ix, figs. 1—5.)

Conus beddomei, n. sp. Pl. ix, fig. 1.

Shell rather solid, light yellowish-brown, ornamented with large irregular white patches, which are mostly longitudinally oblong and here and there zigzag, those at the angle being smaller and arranged in a regular way; the growth lines form slightly-waved longitudinal striae, crossed by very faint spiral ridges, which become stout and prominent towards the base. Spire broadly conical, but little raised, rather sharply angled; whorls slightly concave above the angle, separated by a well-defined impressed suture, sculptured with three rather deep spiral grooves, crossed by numerous rather prominent oblique striae. Interior of the aperture pink.

Length 22, breadth at angle 16 millim.

Hab.—"West Indies" (C. E. Beddome).

This pretty cone bears no very close resemblance to any known species: its markings somewhat resemble those of *C. colubrinus*, Lamk., but of course it does not belong to that section of the genus.

The shell was found in the collection of the late C. E. Beddome (recently acquired by us), labelled "*Conus ziczac*, Muhlf., West Indies." This led me to look up the description of that species which has not been recognized by modern authors—Reeve (*Conch. Icon.*) and Weinkauff (*Conch. Cab.*) make no mention of it; Sowerby (*Thes. Conch.*) places the name in the index with "Unknown to me." Tryon (*Manual of Conch.*) only quotes Sowerby. I now find *Conus ziczac*, Megerle von Muhlfieldt described and figured (*Mag. Gesellsch. Naturf. Berlin*, vol. viii, p. 4), and it does not at all resemble the shell which I now call *C. beddomei*, and it is certainly not that species. The question what it is, is perhaps not so easy to answer, as the figure is a poor one, but in my opinion it is nothing but a form of *C. mediterraneus*. The locality quoted "Mediterranean Sea," the obtusely elevated form of the spire as figured, and the general contour of the shell (although the markings are rather peculiar) lead me to that conclusion. I may say also, that in the description there is nothing to render the correctness of this identification improbable.

Pisania delicatula, n. sp. Pl. ix, fig. 2.

Shell elongated, rather narrow, pale yellow, with an obscure interrupted white zone about the middle of the body-whorl; spire acutely pyramidal; apex brown, papillary; whorls 7, the first two smooth,

rounded and polished, the next slightly convex, decussated with rather strong longitudinal ridges crossed by spiral striae, the ridges and striae become gradually less pronounced on the subsequent whorls, the last being almost smooth, excepting towards the base where it is strongly spirally ridged, and at the upper part, where fine close striae and a few more distant ridges are faintly visible. Aperture rather small, oblong-ovate; columella arched in the middle, and slightly recurved towards the base, and furnished above with a small projection marking the entrance to the posterior canal; outer lip slightly thickened, very slightly crenulated, and furnished with two or three small tooth-like projections near the posterior end: anterior canal short, rather wide, posterior canal narrow and shallow.

Length 17. breadth 6 millim.

Hab.—Bird Island, Pacific.

A small lemon-coloured shell allied to *P. montrouzieri*, Crosse, but smaller, proportionately narrower, smoother, and of a different colour.

Vanikoro expansa, n. sp. Pl. ix, fig. 3.

Shell small, white, rather solid, obliquely rounded, strongly latticed, with 5 stout nodulous spiral ribs, crossed by numerous stout rounded ridges, the 5 middle ones being the most prominent, the interstices forming deep pits; spire very small, apex acute; whorls $3\frac{1}{2}$, rapidly increasing, first $1\frac{1}{2}$ smooth, minute, the next somewhat obliquely plicate: last whorl slightly flattened at the top, with an irregular callus next the suture. Umbilicus moderately open. Aperture wide, rather oblique; lip acute; interior smooth.

Length 5, width 6 millim.

Hab.—North-west Australia.

This little species may be readily distinguished from its congeners, and notably by the comparative width of its aperture. Several specimens of it were found among a quantity of small shells (until recently unsorted) brought some years ago by Mr. J. J. Walker from north-west Australia.

Mangilia eudeli, n. sp. Pl. ix, fig. 4.

Shell white, with a very faint zone of pale buff colour; spire turreted, acute; whorls 7, the first 3 smooth, subpellucid, the rest shouldered, and slightly convex with about 13 longitudinal ribs which are rendered nodulous by the crossing of numerous spiral ridges; last whorl rather more than half the length of the shell; sides rather straight. Aperture rather narrow, very slightly attenuated at each end; interior lirate; lip thick, crenulated; posterior sinus rather broad and moderately deep, situated close to the whorl; anterior canal very short and rather wide.

Length $4\frac{1}{2}$, width scarcely 2 millim.

Hab.—St. Pierre, Réunion Island.

Compared with *M. rugulosa*, Phil., this shell is narrower and more straight sided, and has more numerous ribs.

A few specimens of this species were taken by the late Captain Eudel at the above locality in 1863, but it does not appear to have been hitherto described.

Cardium (Papyridia) hungerfordi, n. sp. Pl. ix, fig. 5.

Shell of very thin substance, rather inflated, rounded in front, slightly expanded and bi-angular behind; anterior side radiately grooved, posterior strongly ribbed; valves equal, completely closed; colour light reddish brown, becoming very pale towards the margin. Umbones tumid, incurved, approximating. Lunule rather long, slightly impressed. Posterior produced, concave.

Length $8\frac{1}{2}$, width 9 millim.

Hab.—Japan.

Some years ago I noticed specimens of this species in the collection of Surgeon-General Hungerford, but although I could not identify it, I thought it might be the young of a larger species. Having now received specimens direct from Japan, I am inclined to think they are mature.

DESCRIPTIONS OF NEW SPECIES OF XESTA,
AMPHIDROMUS, AND CYCLOSTOMA FROM
MADAGASCAR AND PERAK.

By HUGH FULTON.

(Plate ix, figs. 6—10.)

Xesta piperata, n. sp. Pl. ix, fig. 7.

Shell dextral, general form as figured, thin, very narrowly umbilicated, whitish with irregular oblique light brown stripes which are more numerous on the last whorl, *the whole exterior of shell marked with numerous, irregularly arranged, dark brown spots*, a narrow dark brown band at periphery of last whorl continued and fading away at suture of the penultimate whorl; whorls barely 6, slowly increasing; peristome simple, quite thin, slightly expanded at joint of insertion; interior of aperture dark brown, the exterior band showing through.

Alt. 20; maj. diam. 22 millim.

Hab.—Fort Dauphin, Madagascar (Sikora).

This distinct new species is well characterised by its peculiar peppered coloration. The position of the band on the body-whorl gives it a somewhat carinate appearance, but there is no trace of a carina.

Amphidromus perakensis, n. sp. Pl. ix, figs. 8—10.

Shell dextral or sinistral, solid, general form as figured, imperforate, polished, yellow with a narrow conspicuous band at the suture; whorls $7\frac{1}{2}$, slightly convex, with weak oblique striae or lines of growth; *columella bearing a thin and somewhat flat projecting plate, situated interiorly at about a third of a revolution from the exterior*; peristome white, thick, expanded and slightly reflected, margins connected by a transparent raised callus, columellar portion triangularly dilated above, somewhat angular below; aperture sub-ovate, whitish within.

Alt. (sinistral specimen) 48; maj. diam. 26 millim.

Alt. (dextral specimen) 50; maj. diam. 27 millim.

Hab.—Perak (Grubauer).

At first sight one could easily take this species to be one of the numerous varieties of *A. perversus*, but on holding the shell obliquely, the very characteristic columellar projection becomes conspicuous. This plate appears, from an exterior view, to be thick, but on breaking away the wall of the shell, it is seen to be quite thin. All the numerous specimens collected are quite constant in the possession of this peculiarity, although it is more prominent in some than in others.

Cyclostoma sikorae, n. sp. Pl. ix, fig. 6.

Shell solid, moderately umbilicated, general form as figured, somewhat shining, milk-white, ornamented with several dark purple-brown bands situated as shown in illustration; whorls $5\frac{3}{4}$, very convex, with inconspicuous oblique striae or lines of growth; aperture circular, interior of a light brown colour; peristome white, rather broadly expanded at outer and basal portions, narrower on columellar part, margins connected by a rather thin callus; operculum normal.

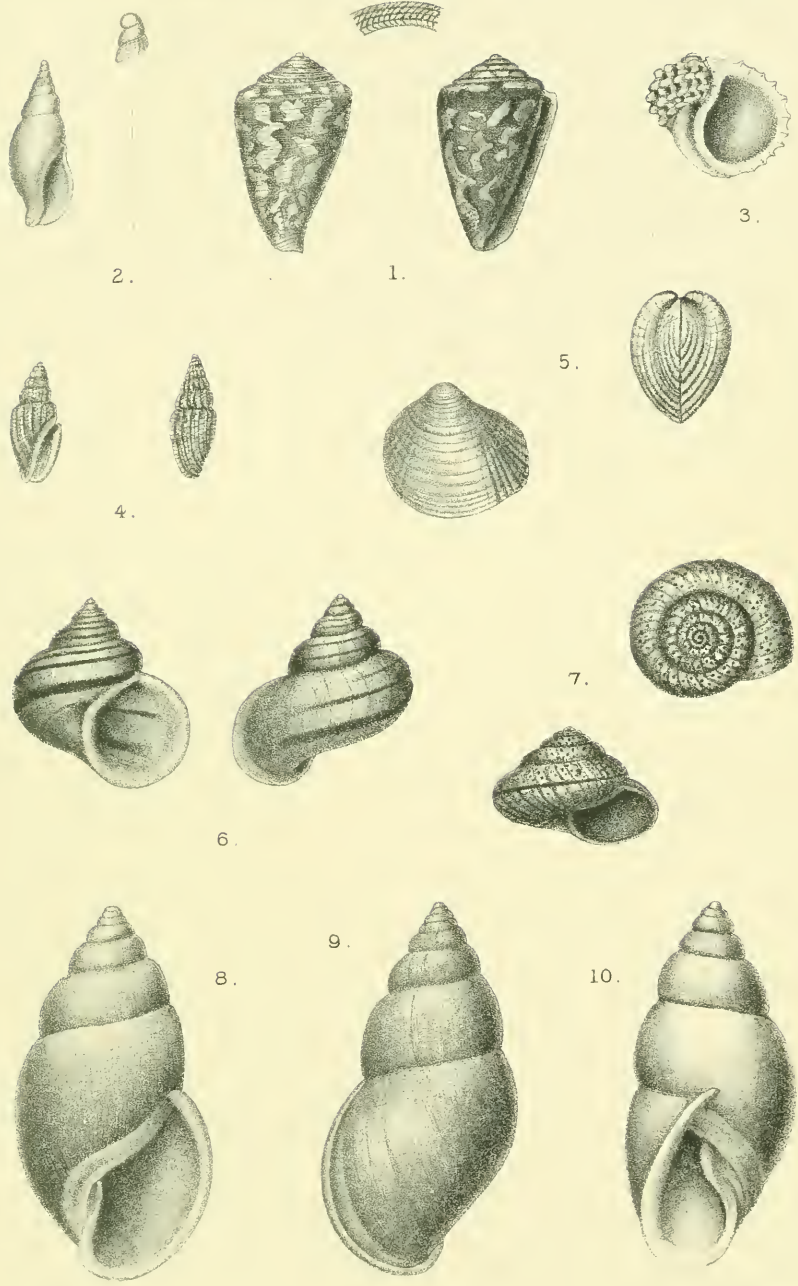
Alt. 25; maj. diam. 24 millim.

Hab.—Fort Dauphin, Madagascar (Sikora).

This species is chiefly distinguished by its smoothness especially at the umbilical area. In general form it is very near *C. filostriatum*, Sowb., but differs in other characters. More rarely *C. sikorae* is almost covered by two or three dark coloured bands which also shew through the interior of aperture.

EXPLANATION OF PLATE IX.

- Fig. 1. *Conus badolmei*, n. sp.
 Fig. 2. *Pisania delicatula*, n. sp.
 Fig. 3. *Tanikoro expansa*, n. sp.
 Fig. 4. *Mangilia eulei*, n. sp.
 Fig. 5. *Cardium hungerfordi*, n. sp.
 Fig. 6. *Cyclostoma sikorae*, n. sp.
 Fig. 7. *Xesta piperata*, n. sp.
 Figs. 8—10. *Amphidromus perakensis*, n. sp.



B. Sowerby del.

W. H. Dall sculp.

NEW SPECIES OF SHELLS.

MALACOLOGICAL NOTES.*

By E. R. SYKES, B.A., F.L.S.

(Plate x.)

9. What is *Cyclostoma giganteum*?

(Pl. x, figs. 1—3.)

RECENTLY I have had brought to my notice the fact that considerable confusion exists with regard to the identification of this form. There appears to be a general agreement that the species belongs to the genus *Neocyclotus*, but various works figure and describe varying forms. In the British Museum occur, under this name, what I take to be three distinct species, and having come into possession, through Mons. Boucard, of all three, I have endeavoured in the following notes to throw some light on the difficulty.

Perhaps the most convenient course is to set out the names I attribute to these forms, to give the references, and then to discuss the matter as a whole.

I. *Aperostoma giganteum* (Rve.).

(Pl. x, fig. 1.)

- Cyclostoma giganteum*, Gray MS. in Mus. Brit.
 „ „ Gray: Reeve, Conch. Syst. [1842], vol. ii, pl. clxxxiv, fig. 17.
 „ „ Sowerby: Proc. Zool. Soc., 1843, p. 30.
 „ „ Sowerby: Thes. Conch. [1843], vol. i, p. 92
 [Figures relate to *fischeri*.]
Cyclotus giganteum, Gray: Cat. Cycloph. Brit. Mus., 1850, p. 7.—
 Cat. Phanerop. Brit. Mus., 1852, p. 7.

II. *Aperostoma fischeri* (Hidalgo).

(Pl. x, fig. 3.)

- Cyclostoma cumingii*, Sby.?: Jay, Cat. Shells, 1839, p. 122, pl. vii, figs. 4, 5.
Cyclostoma giganteum, Sby.: Thes. Conch., vol. i, p. 92, pl. xxiii, figs. 8, 9. [1843: figures, and included in text.]
Cyclotus giganteus, Sby.: Reeve, Conch. Icon. [1863], pl. i, fig. 3.
Cyclotus fischeri, Hidalgo: Journ. Conchyl., 1867, tom. xv, p. 305, pl. viii, fig. 3.
Cyclotus giganteus, Gray: Hidalgo, Viaje. Pacif., Moll., p. 144, pl. viii, figs. 9—11. [*fischeri* as synonym.]
 ? *Aperostoma giganteum*, Gray: Mousson, Malak. Blätt., 1869, Bd. xvi, p. 179.
 ? „ „ Gray: Mousson, Op. cit., 1873, Bd. xxi, p. 17.

* See ante p. 59.

Cyclotus giganteus, Gray, var. *fischeri*, Hidalgo: Miller, Malak. Blätt, 1879, N.F., Bd. i, p. 140.

III. *Aperostoma confusum*, n. sp.

(Pl. x, fig. 2.)

Cyclostoma giganteum, Gray: Pfeiffer, Conch. Cab., Cyclostomacea [1846], p. ii, pl. i, figs. 11-14.

The first reference I can trace is that of Reeve (Conch. Syst.) which appears to have really appeared in 1842, and he refers to "Gray MS. in Mus. Brit.," figuring a specimen which I have, I believe, succeeded in tracing (so-labelled), and which belongs to the large depressed form (I). Reeve gives no diagnosis and does not refer to Sowerby's paper in the Proceedings of the Zoological Society, 1843, though it may possibly be that they are nearly of the same date. One reference, to "Sowerby, Sp. Conchyl., f. 9, 10," I have entirely failed in tracing: so far as I know only one portion of the "Species Conchyliorum" appeared, and this did not relate in any way to land operculates. Included in my copy of the "Malacological and Conchological Magazine" there appear, in both parts (1838 and 1839), advertisements stating that the author "is actively engaged in completing the second and third parts of the Species Conchyliorum, of which all the plates are engraved, some are printed off and coloured; and all the manuscript is ready, a part of that also being printed off." It may well be that proof copies were distributed and that from one of these Reeve was quoting, and that these plates were used in the early parts of the "Thesaurus." From a copy of one of the covers of the "Thesaurus," preserved in the British Museum, I find that in 1845, only one part of the "Species Conchyliorum" was advertised for sale.

In 1843 Sowerby gave a latin diagnosis, but no figure, and his description is somewhat vague, but one or two points may be gleaned. Firstly, the habitat is Panama, which agrees with that of the shell I now identify. Secondly, the shell has a "*cornea, fulca*" periostracum, and he makes no mention of any darker coloured bands; further, though no size is given, the very name implies that it is about the largest species he knew; also the shell is "*orbiculato-subdepressa*" and the apex is "*rufescente*." One point of difficulty in referring this to Form I is that he describes the operculum, and this I am unacquainted with in that form. The colour does not tally with Form II, and Form III would not be well characterised as "*orbiculato-subdepressa*." I think therefore that the diagnosis refers to Form I. When however we come to the "Thesaurus" we find that the figure is darkly banded and resembles Form II, while the latin letterpress

relates to Form I, and the English apparently to both. Probably he considered both to be varieties of one species. The references by Gray in 1850 and 1852 relate, no doubt, to Form I.

In 1846 Form III first appears on the scene, being figured by Pfeiffer, and he notes that the form figured in the "Thesaurus" (Form II) is larger and more depressed. The shell figured by Reeve in 1863 as a *Cyclotus* is, I feel sure, Form II; he gives a fresh diagnosis and suggests that "this fine species should be regarded as the type of the genus."

In 1867 Hidalgo described *Cyclotus fischeri*, which later on he sank as a synonym of *giganteus*.

Later authors throw but little light on the difficulty, and I therefore suggest the following as the best course.

That the name *giganteum* be used for the large depressed form, which has no dark colour bands. I have seen several specimens, which are constant, and it comes from Panama (coll. Boucard), the original locality given. That the name *fischeri* be used for the smaller, not so depressed form, with corrugated sculpture on the upper surface and darker bands of colouring; this comes from Ecuador (Hidalgo, etc.); Isle of Tumaco (Jay). Very possibly the shells referred to *C. giganteus* by Bland (Contrib. Conch., p. 228), and collected in "New Granada," belong here, as he refers to Sowerby's figure in the "Thesaurus."

I propose the name *confusum* for the well elevated shell, with a strong sinuation at the top of the outer lip, and the same general colouring as *giganteum*. This is the shell which Prof. von Martens refers to when he states (Biol. Centrali-Amer., Mollusca, p. 598) "This species [*giganteum*] is mentioned by Boucard among the shells from Vera Paz (N. Guatemala) . . . , probably an error in determination, as *C. giganteus* has not been recorded by anyone else from so far north as Guatemala." I have specimens from Mons. Boucard.

A few remarks in conclusion as to the generic name to be used for these shells.

Aperostoma was proposed by Troschel (Zeitschr. f. Malak., 1847, p. 44) for "*volvulus*, Lam., *mexicanum*, Mke., *blanchetianum*, Moric, und viele andere." Later on in the same volume (pp. 47, 104) Pfeiffer removed *volvulus* to *Cyclophorus* and left, with a number of other species, both *mexicanum* and *blanchetianum* in *Apero-toma*, adopting the generic name. In 1852 Mörch (Cat. Yoldi, pp. 39, 40) placing *Aperostoma* as a synonym of *Cyclotus*—which was proposed for very different shells—left *blanchetianum* (= *inca*) there, and proposed *Cyrtotoma* for *mexicanum*. In 1855 the brothers Adams in their "Genera"

placed *Aperostoma* as a subgenus of *Cyclotus* for many species including *inea* and adopt *Cyrtotoma*.

To complete the history of *Cyrtotoma*, I may remark that Martens in 1865 formed a new species from some of the shells previously placed under *Cyrt. mexicanum*, and later on Crosse and Fischer proposed *Habropoma* for *C. mexicanum* (*sensu stricto*). The two forms are by no means easy to separate specifically and I think that they are identical generically, and that therefore *Habropoma* is unnecessary.

Returning to *Aperostoma*, we find Crosse and Fischer (Moll. Mexique, Tom. ii, p. 149) stated that the genus was "incertain et mal fixé," and they proposed *Neocyclotus*, which, if we regard *blanchetianum* (= *inea*) as the type of *Aperostoma*, appears to be unnecessary. Acting on the principle that it is wise to save these old generic names where possible, I propose to retain it and to place *Neocyclotus* in the synonymy.

Such criticism as Crosse and Fischer applied to *Aperostoma* might equally be applied to all the Linnean genera which included species now scattered over other groups: some day, even, it might be utilised in considering *Neocyclotus*, in case that group be further subdivided.

Dr. von Martens (Biol. Centrali-Amer., p. 3) placed *Aperostoma*—regarding *Neocyclotus* as a synonym—as a section of *Cyclotus*: it appears, however, to be quite distinct from that genus.

10. Note on *Voluta beauui*, Fisch. and Bernardi.

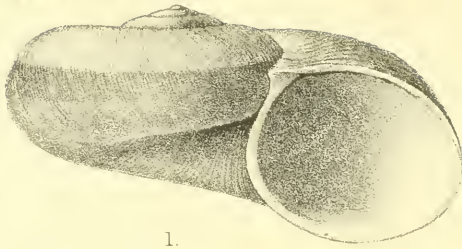
(Pl. x, fig. 5.)

This handsome species was described¹ from Marie Galante. The authors state that only two specimens were known, and it still remains scarce in collections. A slightly smaller specimen has been figured by Sowerby.²

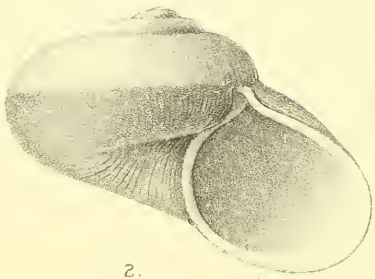
Having recently come into possession of a fine specimen, slightly larger than the original dimensions given, I take this opportunity of figuring it (Pl. x, fig. 5). It is slightly more attenuate than that figured in the "Journal," and the outer lip is not so much "shouldered" above, neither is it so effuse at the base. The ground-colour is also more flesh-coloured. The longitudinal ribs appear to be more obsolete than in either of the figures, and not so closely set as in the shell figured by Mr. Sowerby. Further there are, just inside the outer lip, a number of rather obsolete denticles. The protoconch appears to be of the usual form found in the *Lyrina*-group.

1. Journ. de Conchyl., 1836 [Janv. 1837], Tom v, p. 296. Reference to plate should be ix not x.

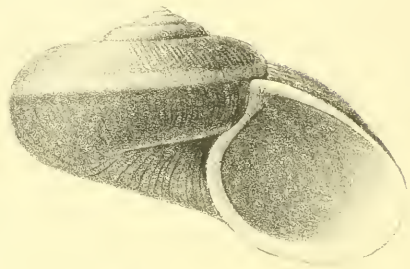
2. Thes. Conch., vol. v, pl. lxxvi, fig. 161.



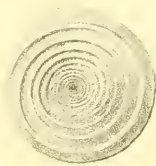
1.



2.



3.

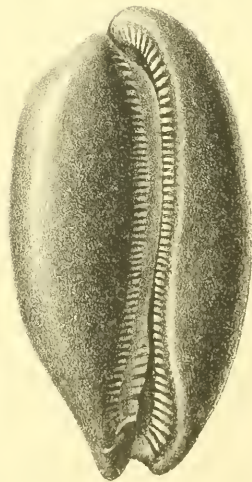


4.



5.

6.



From a cat. 10.

A. S. Huth, imp.

11. Note on *Cypraea talpa* and *C. exusta*.

(Pl. x, figs. 4, 6.)

Cypraea talpa was described by Linnaeus,³ and it is stated by Hanley⁴ that "the *Cypraea talpa* of authors is marked for this species in the Linnean Cabinet." *Cypraea exusta* made its first appearance as a variety of *C. talpa* in a list by Gray, but was duly described and figured by Sowerby in the "Conchological Illustrations." All the monographers since then appear to have regarded the two as closely allied, but distinct species.⁵ The distinction drawn may, I think, be summarised as follows: that in *C. exusta* the form is more rounded, being swollen in the middle and pinched at the ends, one extremity of the lip is more produced, and the teeth are much finer and more closely set, being also more eroded and not so produced within, and the colour of the shell is slightly darker.

In the shell I now figure (Pl. x, figs. 4, 6), the form and colour appear to be those of *C. talpa*, and the teeth to be those of *C. exusta*; indeed the shell seems to be in many respects a "missing link," and I would suggest that in all probability the true place of *C. exusta* is that which was originally given to it as a variety of *C. talpa*.

12. The value of *Murdochia*, Ancey.

In a recent paper by Mons. Ancey,⁶ when dealing with the fauna of New Zealand, he states "Les *Lagochilus* de très-petite taille, qui ont été rapportés à ce genre Indo-malais, ont un aspect particulier et doivent, à mon sens, constituer une section distincte, sinon un genre tout à fait différent. Je lui ai appliqué dans ma collection le nom de *Murdochia*." This seems a somewhat unsatisfactory method of proposing a new section, but no doubt the name must be reckoned with, and I would only point out that it seems to be an absolute synonym of *Cyrtora*, Kob. and Müllff.⁷

EXPLANATION OF PLATE X.

- Fig. 1. *Aperostoma giganteum* (Rve.).
 Fig. 2. *Aperostoma confusum*, n. sp.
 Fig. 3. *Aperostoma fischeri* (Hidalgo).
 Figs. 4, 6. *Cypraea talpa*, L., var.
 Fig. 5. *Voluta beaulti*, Fisch. and Bern.

3. Syst. Nat., ed. x, p. 720.

4. Ipsa Linn. Conch., p. 183.

5. See Kiener, Coq. Viv., *Cypraea*, pp. 79-81; Reeve, Conch. Icon., vol. viii, *Cypraea*, sp. 4 and 5; Sowerby, Thes. Conch., vol. iv, *Cypraea*, p. 6; Roberts in Tryon's Manual, vol. vii, p. 167; Melvill, Mem. Manchester Soc., ser. 4, vol. 1, p. 250.

6. Journ. de Conchyl., 1901, vol. xlix, p. 24.

7. Nachrbl. Deutsch. Malak. Gesell., 1897, p. 85.

ON TWO NEW AND THREE HITHERTO UNFIGURED SPECIES OF PLECTOPYLIS FROM TONKIN.

By G. K. GUDE, F.Z.S.

THE shells which form the subject of these notes were collected by Mr. Fruhstorfer. Three new species were established on them by Dr. von Möllendorff in the *Nachrichtsblatt der Deutschen Malakozologischen Gesellschaft* in 1901. A fourth species described at the same time, proved to be identical with one collected by Col. Messager and placed in my hands for examination. This species *Plectopylis emigrans*, Möllendorff, I have recently figured.¹ Dr. von Möllendorff obligingly lent me the types of his four species for comparison and illustration. Together with these was a form which he thought would prove to be *P. phillyaria*, Mab., but I have since received from Mr. Fruhstorfer a series of the true *P. phillyaria*, and upon comparison it is clear that Dr. von Möllendorff's shells pertain to a different and hitherto undescribed species.

Plectopylis pilsbryana, n. sp.

P. villetaryi, Pilsbry and Gude (*non* Ancey): Pilsbry, *Manual of Conch.*, 1893, viii, p. 157, pl. 43, figs. 36—39.—Gude, *Science Gossip*, 1897, N.S. iv, p. 139, figs. 60a, 60b. *Journ. of Malac.*, 1901, viii, p. 48, figs. 3a, 3b. *Journ. de Conchyl.*, 1901, xlix, p. 212.

Hab.—Lang-Son, Bac-Ninh (Vathelet). Isles in Along Bay (Messager). Tonkin (Fruhstorfer).

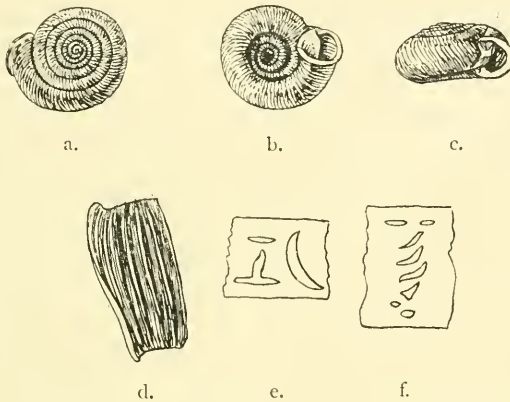
The shell which I have hitherto considered to be *P. villetaryi* (following Mr. Pilsbry's identification), has now been examined by Mr. Ancey who informs me it is not his species but a new form. It thus requires to be renamed, and I have pleasure in dedicating it to Mr. Pilsbry, who has done so much to place systematic malacology on a scientific basis.

1. *Journ. de Conchyl.*, 1901, vol. xlix, pl. 6, figs. 5a—5c.

Plectopylis (Endoplion) hirsuta, Mlldff. Figs. 1a—1f.

Plectopylis (Endoplion) hirsuta, Mlldff. : Nachrbl. Deutsch. Malak. Gesell., 1901, p. 115.

Shell dextral, discoid, deeply and widely umbilicated, dark corneous, finely striated, decussated with rather indistinct, minute, spiral striae, under a deciduous silky cuticle which is raised into close imbricating lamellae, parallel with the lines of growth. Apex obtuse, suture impressed. Whorls 7, a little convex above and at the side, obtusely angulated above the periphery and round the umbilicus, increasing slowly and regularly; the last a trifle dilated towards the mouth, shortly descending in front. Aperture oblique, auriculate. Peristome fuscous, thickened, and shortly reflected, the margins united by a



Figs. 1a—1f.—*Plectopylis (Endoplion) hirsuta*, Mlldff.

strong raised flexuous ridge, which gives off a longish entering, slightly ascending fold on the parietal wall. Parietal armature composed of two transverse plates, the posterior strongly raised, crescent-shaped, the lower extremity deflexed posteriorly; the anterior one shorter, flexuous, giving off a strong ridge on each side at the lower extremity and with a short, strong, free, horizontal fold above it. Palatal armature composed of five folds: the first horizontal, short but strong, with a slight denticle anteriorly in a line with it; the second longer, almost horizontal, the posterior extremity slightly descending; the third longer than the preceding, obliquely descending posteriorly; the fourth still longer, also obliquely descending posteriorly; the fifth smaller, obliquely descending posteriorly, its lower extremity bifurcated, the upper arm horizontal; below the lower arm occurs a slight elongated denticle

and below that, but more anteriorly, another stronger elongated denticle.

Major diam. 16.5, minor 14.5; alt. 8 millim.

Hab.—Island Bah-Mung.

The shell figured is Dr. von Möllendorff's type specimen.

P. hirsuta, in outward appearance resembles *P. villedaryi*, but is a trifle smaller, and differs in the umbilicus, which is not so much excavated and not carinated as in that species. The parietal fold at the aperture in *P. villedaryi* is shorter, more raised, and more oblique. The principal difference, however, is in the parietal armature, as a comparison of the figures will show. In this character *P. hirsuta* is more allied to *P. barayi*, the posterior parietal plate of the latter, however, gives off at the upper extremity a short ridge which is wanting in *P. hirsuta*, and the anterior parietal fold in *P. barayi* is straight, oblique, and considerably stronger and longer. In the palatal armature these two species are also closely allied, but in the present species the fifth fold has the lower extremity bifurcated, a feature not found in its ally, while the sixth fold of *P. barayi* is in *P. hirsuta* reduced to a strong denticle. Figs. 1a—1c give three different views of the entire shell, fig. 1d shows part of the exterior behind the peristome, enlarged. In fig. 1e the parietal, and in fig. 1f the palatal armature is shown diagrammatically.

Plectopylis (Sinicola) fruhstorferi, Mlldff. Figs. 2a—2c.

Plectopylis (Sinicola) fruhstorferi, Mlldff.: Tom. cit. p. 114.

Shell dextral, discoid, widely umbilicated, thin, fragile, dark corneous, dull, finely striated. Spire flattened, apex obtuse, suture slightly impressed. Whorls 6, rounded, increasing slowly, the last a little dilated towards the mouth, scarcely descending in front. Aperture oblique, subrotundate. Peristome fuscous, slightly thickened and shortly reflected; margins approaching, united by a very slight flexuous ridge on the parietal callus, with a slight oblique free entering fold. Umbilicus wide, rather shallow. Parietal armature composed of a strong oblique crescent-shaped plate with two short, free, horizontal folds in front. Palatal armature composed of: first, two short elongated denticles in a line near the suture; next, four short, oblique, slightly curved folds, attenuated and slightly notched posteriorly; and finally near the lower suture a short horizontal fold with a slight denticle above its posterior extremity.

Major diam. 12.5, minor 11; alt. 5 millim.

Hab.—Kebao.

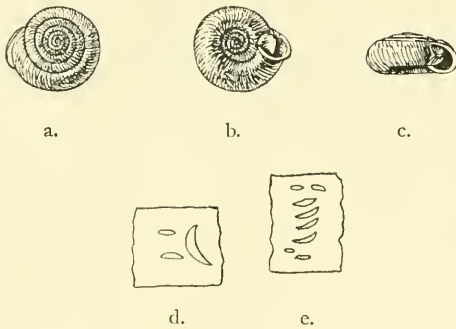


Fig. 2a.—2e.—*Plectopylis (Sinicola) fruhstorferi*, Mildff.

P. fruhstorferi is allied to *P. tenuis*, but the latter is thinner and more shining, and has a white peristome. More important differences are found in the parietal armature, which in *P. tenuis* consists of two vertical plates with a horizontal fold above and below the anterior plate, while *P. fruhstorferi* has only the two free horizontal folds in front of the crescent-shaped plate. In the palatal armature there are also important differences, the second fold in *P. tenuis* being much longer than the others and attenuated anteriorly, while in *P. fruhstorferi* it is short like the next three folds; in *P. tenuis* these folds are much more elevated and more oblique and the denticle above the sixth fold of *P. fruhstorferi* is absent in *P. tenuis*.

The specimen figured is Dr. von Möllendorff's type. A shell in my collection measures major diam. 12.5, minor 10.5; alt. 5 millim., and is a little paler than the type.

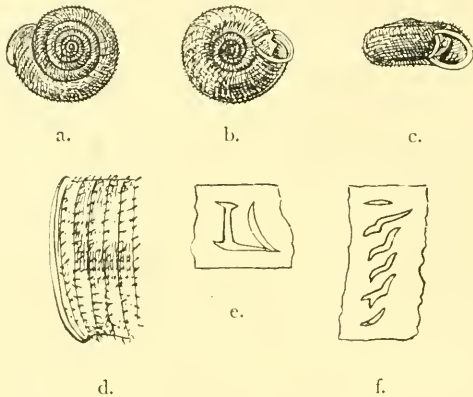
Figs. 2a—2c show the shell in three different positions, while fig. 2d illustrates the parietal, and fig. 2e the palatal armature.

***Plectopylis (Endoplon) phlyaria*, Mab. Figs. 3a—3f.**

Helix (Plectopylis) phlyaria, Mab.: Bull. Soc. Mal. France, 1887, iv, p. 100, pl. 2, figs. 1—3.

Shell dextral, discoid, widely umbilicated, thin, subpellucid, pale corneous, finely striated and provided with numerous raised spiral ridges, under a deciduous cuticle, which is produced into short rather stiff bristles, regularly disposed on the spiral ridges and the transverse striae. Spire flattened, apex mucronate, suture impressed. Whorls 7, rounded, slightly angular round the wide but rather shallow umbilicus; increasing slowly and regularly, the last twice as wide as the penultimate, a little dilated towards the mouth, deeply and abruptly descending in front. Aperture oblique, obcordate. Peristome white,

a little thickened and shortly reflected, margins approaching, united by a thin raised flexuous ridge on the parietal callus, which gives off a thin, short, slightly ascending fold. Parietal armature composed of two transverse plates, the posterior crescent-shaped, deflected posteriorly below, thinner and slighter than the anterior one, which is vertical and gives off at the upper extremity a strong support anteriorly and a slight ridge posteriorly; at the lower extremity occurs a short support anteriorly, and a long fold posteriorly reaching to the lower extremity of the posterior plate. Palatal armature composed of six folds: the first slight, thin, horizontal; the second oblique, its anterior extremity attenuated, its posterior extremity clavate, a little reflected upwards: the third and fourth subvertical, their posterior extremities attenuated and obliquely deflected; the fifth also subvertical, the



Figs. 3a—3f.—*Plectopylis (Endoplon) phlyaria*, Mab.

posterior extremity obliquely deflected, bifurcate; the sixth oblique, sinuous, thin and shorter than the preceding four.

Major diam. 15, minor 13; alt. 6.5 millim.

Hab.—Than-Moi.

A long lost shell, apparently not found since it was described by Mr. Mabille. It was not amongst the shells collected by Col. Messenger. The armature was not hitherto known and I am pleased to have this opportunity of examining and figuring these important structures.

Among the specimens with which Mr. Fruhstorfer has favoured me are a number of immature shells. One of these has only $3\frac{1}{4}$ whorls completed, but both armatures are already formed; the anterior parietal plate is distinctly notched at the upper and lower extremity, at the junctions with the horizontal folds; the palatal folds are very

short. One third of a whorl behind this set of barriers, occurs the remains of an earlier set: the parietal barriers have been completely absorbed, but the palatal folds are still left, although the upper ones are already in course of disintegration. At this stage the bristles do not appear to have been produced, several specimens, although quite fresh, being void of these cuticular processes. A shell with only three whorls has also two sets of armatures; of the earlier the parietal folds are still intact, while of the palatal folds the first and second have almost disappeared, and the remaining ones are very slight.

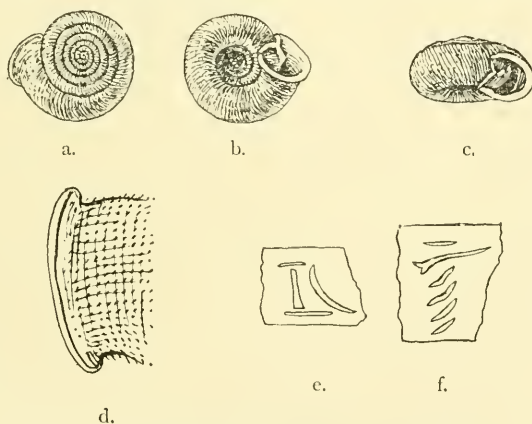
The shell figured is in my collection.

Figs. 3a—3c show the shell in three different positions, fig. 3d the exterior of the wall behind the peristome magnified, fig. 3e illustrates the parietal, and fig. 3f the palatal armature in situ.

Mr. Mabille has obligingly compared my shell with the type in the Muséum d'Histoire Naturelle in Paris, and he informs me that it is the true *P. phillyria*.

Plectopylis (Endoplon) moellendorffi, n. sp. Figs. 4a—4f.

Shell dextral, discoid, deeply umbilicated, whitish corneous, rather thin, the earlier whorls finely ribbed, the later ones finely striated, the cuticle produced into raised lamellae and decussated with close set,



Figs. 4a—4f.—*Plectopylis (Endoplon) moellendorffi*, n. sp.

raised, spiral ridges provided with short bristles. Spire depressed, apex raised, suture linear. Whorls $7\frac{1}{2}$, a little flattened above, rounded at the side and below, increasing slowly and regularly; the last twice as wide as the penultimate, a little dilated towards the mouth and slightly constricted behind the peristome, a little descending in front.

Aperture oblique obcordate. Peristome white, slightly thickened and reflected; the margins subparallel, united by a thin raised flexuous ridge on the parietal wall, giving off a strong curved entering fold. Parietal armature composed of two transverse plates, the posterior crescent-shaped, deflected posteriorly below, a little thinner but longer than the anterior, which is vertical, truncate above and triangularly dilated below: above its upper extremity occurs a short, free, horizontal fold and below the inferior extremity a longer, free, horizontal fold reaching close to the posterior plate. Palatal folds similar to those of *P. phlyaria*, but the second is more attenuated and elongated anteriorly, and bifurcated posteriorly; the third, fourth, and fifth folds are less curved and more elongated, while the fifth is not bifurcated posteriorly.

Major diam. 16·75, minor 14; alt. 8 millim.

Hab.—Than-Moi.

The present species is nearly allied to *P. phlyaria*, but the shell is larger and less depressed, the umbilicus deeper and more constricted, the spiral ridges closer together and consequently more numerous, and in addition it possesses half a whorl more. In the parietal armature *P. moellendorffi* differs from its ally in having the horizontal folds above and below the anterior plate quite free. The differences in the palatal armature are indicated in the diagnosis.

The type, here figured, is in the collection of Dr. von Möllendorff. Figs. 4a—4c give three different views of the shell, fig. 4d the exterior wall behind the peristome, while the parietal armature is shown in fig. 4e, and the palatal armature in fig. 4f.

Plectopylis (Endoplou) villedaryi, Ancy. Figs. 5a—5e.

Plectopylis villedaryi, Ancy: Le Naturaliste, 1888, p. 71, fig. 2.

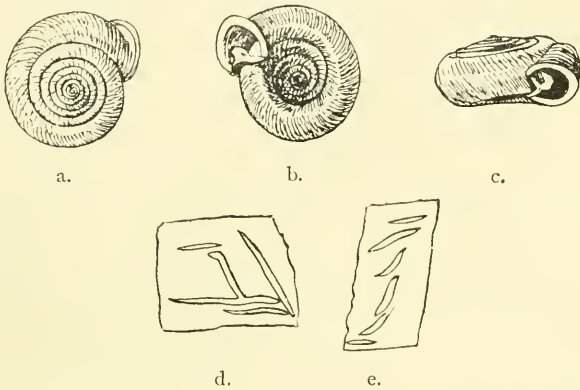
Plectopylis (Endoplou) choanomphala, Mildff.: Tom. cit., p. 75.

Shell dextral, discoid, solid, deeply widely umbilicated, whitish-corneous, finely striated and decussated with microscopic spiral lines. Spire flattened, apex mucronate, suture impressed. Whorls 8, a little rounded above, compressed at the sides, obsoletely angular at the periphery, angulated above and keeled around the wide perspective umbilicus; increasing slowly and regularly, the last twice as round as the penultimate, deeply and abruptly descending in front. Aperture oblique, auriculate. Peristome strongly thickened and reflected; margins united by a strongly raised flexuous ridge, which gives off a short oblique entering fold on the parietal wall. Parietal armature composed of two strong oblique plates, the upper extremities inclined towards the mouth the posterior longest; the anterior has the upper

extremity clavate, the lower extremity joined to a long horizontal flexuous fold, whose posterior termination touches the posterior plate; below this occurs a shorter flexuous horizontal fold, the posterior termination of which, also touches the posterior plate; above the anterior plate occurs a short, free, horizontal fold. Palatal armature composed of six folds: the first short, thin, and horizontal; the second longer, obliquely descending posteriorly; the third and fourth subvertical, slightly deflected posteriorly below; the fifth curved, obliquely descending backwards; the sixth short and slight, horizontal, placed below the posterior extremity of the preceding.

Major diam. 19·5, minor 16·5: alt. 9 millim.

Hab.—Than-Moi.



Figs. 5a—5e.—*Plectopylis (Endoplon) villedaryi*, Ancy.

P. villedaryi resembles *P. schlumbergeri*, both above and below, but it is smaller, and the strongly raised flexuous ridge at the aperture recalls *P. pilsbryana*. In the parietal armature the present shell has affinity with *P. Jautzenbergi*, but differs from it in the anterior plate being oblique instead of horizontal, and in the upper horizontal fold being free, and, below, it has in addition a second free horizontal fold.

The shell figured is the type of *P. choanomphala* in the collection of Dr. von Möllendorff.

Figs. 5a—5c show three different aspects of the shell, the parietal armature is shown in fig. 5d, and the palatal folds in fig. 5e.

Mr. Ancy has been kind enough to forward the type of *P. villedaryi* for comparison. Upon examination it proves to be identical with *P. choanomphala*, Mildff., which name therefore must be consigned to the synonymy of *P. villedaryi*.

DESCRIPTION OF SOME NEW SPECIES OF SLUGS
COLLECTED BY MR. H. FRUHSTORFER.

By WALTER E. COLLINGE.

I HAVE recently received from Mr. H. Fruhstorfer of Berlin an interesting collection of slugs made by him in Japan, Tonkin, and Annam, and as it will be some time before I can complete the descriptions and figures of their internal anatomy, at his request I am now describing the new species. A detailed account of the anatomy together with coloured figures of the animals is in active preparation.

MYOTESTA, n. gen.

Animal slug-like, with the mantle conspicuously elevated into a non-spiral visceral hump, and completely enclosing a flat, non-spiral, plate-like shell. Dorsum posteriorly sharply keeled. Respiratory orifice in front of the middle of right margin of mantle. Generative orifice below and immediately behind the right upper tentacle. The foot-fringe is continued posteriorly to form the overhanging caudal lobe. Caudal mucous pore. Foot-sole narrow, divided into median and lateral planes. Viscera elevated into a non-spiral dorsal hump, and posteriorly lying in a triangular depression of the dorsum. Body-cavity not extending into the tail-portion, which is solid.

Jaw crescentic, with 10 broad ribs, slightly denticulating the basal margin.

Generative system with well developed penis, passing into an epiphallus. Receptacular duct long. No dart-gland or dart-sac.

Myotesta fruhstorferi, n. sp.

Animal yellowish-brown, with blue mottling; head and tentacles blue; mantle, ground colour same as the body with faint, net-like, brown markings. Caudal mucous pore small. Peripodial groove very distinct. Foot-fringe deep yellow, with broad irregular dark lineoles. Foot-sole dirty yellow.

Length (in alcohol) 39 millim, breadth of foot-sole 3 millim.

Hab.—Mt. Maussion, 2—3000 ft, Tonkin (H. Fruhstorfer).

Type in my collection.

Myotesta punctata, n. sp.

Animal a deep brown with a few yellowish, somewhat stellate spots; head and tentacles dark blue; mantle brown, spotted with yellow. Peripodial groove ill defined. Foot-fringe yellowish-brown with closely set lineoles. Foot-sole, lateral planes brownish with yellow maculations, median plane dirty brown and smooth.

Length (in alcohol) 3.4 millim., breadth of foot sole 4 millim.

Hab.—Mt. Maussion, 2—3000 ft., Tonkin (H. Fruhstorfer).

Type in my collection.

PHILOMYCUS, Raf.**Philomycus fruhstorferi**, n. sp.

Animal yellowish-brown with broad black irregular lateral bands, and irregular median dorsal band, cloudy blackish mottling over the whole of the mantle, colour subject to some variation. Peripodial groove distinct. Foot-fringe dark brown and yellowish, with closely set, dark lineoles. Foot-sole yellowish brown, divided into median and lateral planes, median plane papillated, lateral planes transversely striated.

Shell, when present, a very small, thin, calcareous disc at the extreme anterior border of the greatly extended shell-sac.

Jaw smooth, laterally produced into a large tooth.

Length (in alcohol) 7.5 millim., breadth of foot-sole 9 millim.

Hab.—Nagasaki, Japan (H. Fruhstorfer). *Type* in my collection.

A very variable species, so far as external colouring goes. I have examined a large series of specimens, amongst which the following variety seems fairly common.

P. fruhstorferi var. **punctatus**, n. v.

Ground colour lighter and lateral bands fainter than in the type, median portion of the dorsum without band, but spotted with irregular blackish markings.

Hab.—Tsushima, Japan (H. Fruhstorfer). *Type* in my collection.

It is of interest to note that, so far, in one specimen a very small shell was found.

Philomycus dendriticus, n. sp.

Animal yellowish, with three dark brown, irregular branching bands. Peripodial groove distinct. Foot-fringe yellowish-brown, with few, faint, imperfect lineoles. Foot-sole yellow, not divided into median and lateral planes.

Length (in alcohol) 43 millim., breadth of foot-sole 5·5 millim. Jaw arcuate, with numerous ribs.

Hab.—Mt. Maussion, 2—3000 ft., Tonkin (H. Fruhstorfer). *Type* in my collection.

MICROPARMARION, Simr.

Microparmarion bruneopalleseens, n. sp.

Animal anteriorly and posteriorly light brown, medio-lateral portions pale yellow, posteriorly there is a latero-dorsal brown band running from the visceral mass to the overhanging caudal lobe, while ventrally are brown blotches and spots, behind the head the dorsum is blue flanked on each side by a broad dark blue band; head and tentacles yellowish; mantle, light brown with irregular darker brown blotches, surrounding the shell on all sides. Keel prominent. Caudal mucous pore small and hidden by the overhanging caudal lobe. Peripodial groove distinct. Foot-fringe light brown, with short, dark brown lineoles. Foot-sole not divided into median and lateral planes.

Length (in alcohol) 28·5 millim.

Hab.—Annam (H. Fruhstorfer). *Type* in my collection.

Microparmarion annamica, n. nom.

Microparmarion andamanica, Collge.: Journ. of Malac., 1891, vol. viii, p. 17, pl. i, figs. 7—10.

When this species was described I was under the impression that it came from the Andaman Isles, later, however, I found that it was collected in the Mekong Valley, Annam (Journ. of Malac., 1891, p. 52).

It has been pointed out to me that bearing a geographical name, it is very likely to lead to error, I therefore propose the name *annamica* for it.

VERONICELLA, Blain.

Veronicella fruhstorferi, n. sp.

Ground colour a greenish-brown, finely granulated; perinotum, hyponotum, and foot-sole ochreous. Foot-sole marked by a series of fine, regular, transverse lines.

Length (in alcohol) 39, breadth 13 millim.; foot-sole 4; hyponotum 5 millim. broad. Female generative orifice situated on the right side 2·5 millim. from the foot-sole, 20 from the right lower tentacle, and 17 from the posterior end of the body.

Hab.—Mt. Maussion, 2—3000 ft., Tonkin (H. Fruhstorfer). *Type* in my collection.

Veronicella himerta, n. sp.

Ground colour ochreous, with fine and closely-set black reticulations; perinotum light brown; hyponotum drab colour, with small, irregular, black markings; foot-sole yellow, with exceedingly fine, transverse lines.

Length (in alcohol) 51, breadth 20 millim.; foot-sole 3; hyponotum 9 millim. broad. Female generative orifice situated on the right side 2.5 millim. from the foot-sole, 22.5 from the right lower tentacle, and 25 from the posterior end of the body.

Hab.—Mt. Maussion, 2—3000 feet, Tonkin (H. Fruhstorfer). *Type* in my collection.

NOTES ON TWO CALIFORNIAN NUDIBRANCHS.

By T. D. A. COCKERELL.

Coryphella iodina (Cooper).

Aeolis iolinea, Cooper, Proc. Cal. Ac. Sci., 1862.

THIS beautiful animal is found on the mud-flats at San Pedro, Cal., in some numbers. By some misfortune, I did not succeed in finding any myself, but Mrs. Bancroft gave me one which she obtained at Dead Man's Island, San Pedro, July 19. This example was 32 millim. long, the body brilliant purple (this colour is changed to bright crimson by caustic potash); the branchial papillae pale salmon colour, very numerous, the separate tufts not obvious. Genital orifice on the right side about 7 millim. from anterior end (dead specimen). True tentacles deep salmon red, purple only at base: oral and foot-tentacles purple, oral tentacles with the apical half (at least) white.

By its striking and peculiar colours, this is clearly the Californian representative of the European *C. landsburgii*. However, *landsburgii* is a smaller animal, with the papillae in obvious tufts; the dorsal tentacles are coloured like the oral, and about the apical fourth is white.

Cooper says nothing about the dentition. The teeth are in about 19 rows, three in a row, as usual in *Coryphella*. The median teeth have a large central denticle, and 11 to 14 denticles on each side. Lateral teeth with small slender denticles (19 to 21) crowded on the lower two-thirds of inner face.

This differs from *landsburgii* by the broader median denticles and much more numerous lateral denticles, of median tooth; also the much more numerous denticles, and much longer outer basal process, of lateral teeth.

Hermisenda opalescens (Cooper).

Aeolis opalescens, Cooper, Proc. Cal. Ac. Sci., 1862.

Hermisenda is virtually a *Facelina* with simple tentacles. This delicately tinted animal is common at San Pedro, Cal., and my wife found one at La Jolla. At San Pedro it abounds on the mud-flats, growing to a length of about 42 millim., there are two opal-blue lines extending along the back, diverging at two or more points (*e. g.* on the head, just behind it, and at the middle of the back) to admit a bright orange streak; otherwise close together, practically forming one blue stripe. There is a broad orange stripe on each side of the head, passing backwards from the oral tentacles. Oral tentacles a beautiful opalescent blue. Papillae easily deciduous, their central part from dark brown to very pale brown, the latter colour more common; their ends white, with an orange subterminal ring.

These characters are recorded, because Cooper's description does not do them justice.

My wife found a variety at San Pedro, in a kelp root washed up by the sea. This form, from below the tides, is coloured much like the kelp; the branchial papillae are brownish-orange, broadly tipped with white, without the orange subterminal ring. When first found, the animal had hardly any of the opalescent blue colour, but after a time it became as blue as those from the mud-flats.

The teeth are in a single row; a long lanceolate middle denticle, and about four pointed denticles on each side, the lowest very small. All this is very similar to *Facelina elegans*, A. and H., but (a) the median denticle extends far beyond the lateral ones, in *elegans* it extends only a little beyond; (b.) the lateral denticles are only three or four, in *elegans* they are six.

OBITUARY.

MARTIN F. WOODWARD.

Born November 5, 1865, Died September 15, 1901.

By the sad accident which caused the death of Mr. Martin F. Woodward on September 15th, malacology and science in general have to mourn the loss of a brilliant and devoted investigator.

The deceased was the younger son of Dr. Henry Woodward, F.R.S., and was born in London on November 5th, 1865, and educated at the Kensington Grammar School. In 1883 he entered the Royal College of Science, and after a brilliant career he was appointed by Huxley as assistant and, later, demonstrator of Zoology.

Of his general work in zoology or his gifts as a teacher, it is not our intention to speak, others more competent to judge have already testified to his care, patience, and enthusiasm for all pertaining to zoology.

Comparatively speaking it is only recently that Mr. Woodward turned his attention to the study of the Mollusca, but in the short time of seven or eight years, amid multifarious duties, he gave to science a series of papers on the anatomy of the Prosobranchia, which undoubtedly gave him the position of the leading living investigator on this particular order, in this country, and forshadowed a brilliant and distinguished career. Most of these papers were published in the Proceedings of the Malacological Society of London, of which Society he had been Secretary since February, 1898.

His work is characterised by force and clearness of exposition, a wonderful grasp of the particular order in which he was interested, a critical capacity of exceptional order and a ready acknowledgment of the work of others.

Ever ready to advise and help others, his decease leaves a gap in the ranks of British zoologists which will long remain.

W.E.C.

NOTES.

Physa heterostropha, Say, in South Staffordshire.—In 1899 Mr. J. Madison recorded this species as having been taken by him in July 1898, in a pool at the west side of Birmingham (Journ. of Conchy., vol. 9, p. 152). I am now able to add a further locality for this interesting species, viz. a mill pool near Wednesbury, South Staffordshire. I am of opinion that it has been here for some length of time, as it is well established and almost as abundant as its companion *Limnaea pereger*. I may mention that the pool is supplied by the River Tame, which probably accounts for its presence here.—J. LINTON.

Amalia gagates, Drp., at Sutton Coldfield.—Although this district has been well worked during the past few years, no previous record exists of the occurrence of *Amalia gagates*, Drp. It may therefore be of interest to note that I have recently collected this species on two separate occasions. The identification has been verified by Mr. Walter E. Collinge.—H. OVERTON.

Limax maximus, L., at Los Angeles, California.—When at Los Angeles last summer, I had some very enjoyable visits at the house of Dr. R. E. C. Stearns. On one of these occasions he took me out to see the *Limax maximus* in his garden, and kindly gave me several specimens. The purpose of this note is to record their variation, which is always of interest. Two forms were found, as follows:

(1.) Mantle dark grey; its anterior and lateral margins pale, spotted with black. Body above dark grey with three light bands, which are more or less edged with black spots or interrupted stripes. Sides pale, mottled with grey.

(2.) Mantle grey with a few black spots. Body dark grey with obscure black spots, and a pale dorsal stripe on posterior two-thirds.—T. D. A. COCKERELL.

PROCEEDINGS OF THE
MIDLAND MALACOLOGICAL SOCIETY.

31ST MEETING, OCTOBER 11TH, 1901.

The President in the Chair.

Various donations to the Library were announced, and thanks voted to the donors.

PAPERS READ.

“On the Dart-gland, Dart-sac, and Dart of certain Asiatic Molluses.

By Walter E. Collinge.

“*Physa heterostropha*, Say, in South Staffordshire.”

By Mr. J. Linton.

EXHIBITS.

By the President: Microscopical slides and drawings in illustration of his paper; also a series of shells of *Vitrima pellucida* from Adel, near Leeds, and Wetherby; *Helix obvoluta* from Hampshire, and *H. pisana* from Stonesfield, Oxford.

By Mr. H. Overton: *Unio margaritifera* from Ireland, *U. tumidus* from Olton and Willenhall, *U. pictoratus* from Sutton Coldfield and Willenhall, also *U. tumidus* with *Dreissensia polymorpha* attached, from the river Avon, near Welford.

32ND MEETING, NOVEMBER 8TH, 1901.

The President in the Chair.

Various donations to the Library were announced, and thanks voted to the donors.

Mr. Hugh McClelland was nominated for membership.

EXHIBITS.

By Mr. H. Overton: *Anodonta cygnea* from Willenhall, and six localities at or near Sutton Coldfield, *A. anatina* from the river Avon, near Welford, Lichfield, and five localities at or near Sutton Coldfield, *A. anatina* var. *complanata* from Tenby; also a darkly coloured form of *Limax maximus* from Sutton Coldfield, and *Anallia gogates* from Falmouth.

By the President: Specimens of *Philomyces bilineatus*, Bens., *P. fruhstorferi*, Clge., *P. dendriticus*, Clge., *Veronicella patriatiana*, Heude, *V. fruhstorferi*, Clge., *V. hinerta*, Clge., and shells of *Helix itala*, *H. cantiana*, and *H. pisana* from Tenby, and *H. obvoluta* from Jena.

The members then had the privilege of inspecting a fine collection of American and Asiatic Unios.

CURRENT LITERATURE.

Pilsbry, Henry A.—Tryon's Manual of Conchology, ser. ii, vol. xiv (pt. 54), pp. 65—128, pls. 16—21. Philadelphia: Academy of Natural Sciences.

The genus *Olostostomus*, Beck, is concluded in the present part. In the subgenus *Spivia*, Pils. and Van., *O. pyriformis* is a new name for *O. doeringii*, Kobelt, 1882, non *O. doeringii*, Kobelt, 1878. *Hyperaulax*, Pils., *Tomigerus*, Spix, and the interesting and peculiar genus *Anostoma*, F. de Wald., are next dealt with.

The part concludes with an "Appendix to Bulimoid Snails." Here under *Strophochilus*, Spix, *S. milleri* v. *krouvi*, v. Iher., and v. *iguapensis*, Pils., both from Brazil, are new, as also *S. calus*, from Brazil. Under the subgenus *Borus*, Alb., the following are new: *S. yporanganus*, v. Iher. and Pils., a species allied to *S. granulatus*; *S. bronni*, Pfr. v. *pergranulatus*; *S. fragilior*, v. Iher., all from Brazil. Under the subgenus *Thaumastus*, Alb., *S. granocinctus* is a new name for the *Bulimus (Dryptus) filocinctus*, Rolle, 1901, non *Bulivus filocinctus*, Reuss, 1861.

Beutler, Bruno.—Die Anatomie von *Paryphanta hochstetteri*, Pfr. Zool. Jahrb. (Abth. f. Morph.), 1901, Bd. 14, pp. 369—416, T. 26—29.

Dr. Beutler has investigated the anatomy of *Paryphanta hochstetteri*, which he describes in some detail. The pharynx is a long, muscular sac whose internal structure is similar to that in *Testacella*. The oesophagus arises from the middle of the pharynx, it is a long tube widening to form the stomach. From the contents it would seem that the food consists partly of animal and partly of vegetable matter. The description of the generative organs is far from correct, the terminology used ancient, and the figure poor. The lung is a small, thin-walled sac. The central nervous system consists of paired cerebral, buccal, and pedal ganglia, and a visceral group of five ganglion, viz. paired pleural and parietal, and a single abdominal ganglia. The cerebral ganglia have accessory lobes which each send off a strand, the well-known cerebral tubes of the embryo. The pedal ganglia are joined together by two commissures and with them is a network of nerve fibres imbedded in the pedal muscles; numerous small ganglia are present in the network.

Comparing *Paryphanta* with *Testacella*, they are regarded as nearly related, the former being nearer *Testacella* than *Daudebardia*. The relative large shell comes first in the phylogenetic development of the Pulmonata, whereas a relatively small

shell is to be regarded as a secondary phenomenon. The author therefore concludes that *Testaella* arose from a mollusc similar to *Paryphanta*, and that in any division of the Agnatha the genus *Paryphanta* must come before *Testaella*.

Bouvier, E. L. et Fischer, H.—Observations nouvelles sur l'organisation des Pleurotomaiés. Compt. Rendus, 1901, vol. cxxxii, pp. 583—585.

The authors give a short account of some parts of the internal structure of *P. beyrichi*, Hilg. The operculum is very reduced. The gills are symmetrically arranged in a branchial chamber, both are small, the right being a little smaller and shorter than the left. The feeble development of the gills in *Pleurotomaria* and their localisation in the anterior half of the pallial chamber, in the authors' opinion, completely justifies Bütschli's view that the respiratory organs of the primitive Diotocard are formed by the forward displacement of two gills which originally were situated behind, to the right and left of the rectum. Between the two gills, the roof of the pallial chamber is richly vasculated, and apparently is homologous with the lung of *Helix*. The respiratory process appears to be equally shared by the two sets of organs, and this the authors are of opinion is the primitive condition.

Vayssièrè, A.—Étude comparée des Opisthobranches des côtes Françaises de l'Océan Atlantique et de la Manche avec ceux de nos côtes Méditerranéennes. Bull. Sci. France et Belg., 1901, T. xxxiv, pp. 281—315.

Professor Vayssièrè's interesting paper gives a list of the Opisthobranchs found on the Channel and Atlantic Ocean coasts of France, and a comparison with those found on the French Mediterranean coast. The list comprises 126 species. A remarkable difference exists between the two faunas, thus 16 genera of the Ocean are not found in the Mediterranean, while 14 genera of the latter are not found on the Ocean coast.

Bergh, R.—Beitrag zur Kenntniss der Gattung *Harpa*. Zool. Jahrb. (Abth. f. Morph.), 1901, Bd. 14, pp. 609—629, T. 47.

Dr. Bergh's interesting study on the structure of *H. ventricosa*, Lam., *H. rosacea*, Mts., *H. nabitum*, Mts., and *H. minor*, Mts., shows that the *Harpidæ* are probably allied to the *Olividæ*, although many points yet remain obscure, while in some features resemblances to molluscs widely separated are indicated.

Externally we note that the large, flattened foot is incapable of being withdrawn into the shell, and is devoid of an operculum. The tentacles, which proximally are close together, exhibit towards the proximal end a well-developed, external optic prominence. There is a long respiratory tube. The alimentary system commencing at the mouth, which is a very narrow opening, has a long proboscis; the gullet is very small, and the intestine short. The salivary glands are well developed and the digestive gland small. The nervous system is characterised by the concentrated ganglia, resembling in this and other features the condition which obtains in the *Buccinidæ*. The penis is unarmed and the seminal duct either traverses this organ as an open groove, or passes subcutaneously on and through it. The kidney, pericardium and other parts are also briefly dealt with.

Baker, F. C.—The Molluscan Fauna of the Genesee River. Amer. Nat., 1901, vol. xxxv, pp. 659—664.

The Genesee River rises in Potter Co., Penn., and flows in a northerly direction for nearly 120 miles, emptying in Lake Ontario, 7 miles north of Rochester, N.Y. At Rochester the river drops to the valley below in three series of falls of considerable magnitude. A study of the Mollusca of the river leads the author to the following conclusions: that a series of falls like these prove an effective barrier to the distribution of some molluscs, such as pelecypods with mud-burrowing habits and the etenobranchs, which cling to the rocks and do not come to the surface, while to the freshwater pulmonates, which frequently come to the surface and can be swept over the falls, it is not a barrier. A table showing the comparative distribution of the various species accompanies the paper.

Dall, W. H.—Synopsis of the *Lucinacea* and of the American species. Proc. U. S. Nat. Mus., 1901, pp. 779—883, pls. xxxix—xlii.

Continuing the series of valuable synopses of various groups of marine bivalves, Dr. Dall here reviews the *Lucinacea*, which includes the following 5 families *Thyasiridae*, *Diplodontidae*, *Lucinidae*, *Corbidae*, and *Cyrenellidae*. Many radical changes have been made by the author and the revision makes a considerable advance. Seventeen new species are described and figured together with figures of other species. For the reception of *Cryptodon mosleyi* and *luzonicus*, E. A. Sm., the author proposes a new genus under the name of *Vaticinaria*.

Mitra, S. B.—The Crystalline Style of Lamellibranchia. Quart. Journ. Micro. Sci., 1901, vol. 44, pp. 591—602, pl. 42.

After careful experiment and study, the author has arrived at the following conclusions respecting the origin and function of the crystalline style. That it is an active amylolytic ferment, secreted as a viscous liquid, most probably by the so-called liver; that it is stored up as a flexible solid either in the caecum, or in some compartment of the alimentary canal; that the end projecting into the stomach is slowly and gradually dissolved there, and mixed up with food-particles, transforming the starchy portion into a reducible sugar.

Sykes, E. R.—Conchology at the Dawn and Close of the Nineteenth Century. Journ. Conch., 1901, vol. 10, pp. 35—42.

This interesting address formed the Presidential Address to the Conchological Society of Great Britain and Ireland, at their Annual Meeting, October, 1900.

Sykes, E. R.—Notes on the Genus *Temesa*, II. and A. Ad., with descriptions of two new land-shells (*Temesa* and *Clausilia*) from South America. Proc. Malac. Soc. Lond., 1901, vol. iv, pp. 220—222, figs. i—iii.

The *Eubalca peruviana*, Philippi, is regarded as a synonym of *T. clausilioides*, Rve. *T. magnifica* from Bolivia, and *Clausilia pilsbryi* from Peru, are described as new.

Sykes, E. R.—The Zoological Record, 1900, vol. xxxvii. Record vii, Mollusca. pp. 1—92, London, 1901.

In view of the preparation of an index-volume to the 'Record,' the present opportunity has been taken to include such genera, sections, etc., as have been omitted in past years. Further the somewhat lengthy paragraphs which now appear under the heading 'Geological,' have been under consideration, with a view to breaking them up: tentatively the large group of 'Tertiary' has been divided geographically by continents.

Record vii maintains the high standard to which the present Recorder, his associates, and predecessor have brought this invaluable work.

Prowazek, S.—Spermatologische Studien. I. Spermatogenese der Weinberg-schnecke (*Helix pomatia*, L.). Arbeit Zool. Inst. Wien., 1901, T. xiii, pp. 197—222, Taf. xi u. 2 textfiguren.

The author describes and figures in great detail the various stages in the development of the spermatozoa of this species.

Cockerell, T. D. A.—On a slug of the genus *Vernicella* from Tahiti. Proc. U. S. Nat. Mus., 1901, vol. xxiii, pp. 835, 836.

Vernicella agassizi, n. sp. "Length, about 21 mm.; breadth $9\frac{1}{2}$; breadth of sole 3; female orifice from sole 2, from margin, scarcely 2, from anterior end about 11 mm.; these measurements all from a dried individual. Dorsal surface granular with small warts; colour, coffee-brown marbled with black; no dorsal band. Under surface whitish. Anatomy not determinable from the material available."

Hab.—Tahiti, Tipaerui Valley.

This species is apparently nearly related to *V. gilsoni*, Clge., from the Fiji Islands, differing in the broader sole and position of the female generative orifice.

Jameson, H. L.—On the Identity and Distribution of the Mother-of-Pearl Oysters. Proc. Zool. Soc. Lond., 1901, pp. 372—394, 4 figs.

Blanford, W. T.—Note on *Bensonia* and on an apparently undescribed species, *B. minima*. Proc. Malac. Soc. Lond., 1901, vol. iv, pp. 178, 179, figs.

The author gives a list of the known species of *Bensonia*, with their localities; and describes *B. minima*, n. sp., from Narkander, E. N. E. of Simla, the type of which has been presented to the British Museum.

Blanford, W. T.—Note on *Bensonia mainwaringi* and *Macrochlamys dalingensis*. Ibid., pp. 180—182, figs.

Dr. Blanford concludes that these two species are closely allied, or sub-specific races of the same species, which would in that case bear the name *M. mainwaringi*, Nev. The animal has not yet been seen, and so it is thought best to keep the two distinct. A description of the shell of *M. mainwaringi* is given together with the synonymy.

Blanford, W. T.—Notes on *Ariophanta*, *Xestina*, *Nilgiria*, and *Euplecta*, with lists of species. Ibid., pp. 241—253, pl. xxv, and figs.

The terrestrial Pulmonata of the Indo-Malay region are from various points of view of exceptional interest, but unfortunately widely differing opinions exist as to their classification and affinities. This is no doubt largely due to our present inexact knowledge of their internal structure, and also in part to their having been classed in genera, sub-genera, and sections upon the form of the shell, jaw and lingual ribbon.

The four genera treated of by Dr. Blanford are by some writers supposed to be members of the *Zonitidae*, while others regard them as belonging to the *Helicidae* or *Limacidae*.

Dr. Blanford accepts Col. Godwin-Austen's view that in certain areas of the Indo-Malay region, certain molluscs, "having shells so diverse that they were formerly classed in distinct genera, or even in some cases different families or sub-families, agree amongst themselves in each area, and differ from those in other areas by characteristic details in the anatomy."

The history of the names *Xestina* and *Nilgiria* is then explained, and the author arrives at the conclusion "that *Xestina* and *Nilgiria* are identical. . . . The group to which these names have been applied is neither a genus or sub-genus, but merely a section of *Ariophanta*, distinguished by a character which is not of generic importance." Then follows a list of 26 species referred to *Ariophanta*, followed by a similar one of *Euplecta* containing 31 species. The following are new: *M. canarica*, *A. heteroca*, *A. gassii*, *E. transrectata*, *E. agastya*, *E. malabarica*, *E. luvvis*, *E. fluctuosa*, *E. granulifera*, *E.(?) mucronifera*, and *oribates*.

This re-classification is undoubtedly a step in the right direction; far too many genera and sub-genera have been made from closely allied forms of Indian molluscs, and we regret to say this process of making a new sub-genus for every supposed difference from the normal, still flourishes.

Dautzenberg, Ph.—Description de trois Mollusques nouveaux provenant de Pétat indépendant du Congo. Ann. Soc. Roy. Malac. Belgique, 1901, T. xxxvi, pp. 3—7, pl. i.

The new forms are *Achatina marteli* and var. *pallescens*, *Melania liebrechtsi* and *Unio briarti*. *Cleopatra johnstoni*, E. A. Sm., is also recorded and figured.

Pilsbry, Henry A.—New Land Mollusca from Japan and the Loo Choo Islands. Proc. Acad. Nat. Sci. Phila., 1901, pp. 344—353. New Japanese Marine, Land and Fresh-water Mollusca. Ibid., pp. 385—408, pls. xix—xxi.

The flow of new species of Japanese molluscs continues unabated. In the first paper Dr. Pilsbry describes the following: *Trochomorpha gouldiana*, *Macrochlamys perforugilis*, *M. gudei*, *Kaliella borealis*, *Eulota (Euhadra) oshimae*, *Chloritis*

eucharistus ("One day prior to *Ch. oshimana*, Gude, which is the same species" H. A. P. in litt.), *Succinea hirasei*, *Cyclophorus hirasei*, *Papinella oshimae*, *Diplommatina turris*, *D. saginata*, *D. oshimae*, *D. luchuana* and *D. septentrionalis*.

In the second paper, in which illustrations of some former species are given in addition to those enumerated below, the following new species and varieties are described: *Daphnella fragilis* v. *articulata*, *Mitra* (*Costellaria*) *hizenensis* and *vanatii*, *Tritonidea submenkeana*, *Euthria hokkaidonis*, *Buccinum hirasei*, *Cerithium chemnitzianum*, *Syrnola bacillum*, *Eulima dunkeriana* and *luchuana*, *Assiminea angustata*, *Nerita martensiana*, *N. helicoides* v. *tristis*, *Leptothyra rubra* v. *luciosulata*, *Solen roscomaculatus*, *Tellina* (*Merisca*) *pristiformis*, *Bulinus reinianus* v. *hokkaidonis*, *Mandarina mandarina*, v. *pouderosa*, *Trishoplita dacostae* v. *arajiensis*, *T. goodwini* v. *strigata*, *Kaliella suberoulata*, *ioderma* and *harimensis*, *Omphalotropis japonicus*, *Bithyia striatula* v. *japonica*, *Sphaerium inutilis*, *Corbicula sudocensis* and *arajiensis*.

Pilsbry, Henry A.—The Land Mollusks of the Loo Choo Islands: *Clausiliidae*. *Ibid.*, pp. 409—424, pls. xxii, xxiii.

The Loo Chooan *Clausilia* fall into five subgenera or sections, of which the *Luchuphaclusa*, nov., has been found nowhere else. The following new forms are now very fully described: Under the section *Stereophaclusa*, *C. valida*, Pfr. v. *perfasciata*; under *Luchuphaclusa*, *C. callistochila*, *nesiotharua*, *oshimae*, *pseudo-oshimae*, and *mina*; under *Hemiphaclusa*, *C. arenilabium* and *minus*.

Smith, Edgar A.—On South African Marine Shells, with descriptions of new species. *Journ. of Conch.*, 1901, vol. x, pp. 104—116, pl. i.

Smith, Edgar A.—A list of the *Volutidae* of South Africa, with descriptions of two new species of *Voluta* from Natal. *Proc. Malac. Soc. Lond.*, 1901, vol. iv, pp. 231—235, 2 figs.

The new species are *V. (Alcihoc) ponsonbyi*, and *V. (Lyria) quckettii*.

Lillie, F. R.—The Organization of the Egg of *Unio*, based on a study of its Maturation, Fertilization, and Cleavage. *Journ. Morph.*, 1901, vol. xvii, pp. 227—292, pls. xxiv—xxvii.

It is only possible in the brief space at our disposal to call attention to the leading points in this valuable paper. After the entrance of the spermatozoon a sperm-amphiaster is formed, which moves towards a definite zone and comes to rest. Gradually this disappears, and at the same time the sperm-nucleus contracts. The first maturation spindle is now entering on its metaphase. The second maturation division having taken place, the sperm-nucleus grows in size synchronously with the egg-nucleus and begins to describe its complicated copulation path, ultimately the two nuclei come into contact at or near the centre of the egg. The first cleavage spindle is then formed and moves axially to one end of the egg. All of these points are discussed in great detail and beautifully illustrated; in addition to the author's own observations, the literature and theories bearing upon the subject are dealt with in a critical, yet careful manner.

Godwin-Austen, H. H.—On the Anatomy of the *Helix ampulla* of Benson, and its generic position in the *Ariophantinae*. *Proc. Malac. Soc. Lond.*, 1901, vol. iv, pp. 187—190, pl. xviii.

The author describes the external appearance of this interesting mollusc, also the generative organs, free muscles, jaw, and radula. In its main characters he regards it as agreeing with *Nilgiria* and *Ariophanta*. Certain characters, such as the jaw, form of the central teeth, smooth foot-sole, pallial margin, and the shell, it does not share with these genera, and they appear to the author sufficient data on which to found a new sub-genus of the *Ariophantinae*, to which he gives the name of *Indrella*.

Godwin-Austen, H. H.—On the Anatomy of *Helix politissima*, Pfeiffer, of Ceylon and on its position in the *Ariophantinae*. *Ibid.*, p. 261—263, pl. xxvi.

Judging from the figures we should not have hesitated to place this species in the genus *Katuaulvipia* or *Nilgiria*, the author however proposes a new sub-genus for its reception to which the name *Kavaau* is given. The malacologist of the future who is bold enough to describe the anatomy of the Indian land mollusca, will have a formidable and perplexing nomenclature to deal with and unravel, to say nothing of the synonyms.

Melville, J. Cosmo. and Standen R.—The Mollusca of the Persian Gulf, Gulf of Oman, and Arabian Sea, as evidenced mainly through the collections of Mr. F. W. Townsend, 1893—1900; with Descriptions of new species. Proc. Zool. Soc. Lond., 1901, pp. 327—460, pls. xxi—xxiv.

The title sufficiently explains the scope of the present work, which forms a valuable and comprehensive survey of the Mollusca of the Persian Gulf and Arabian Sea. The present part treats of the Cephalopoda, Gastropoda, and Scaphopoda, and of these the authors enumerate 935 species of which 77 are new, contained in 171 genera, one of which is new.

It is impossible here to do more than point out some of the many interesting peculiarities of this fauna. A single species, *Argonauta hians*, Soland, represents the Cephalopoda. There are no Amphineura mentioned. Few *Patellae*, *Fissurellae*, or *Haliotis* occur. Amongst the *Trochidae* many endemic species are found. *Natica* abounds; so do the *Littorinidae*, and allied small families, the *Rissoidae* being especially interesting; the *Cerithiidae* are also plentiful. *Murex* is not here represented by any of the larger species, the same may be said of *Fusus*, *Lotorium*, and *Purpura*. *Murex* (*Ocenebra*) *bombayanus*, Melv., is interesting as the Indian analogue of *M. cristatus*, Brocchi, from the Mediterranean. Many *Columbellidae*, *Enginae*, and *Riciniidae* seem peculiar, as also many *Nassac* and *Mitrae*,—while the *Bullidae* are especially interesting. *Terebra* is represented by 23 small species, mostly endemic. The *Leptoconus* section of *Conus* here attains its maximum development; while the *Pleurotomidae* are by far the most numerous distributed family. *Oliva* hardly occurs, and *Folota* is absent. Beautiful and peculiar forms of *Scalariae*, *Cancellariae*, and *Trichotropis* are especially noteworthy.

The Tectibranchia are represented by 41 species of which 5 are new. Two species of *Siphonaria* from the coasts of India are peculiar. Among the Scaphopoda, *Catulus* is represented by *C. cuboides*, n. sp., and *C. gadus*, Sby., and 11 species of *Dentalium*.

The authors hope, at no very distant date, to publish a second part treating of the Pelecypoda.

Gude, G. K.—Sur une collection de Plectopylis du Tonkin, avec la description de six espèces nouvelles. Journ. de Conchyl., 1901, vol. xlix, pp. 197—212, pl. vi, et 7 figs.

The new species are *P. dautzenbergi*, *P. boyayi*, *P. tenuis*, *P. fisheri*, *P. anceyi*, and *P. persimilis*. Coloured figures of all the species are given, in addition to figures of the parietal and palatal armature. Figures of *P. emigrans*, Mlldf., are also given.

Dautzenberg, Ph.—Description de deux Bulimulidés nouveaux provenant du Pérou. Ibid., pp. 213, 214, pl. vii, figs. 1—4.

The author describes and figures two species of *Peronacus*, *iocosensis* and *baeri*, previously diagnosed (J. de C., p. 131).

Dautzenberg, Ph. et Bernier, J.—Description d'un Bulimulé nouveau, provenant de la Nouvelle-Calédonie. Ibid., pp. 215, 216, pl. vii, figs. 5, 6.

Leucocharis porphyrochila, n. sp.

Dautzenberg, Ph.—Sur deux déformations observées chez des *Plucostylus* de la Nouvelle-Calédonie. Ibid., pp. 217, 218, pl. vii, figs. 7, 8.

Henderson, J. B. Jr.—A new Jamaican *Adamsiella*. Naut., 1901, vol. xv, pp. 49, 50, 2 figs.

A. jarvisi from near Ewarton, Jamaica.

Pilsbry, Henry A.—Land Mollusks of the Northeastern group of the Loo Choo Islands. *Ibid.*, pp. 61—65.

The new species are *Ganesella tanegashimae*, *Diplommatina yakushimae*, and *Ennea iwakawa* var. *yakushimae*.

Walker, Bryant.—A new species of *Strophitus*. *Ibid.*, pp. 65, 66, pl. iii.

S. wrightianus from Flint river, Baker Co., Ga., is most nearly related to *S. tombigbeensis*.

Sterki, V.—New *Pisidia*. *Ibid.*, pp. 66—69.

Two interesting species are described, viz. *P. affine*, and *P. sargenti*, as usual they are not figured.

Suter, H.—Further Contributions to the Geographical Distribution of the New Zealand non-marine Mollusca. *Trans. N. Z. Inst.*, 1900, vol. xxxiii, pp. 151, 152.

Hoyle, W. E.—Note on d'Orbigny's figure of *Onychoteuthis dussumieri*. *Mem. and Proc. Manchester Lit. Philo. Soc.*, 1901, vol. xlv, pp. 1—3.

Yoshiwara, S.—On an apparently New Species of *Argonauta* from the Tertiary of Izumo. *Annott. Zool. Japon.*, 1901, vol. iii, pp. 174—176, 1 pl.

Thompson, W. D'Arcy.—On a rare Cuttlefish, *Ancistroteuthis robusta* (Dall). *Proc. Zool. Soc. Lond.*, 1900, pp. 992—998, 3 figs.

Luther, A.—Verzeichnis der Land-und Süßwassermollusken der Umgebungen Revals. *Acta Soc. F. et Fl. Fennica*, 1901, xx, no. 2, pp. 1—16.

Luther, A.—Bidrag till kännedom om Land-och Sötvattegastropodernas utbredning i Finland. *Acta Soc. F. et Fl. Fennica*, 1901, xx, no. 3, pp. 1—125, and map.

Hesse, R.—Die Augen einiger Mollusken. *Zeit. f. wiss. Zool.*, 1900, Bd. lxxviii, pp. 379—477, T. xxv—xxxii.

Godwin Austen, H. H.—On the Anatomy of certain Agnathous Pulmonate Mollusks. *Ann. Mag. N. H.*, 1901 (s. 7), vol. vii, p. 488.

Smidt, H.—Weitere Untersuchungen über die Glia von *Helix*. *Anat. Anz.*, 1901, Bd. xix, pp. 267—271, 5 Abbildgn.

Conklin, E. G.—Centrosome and Sphere in the Maturation, Fertilization, and Cleavage of *Urepidula*. *Anat. Anz.*, 1901, Bd. xix, pp. 280—287, 8 figs.

Smidt, H.—Ganglienzellen in der Schlundmuskulatur von Pulmonaten. *Arch. f. mikr. Anat.*, 1901, Bd. lvii, pp. 622—631, 1 Taf.

Pace, S.—On the Rediscovery of *Euselelops* [= *Neda*] *luniceps*, Cuv. *Proc. Malac. Soc. Lond.*, 1901, vol. iv, pp. 202—204, fig.

Pace, S.—Note on the Anatomy of *Thersites* (*Hadra*) *bipartita*, Fér. *Ibid.*, pp. 205—207, figs. i, ii.

Drew, Gilman A.—The Life-History of *Nacula delphinodontu* (Mighels). *Quart. Journ. Micro. Sci.*, 1901, vol. 44, pp. 313—391, pls. 20—25, and 24 figs. in text.

Jordan, H.—Die Physiologie der Locomotion bei *Aplysia limacina*. *Zeit. f. Biol.*, 1901, Bd. 41, pp. 169—238, 1 Taf.

Weldon, W. F. R.—A First Study of Natural Selection in *Clausilia laminata* (Montagu). *Biometrika*, 1901, vol. i, pp. 109—124, tables, i—v.

- Hescheler, K.**—Ueber die Gattung *Pleurotomaria*. Biol. Centralbl., 1901, Bd. xxi, pp. 569—582.
- Ihering, H. von.**—The *Unionidae* of North America. Naut., 1901, vol. xv, pp. 37—39, 50—53.
- Simpson, C. T.**—On the Classification of the *Unionidae*. Ibid., pp. 77—82.
- Simroth, H.**—Ueber die Abhängigkeit der Nacktschneckenbildung vom Klima. Biol. Centralbl., 1901, Bd. xxi, pp. 503—512.
- Kerr, J. G.**—Phylogenetic Relationship between Amphineura and Cephalopoda. Zool. Anz., 1901, Bd. xxiv, pp. 437, 438.

GENERAL REVIEWS.

A Treatise on Zoology.—Edited by E. Ray Lankester.—Pt. iv. The Platyhelminia, Mesozoa, and Nemertini. By W. Blaxland Benham. Svo, pp. viii + 204. London, 1901. Adam and Charles Black.

A further volume of this invaluable treatise has been issued forming Part iv. It deals with the Platyhelminia, the Mesozoa, and the Nemertini, and Professor Benham is responsible for the whole of the work. Unfortunately, as the Editor points out, the work was in print three years ago, when the author left England for New Zealand, but the Editor is satisfied that no important omissions due to this fact occur in the book, the proofs of which have been revised and some additions made during the present year. Further Mr. R. C. Punnett has added some notes to the section on the Nemertina, practically bringing the work up to date, a few omissions, however, do occur, but these do not generally affect the value of the work.

The volume before us forms the most complete and up-to-date account of the particular phyla of which it treats, and cannot fail to prove of great service to zoologists.

A word must be said in praise of the illustrations, of which many are new, some of the semi-diagrammatic figures are capital, such for instance as fig. xiii, p. 29, illustrating the various relations of the uterus in Aquatic Triclad, fig. 1, p. 51, anatomy of a schematic Heterocotylean, fig. xxxii, p. 141, life-history of a *Cysticercus*, and many others.

EDITOR'S NOTES.

A large number of Subscribers having expressed the wish that the volumes of the Journal should be annual ones, we have brought volume viii to a close with the end of 1901. It will be noticed however, that the actual number of plates exceeds what we have previously issued in two years, while the printed matter remains almost the same.

In order not to delay the publication of the different parts, the Editor requests that contributors requiring illustrations, will kindly forward their drawings as early as possible.

To Contributors, Subscribers, and all who have in any way furthered the interests of the Journal during 1901, the Editor tenders his grateful acknowledgement.

At the Anniversary meeting of the Royal Society, held on November 30th, Dr. William Thomas Blanford was elected as a member of the Council, and was also the recipient of a Royal Medal, for his work in connection with the geographical distribution of animals.

INDEX TO VOLUME VIII.

	PAGE		PAGE
A.			
Africa. On some Land Shells from		<i>Ashmunella chiricahuana</i> v. <i>vari-</i>	
British East	93	<i>cifera</i> , n. var.	77
<i>Amphidromus palacrus</i> , Mouss.		<i>Ashmunella levettei</i> (Bland).	74
Note on the anatomy of	50	<i>Ashmunella mearnsii</i> (Dall).	74
<i>Amphidromus perakensis</i> , n. sp.		<i>Ashmunella miorrhysa</i> (Dall).	78
(figs.)	104	<i>Ashmunella pseudodonta</i> (Dall).	75
Anatomy of <i>Amphidromus pala-</i>		<i>Ashmunella pseudodonta</i> (Dall).	
<i>ccus</i> , Mouss. (figs.)	50	Anatomy of	79
Anatomy of <i>Apera burnupi</i> , E. A.		<i>Ashmunella pseudodonta</i> (Dall)	
Smith. (fig.)	71	subsp. <i>capitanensis</i> , Ashmun	
Anatomy of <i>Ashmunella pseudo-</i>		and Ckll.	76
<i>donta</i> (Dall). (fig.)	79	<i>Ashmunella rhyssa</i> (Dall).	78
Anatomy of <i>Ashmunella thomson-</i>		<i>Ashmunella rhyssa</i> , Dall var. <i>hy-</i>	
<i>iana</i> (Ancey) var. <i>porterac</i> ,		<i>porhyssa</i> , Ckll.	78
Pils. and Ckll. (figs.)	82	<i>Ashmunella thomsoniana</i> (Ancey).	75
Anatomy of <i>Microparmarion mül-</i>		<i>Ashmunella thomsoniana</i> (Ancey)	
<i>lendorffii</i> . (figs.)	17	var. <i>porterac</i> , Pils. and Ckll.	75
Anatomy of <i>Ratnadvipia irradians</i> ,		<i>Ashmunella thomsoniana</i> (Ancey)	
Pfr. (figs.)	63	var. <i>porterac</i> , Pils. and Ckll.	
Anatomy of <i>Solen ensis</i> , L. (figs.)		Anatomy of	82
36, 38, 41, 97, 98	98	<i>Atopos</i>	71
Anatomy of <i>Solen marginatus</i> ,			
Pult. and Don. (figs.) 37, 40, 43,	98, 100		
Anatomy of <i>Solen siliqua</i> , L. (figs.)		B.	
37, 40, 43, 98, 100	100	Bloomer, H. II.—“The Anatomy	
Ancey, C. F.—“On the genus <i>Ash-</i>		of the British species of the	
<i>munella</i> , Pils. and Ckll., with		genus <i>Solen</i> . Pt. i.”	56
Anatomical notes by R. Mur-		— “The Anatomy of the	
doch.”	73	British species of the genus	
André, Emile.—“Note sur une		<i>Solen</i> . Pt. ii.”	97
Linnée de la faune profonde		Boycott, A. E.—“Investigation on	
du Lac Léman.”	35	the Variation, etc., of British	
<i>Anomia</i> . Derivation of the word . . .	2	Molluscs.”	22
<i>Apera burnupi</i> , E. A. Smith. Note		<i>Bulimivus bambuseti</i> , Martens, var.	
on the anatomy of	71	(fig.)	94
<i>Aperostoma confusum</i> , n. sp. (fig.)	106		
<i>Aperostoma fischeri</i> (Hidalgo). (fig.)	105	C.	
<i>Aperostoma giganteum</i> (Rve.). (fig.)	105	California. <i>Limax maximus</i> at Los	
<i>Ashmunella altissima</i> (Ckll.).	77	Angeles.	124
<i>Ashmunella ashmuni</i> (Dall).	76	California. Three new Nudibranchs	
<i>Ashmunella</i> . Catalogue and shell		from	85
characters of	74	California Nudibranchs. Notes	
<i>Ashmunella chiricahuana</i> (Dall).	76	on two	121

	PAGE		PAGE
<i>Cardium (Papyridia) hungerfordi</i> , n. sp. (figs.)	103	D.	
<i>Cerina manchurica</i> , A. Ad. (figs.)	60	Description of five new species of Shells. (figs.)	101
<i>Chiton cancellatus</i> of Leach. The supposed	7	Description of new species of <i>Xesta</i> , <i>Amphidromus</i> , and <i>Cyclostoma</i> . (figs.)	103
<i>Clausilia</i> mimicked by a Micro- leptidopteron. (figs.)	33	Description of some new species of Slugs collected by Mr. H. Fruhstorfer.	118
<i>Clio pyramidata</i> , L.	13	Description of two new species of Helicoid Land Shells. (figs.)	14
Cockerell, T. D. A.—“ <i>Helix lapi- cida</i> n. <i>sinistrovsun</i> .”	21	Description of two new species of <i>Microparmarion</i> from the An- daman Islands. (figs.)	16, 52
—“ <i>Trichomya</i> , von Iher- ing.”	21	<i>Dreissensia polymorpha</i> , Pall.	53
—“Three new Nudibranchs from California.”	85	E.	
—“ <i>Limax nyctelius</i> , Bgt., in Washington.”	88	Editor's Notes.	32, 56, 92, 132
—“ <i>Psammobit ferroensis</i> var. <i>pallida</i> .”	88	<i>Eanea (Gulella) ugandensis</i> , n. sp. (fig.)	93
—“Notes on two Califor- nian Nudibranchs.”	121	<i>Epiphragmophora dormeri</i> , n. sp. (figs.)	15
—“ <i>Limax marinus</i> , L., at Los Angeles, California.”	124	F.	
Collinge, Walter E.—“Descrip- tion of two new species of <i>Microparmarion</i> from the An- daman Islands.”	16	<i>Facelina steurasi</i> , n. sp.	86
—“Note on the Anatomy of <i>Amphidromus palaceus</i> , Mouss.”	50	Fulton, Hugh.—“Descriptions of new species of <i>Xesta</i> , <i>Amphi- dromus</i> and <i>Cyclostoma</i> from Madagascar and Perak.”	103
—“Description of two new species of <i>Microparmarion</i> from the Andaman Islands: A Correction.”	52	G.	
—“On the Anatomy of the <i>Vitrina irradians</i> of Pfeiffer.”	65	General Reviews.	30, 92, 132
—“Note on the Anatomy of <i>Apera buruupi</i> , E. A. Smith.”	71	Gude, G. K., F. Z. S.—“Description of two new species of Helicoid Land Shells.”	14
—“Description of some new species of Slugs collected by Mr. H. Fruhstorfer.”	118	—“Notes on some known species of <i>Plectopylis</i> , and description of a new variety of <i>Plectopylis plectostoma</i> , Bens.”	47
Conchological Exchange Club. The	32	—“On two new and three hitherto unfigured species of <i>Plectopylis</i> from Tonkin.”	110
Conchological Society. The	88	H.	
<i>Comus bedomei</i> , n. sp. (fig.)	101	<i>Haubropoma</i> , Crosse and Fischer.	108
Cooke, Rev. A. H., M. A., F. Z. S.— “Notes on the References for authorship of species, as given in Jeffreys, British Conchology, vols. ii—v.”	1	<i>Helicella zaccarenensis</i> , Kob. Mea- surements of pallial organs.	84
<i>Coryphella cooperi</i> , n. sp.	85	<i>Helicella (Trochula) ziboumici</i> . Measurements of pallial organs.	84
<i>Coryphella iadinea</i> (Cooper).	121	<i>Helicina</i> . On a new species of . . . from Kangean Island.	59
<i>Ctenopoma</i> . Value of the name	59	<i>Helicina rollei</i> , n. sp. (figs.)	59
Current Literature.	23, 53, 89, 125	<i>Helix (Otala) constantinæ</i> , Forbes. Measurements of pallial organs.	84
<i>Cyclostoma giganteum</i> ? What is	105		
<i>Cyclostoma rugulosum</i> , Pfr.	60		
<i>Cyclostoma sikoræ</i> , n. sp. (figs.)	104		
<i>Cypraea crassa</i> . Note on	109		
<i>Cypraea tulpa</i> . Note on	109		
<i>Cypraea tulpa</i> , var. (fig.)	109		
<i>Cyrtotoma</i> , Mörch.	107		

	PAGE
<i>Helix (Levantina) hierosolyma</i> , Boiss. Measurements of pallial organs.	84
<i>Helix lapicida</i> m. <i>sinistrorsum</i>	21
<i>Helix subaperta</i> , Ancey. Measure- ments of pallial organs.	84
<i>Hermiscula opalescens</i> (Cooper). 122	122

I.

<i>Ianthina rotundata</i>	10
Investigations on the Variation and Life-history of British Land and Freshwater Molluscs.	22

L.

Lacaze-Duthiers. Notice sur le Professeur de	58
<i>Leucochroa candidissima</i> , Drap. Measurements of pallial organs.	84
<i>Limicola dohertyi</i> , n. sp. (fig.)	95
<i>Limax marinus</i> , L., at Los An- geles, California.	124
<i>Limax nycetius</i> , Bgt., in Wash- ington.	88
Limnée de la faune profonde du Lac Léman. Note sur une	35
Linton, J.—“ <i>Physa heterostropha</i> , Say, in South Staffordshire.	124

M.

Madagascar. New species of <i>Xesta</i> and <i>Cyclostoma</i> from	103
<i>Mangilia eudeli</i> , n. sp. (fig.)	102
Marshall, J. T.—“Note on <i>Myrina</i> <i>simpsoni</i> , Marsh.”	19
<i>Martensia permanens</i> , n. sp. (fig.)	94
<i>Microparmarion andamanica</i> , n. sp. (figs.)	17
<i>Microparmarion anamica</i> , n. nom.	120
<i>Microparmarion bruncepalescens</i> , n. sp.	120
<i>Microparmarion müllendorffi</i> , n. sp. (figs.)	17
Murdoch, R.—see Ancey, C. F.	109
<i>Murdochia</i> , Ancey. The value of <i>Murdochia</i> , Ancey = <i>Cytora</i> , Kob. and Mlldff.	109
<i>Murex octogonus</i> , Q. and G.	61
<i>Murex octogonus</i> var. <i>umbilicatus</i>	62
<i>Murex scalaris</i>	62
<i>Murex umbilicatus</i>	61
<i>Myotesta</i> , n. gen.	118
<i>Myotesta fruhstorferi</i> , n. sp.	118
<i>Myotesta punctata</i> , n. sp.	119
<i>Myrina simpsoni</i> , Marsh. Note on	19

N.

	PAGE
Naides. Synopsis of, by C. T. Simpson. Review.	23
<i>Neocyctolus</i> , Cr. and Fisch.	108
Nudibranchs. Notes on two Cali- fornian	121
Nudibranchs. Three new . . . from California.	85

O.

Obituary.	123
<i>Onchidium celticum?</i> Who first described	13
<i>Opeas crenulata</i> , n. sp. (fig.)	96

P.

Perak. New species of <i>Amphi-</i> <i>dromus</i> from	103
<i>Philomyces dendriticus</i> , n. sp.	119
<i>Philomyces fruhstorferi</i> , n. sp.	119
<i>Physa heterostropha</i> , Say, in South Staffordshire.	124
<i>Plectopyllis (Sinicola) fruhstorferi</i> , Mlldff. (figs.)	112
<i>Plectopyllis (Endoplon) hirsuta</i> , Mlldff. (figs.)	111
<i>Plectopyllis jovia</i> , Mab. (figs.)	47
<i>Plectopyllis lepida</i> , Gude. (figs.)	48
<i>Plectopyllis (Endoplon) moellen-</i> <i>dorffi</i> , n. sp. (figs.)	115
<i>Plectopyllis (Endoplon) phlygaria</i> , Mab. (figs.)	113
<i>Plectopyllis pilsbryana</i> , n. sp.	110
<i>Plectopyllis plectostoma</i> v. <i>caserta</i> n. var. (figs.)	49
<i>Plectopyllis schlumbergeri</i> , Morlet. (figs.)	48
<i>Plectopyllis villedaryi</i> , Ancey. (figs.)	48
<i>Plectopyllis villedaryi</i> , Pilsbry and Gude.	110
<i>Plectopyllis (Endoplon) villedaryi</i> , Ancey.	116
<i>Piscunia delicatula</i> , n. sp. (fig.)	101
<i>Pleurotomaria adansoniana</i> , Cr. and Fisch.	32, 56
Proceedings of the Midland Malac- ological Society. 22, 53, 88, 124	124
<i>Psammobia ferrocensis</i> var. <i>pallida</i>	81

R.

<i>Ratnavipina</i> . Affinities of	69
<i>Ratnavipina irradians</i> . Anatomy of	65
<i>Rhytidopoma</i> , nom. nov.	60
<i>Rhoda</i> . The genus . . . List of species.	20

S.		PAGE
<i>Scrobicularia piperata</i> , Gmelin non Bellonius.		6
<i>Sesara mouleyitensis</i> , n. sp. (figs.)		15
Simroth, H.—“ <i>Clausilia</i> mimicked by a Microlepidopteron.”		33
Slugs. Description of some new species of		118
Smith, Edgar A.—“On some Land Shells from British East Africa.”		94
<i>Solen</i> . Anatomy of the British species.		36, 97
<i>Solen ensis</i> , L. Alimentary canal.		41
<i>Solen ensis</i> , L. Circulatory system.		97
<i>Solen ensis</i> , L. External characters.		36
<i>Solen ensis</i> , L. Musculature.		38
<i>Solen marginatus</i> , Pult. and Don. Alimentary canal.		44
<i>Solen marginatus</i> , Pult. and Don. Circulatory system.		98
<i>Solen marginatus</i> , Pult. and Don. External characters.		37
<i>Solen marginatus</i> , Pult. and Don. Musculature.		40
<i>Solen siliqua</i> , L. Alimentary canal.		43
<i>Solen siliqua</i> , L. Circulatory system.		98
<i>Solen siliqua</i> , L. External characters.		37
<i>Solen siliqua</i> , L. Musculature		40
South Staffordshire. <i>Physa heterostropha</i> , Say, in		124
Sowerby, G. B.—“Descriptions of five new species of Shells.”		101
Suter, Henry.—“Note upon <i>Trophon umbilicatus</i> ,” Tenison Woods.”		61
Sykes, E. R., B.A., F.L.S.—“Malacological Notes. 5. The genus <i>Rhoda</i> .”		20
—“Malacological Notes. 6. On a new species of <i>Helicina</i> from Kangean Island. 7. The value of the name <i>Ctenopoma</i> . 8. Note on <i>Cecina manchurica</i> , A. Ad.”		59
—“Malacological Notes. 9. What is <i>Cyclostoma gigantum</i> ? 10. Note on <i>Voluta beaultii</i> , Fisch. and Bernardi. 11. Note on <i>Cypraca talpa</i> and <i>C. causta</i> . 12. The value of <i>Murdochia</i> , Ancey.”		105
T.		
<i>Thecæra velox</i> , n. sp.		87
Tonkin. On two new and three hitherto unfigured species of <i>Plectopylis</i> from		110
<i>Trichomya</i> , von Ihering.		21
<i>Trophon umbilicatus</i> , T. Woods.		61
V.		
<i>Vanikoro expansa</i> , n. sp. (fig.)		102
Vayssière, A.—“Notice sur le Professeur de Lacaze-Duthiers.”		58
<i>Veronicella fruhstorferi</i> , n. sp.		120
<i>Veronicella himerta</i> , n. sp.		121
<i>Vitrina irradians</i> . Anatomy of the . . . of Pfeiffer.		63
<i>Voluta beaultii</i> , Fisch. and Bernardi. Note on (fig.)		108
W.		
Woodward, B. B.—“Dates of publication of Forbes and Hanley’s History of British Mollusca.”		21
Woodward, M. F.—Review of Meisenheimer’s “Entwicklungsgeschichte von <i>Dreissensia polymorpha</i> , Pall.”		53
Woodward, M. F. Obituary.		123
X.		
<i>Xesta piperata</i> , n. sp. (fig.)		103
Z.		
Zoological Record. Index-Volume to		32

THE
JOURNAL OF MALACOLOGY.

ESTABLISHED IN 1890 AS "THE CONCHOLOGIST. A JOURNAL OF
MALACOLOGY."

EDITED BY

WALTER E. COLLINGE, B.Sc.,

LECTURER ON ZOOLOGY AND COMPARATIVE ANATOMY IN THE UNIVERSITY
OF BIRMINGHAM,

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF. F. BABOR,

The University, Prague.

THE REV. A. H. COOKE, M.A., F.Z.S.,

Fellow of King's College, Cambridge.

CHARLES HEDLEY, F.L.S.,

Australian Museum, Sydney, N.S.W.

E. R. SYKES, B.A., F.Z.S., F.L.S.,

London.

B. B. WOODWARD, F.G.S., F.L.S.,

British Museum (South Kensington), London.

VOLUME IX.

1902.

Authors alone are responsible for the statements in their respective papers.

LONDON:

DULAU AND CO., 37, SOHO SQUARE, W.

1902.

CONTENTS OF VOLUME IX.

	PAGE.
A Classified List of the Helicoid Land Shells of Asia. By G. K. GUDE, F.Z.S.	I
On the Anatomy of the genus <i>Myotesta</i> , Cllge. By WALTER E. COLLINGE. (Plate i.)	11
Description of a new species of <i>Onchidium</i> from South Africa. By WALTER E. COLLINGE. (Illustrations.)	17
The Anatomy of the British species of the genus <i>Solen</i> . Pt. iii. By H. H. BLOOMER. (Plate ii.)	18
Descriptions of six new Land Shells from the Malay Peninsula. By E. R. SYKES, B.A., F.L.S.	22
Obituary. C. A. F. Wiegmann. By Dr. O. F. von MÖLLENDORFF.	24
Notes on the British species of <i>Buccinum</i> , <i>Fusus</i> , etc. By J. T. MARSHALL.	35
A Classified List of the Helicoid Land Shells of Asia. Part ii. By G. K. GUDE, F.Z.S.	51
Description of a new species of <i>Chloritis</i> from New Guinea. By G. K. GUDE, F.Z.S. (Illustrations.)	59
On a collection of Land and Freshwater Shells from Kelantan, Malay Peninsula. By E. R. SYKES, B.A., F.L.S. (Plate iii.)	60
Is <i>Amalia carinata</i> , Risso, a British Slug? By WALTER E. COLLINGE.	63
On a malformed variety of <i>Limnaea pereger</i> , Müll. By H. OVERTON. (Illustrations.)	64
Description of a new species of <i>Separatista</i> from New Zealand. By HENRY SUTER. (Illustrations.)	65
On the non-operculate Land and Freshwater Molluscs collected by the Members of the "Skeat Expedition" in the Malay Peninsula, 1899-1900. By WALTER E. COLLINGE, B.Sc. (Plates iv, v, and vi.)	71

Notes on some further malformed specimens of <i>Anodonta cygnea</i> , L. By H. H. BLOOMER. (Plate vii.)	96
A Classified List of the Helicoid Land Shells of Asia. Part iii. By G. K. GUDE, F.Z.S. (Illustrations.)	97
Description of a new species of <i>Gomphina</i> from New Zealand. By EDGAR A. SMITH, F.Z.S. (Illustrations.)	109
On the Systematic Position of <i>Patella kermadecensis</i> , Pilsbry. By HENRY SUTER. (Plate viii.)	111
A Classified List of the Helicoid Land Shells of Asia. Part iv. By G. K. GUDE, F.Z.S.	112
Some notes on the genus <i>Prisma</i> , Simroth. By WALTER E. COLLINGE, B.Sc. (Plate ix.)	129
Further notes on <i>Amatia carinata</i> , Risso. By WALTER E. COLLINGE, B.Sc.	132
The Anatomy of the British species of the genus <i>Solen</i> . Pt. iv. By H. H. BLOOMER. (Plate x.)	133
Obituary.	137
<i>Physa virgata</i> mut. <i>alba</i> , nov. By Professor T. D. A. COCKERELL.	138
<i>Limaæ marinus</i> , L., in the Hawaiian Islands. By WALTER E. COLLINGE.	138
Proceedings of the Midland Malacological Society.	24 67, 138
Current Literature.	26, 67, 105, 139
General Reviews.	70
Editor's Notes.	34, 70, 108, 144

LIST OF ILLUSTRATIONS IN VOLUME IX.

	PAGE.
Anatomy of <i>Myotesta</i> . Plate I.	16
<i>Onchidium burnupi</i> , n. sp.	17
Anatomy of <i>Solen</i> . Plate II.	21
<i>Chloritis (Sulcobasis) prestoni</i> , n. sp.	59
Shells from Malay Peninsula. Plate III.	63
<i>Limnaea pereger</i> , Müll. Malformed variety of	64
<i>Separatista benhami</i> , n. sp.	65
Mollusca of the Malayan Peninsula. Plates IV, V and VI.	94
<i>Anodonta cygnea</i> , L., Parts of animal showing malformations of the gills. Plate VII.	96
<i>Macrochlamys coeligena</i> , n. sp.	97
<i>Gomphina maorum</i> , n. sp.	110
<i>Patella kermadecensis</i> , Pilsbry. Plate VIII.	111
The genus <i>Prisma</i> , Simr. Plate IX.	132
Anatomy of <i>Solen</i> . Plate X.	136

CORRIGENDA.

VOLUME viii.

- p. 121, line 14 for *iodina* read *iodinea*.
p. 123, line 21 for *torshadowed* read *foreshadowed*.

VOLUME ix.

- p. 14, line 17 for *Myolesta fruhstorfferi* read *M. fruhstorferi*.
p. 49, head-line for *Marsnall* read *Marshall*.
p. 63, lines 17 and 31 for *Lesson* read *Lessona*.
p. 78, line 10 for *fig. 24* read *fig. 15*.

THE
JOURNAL OF MALACOLOGY.

NO. I.

APRIL 10th, 1902.

VOL. IX.

A CLASSIFIED LIST OF THE HELICOID LAND
SHELLS OF ASIA.

BY G. K. GUDE, F.Z.S.

DURING the last thirty years enormous numbers of land shells have been collected in almost every part of the world, and have been described by malacologists of many countries, in memoirs scattered through innumerable publications. It thus happens that, with some exceptions, it is impossible, without much labour, to form an adequate idea of our present knowledge of the molluscan fauna of any given region.

Having concentrated much attention during the last fourteen years upon the Helicoid land shells, it has appeared to me to be desirable to catalogue these molluscs, which, fortunately enjoy great popularity among the bulk of collectors.

In the present series of articles it is proposed to attempt to draw up systematic lists of all the known Helicoids of Asia. For the sake of convenience the arrangement proposed will coincide with political divisions, except in the case of islands and archipelagoes. From present consideration, however, the following divisions will be excluded: 1.—The Philippine Islands, which have recently been treated of by Dr. O. F. von Möllendorff (*Abh. Naturf. Gesell. Görlitz*, 1898, xxii., p. 26); 2.—the Japanese Empire, the Helicoids of which have been enumerated by myself (*Proc. Malac. Soc. Lond.*, 1900, iv. p. 8., *ib.*, p. 70, *ib.*, 1901, p. 191); and 3.—India with Burma and Ceylon, which will be included by Dr. W. T. Blanford in the forthcoming volume of the "Fauna of India."

I. THE CHINESE EMPIRE.

OUR knowledge of the vast majority of Chinese land shells is derived from the labours of missionaries. Foremost must be counted the important work on the Terrestrial Mollusca of the valley of the Blue River by Father Heude, S.J., which forms part of the monumental

work of the Jesuit Fathers of Shanghai "Mémoires concernant L'Histoire Naturelle de l'Empire chinois." Next in importance come the collections made by the brothers Kaspar and Lorenz Fuchs, and Zeno Molltner, enumerated and described by Father Vincenz Gredler in twenty separate papers (1878-1900). Further important collections have been made by the Russian travellers Przewalski, Potanin, and Beresowski, whose shells have been described by Dr. von Martens (Mem. Acad. Imp. Sc. St. Petersb., 1882, xxx, p. 1), and by Dr. O. F. von Möllendorff (Ann. Mus. Zool. St. Petersb., 1899, p. 46). More recently further collections made by Mr. W. A. Obrutschew, have been described by Dr. Rudolf Sturany (Denkschr. Math. Nat. Cl. K. Akad. wiss. Wien, 1900, p. 1): and collections made by Prof. K. Futterer and Dr. Holderer have been provisionally figured, but not described, by Dr. A. Andreae (Mitth. Roemer Museum, 1900, No. 12, p. 1). Several lesser contributions will be found enumerated in the Bibliography.

So far as our present knowledge enables us to judge, the greater number of the Helicoids of this region have a limited distribution, notable exceptions are: *Cathaiva fasciola*, Drap., which is found over the whole of north, central, and western China as far south as Kiang-su; *C. pulveratrix*, Mts., which occurs over the whole of northern China, reappearing in Hu-nan, and will possibly be found on further exploration in the intermediate provinces of Ho-nan and Hu-pe. *C. richthofeni*, Mts., also occurs over the whole of North China; and *C. przewalskii*, Mts., in west China, north from Kan-su through Sze-chuen to Yun-nan in the south. The cosmopolitan *Eulota similis* and its varieties, moreover, inhabit the whole of Central China as far north as Che-kiang, west as far as Sze-chuen, and reappears in the north-west in Kan-su (Sturany), in the variety *stimpsoni*, Pfr.

A. CHINA PROPER.

Family Zonitidae.	Genus TROCHONANINA, Mouss.
Subfamily Ariophantinae , Pils	laurentiana, Gredl. Hu-pe.
Genus BENSONIA, Pfr.	Genus XESTINA, Semp.
buccata, Hde. Yun-nan.	chrysoraphe, Mdff. Sze-chuen.
Genus EUPLECTA, Semp.	Genus XESTA, Alb.
rathouisi, Hde. Kiang-su.	? indurata, Hde. Sze-chuen.
eastlakiana, Mdff. Fo-kien.	Subfamily Macrochlaminae.
petasus-chinensis, Hde. Sze- chuen.	Genus MACROCHLAMYS, Bens. superlita, Mör. Kwan-tung.

- v. *herziana*, Mdff.
politissima, Pfr. North China.
planula, Hde. Ngan-whei.
zikaveiensis, Hde. Che-kiang.
pedisequae, Hde. Yun-nan.
apex, Mdff. Kwang-tung.
simplex, Hde. Yun-nan.
stearnsi Pils Chi-li
amdoana, Mdff. Kan-su, Sze-
 chuen.
cathaiana, Mdff. Kan-su.
davidii, Desh. Chi-li.
 = *sinica*, Mts.
moupiniana, Desh. Sze-chuen.
 = *maupiniana*, Desh..
 = *mupingiana*, Mdff.
boettgeri, Hilb. Sze-chuen.
fargesiana, Hde. Sze-chuen.
distorta, Hde. Sze-chuen.
unica, Hde. Kwei-chou.
sciadophila, Hde. Sze-chuen.
derelicta, Hde. Sze-chuen.
fellea, Hde. Yun-nan.
rejecta, Pfr. Hu-nan.
 = *mamillaris*, Hde.
- Genus *KHASIELLA*, G.-A.
arata, Blf.
 v. *minor*. Yun-nan.
- Genus *MICROCYSTINA*, Mörch.
minensis, Mdff. Fo-kien.
 = *glaberrima*, Mdff.
planata, Hde. Hu-nan.
microgyra, Hde.
clausa, Hde.
sinensis, Hde.
colombeliana, Hde.
bambusicola, Hde. Ngan-whei.
hunancola, Mdff. Hu-nan.
spelaea, Hde. Ngan-whei.
castaneola, Hde. Ngan-whei.
moellendorffi, Reinh. Chi-li.
sinica Mdff. Kwang-tung.
- schmackeriana*, Mdff. Fo-kien.
perforata, Desh. Chil-li.
- Genus *RHYSOTA*, Alb.
erratica, Hde. Hu-pe.
fuchsiana, Hde. Hu-nan.
flaveopurpurea, Hde. Yun-nan.
delavayana, Hde. Yun-nan.
- Subfamily **Helicarioninae**.
- Genus *GIRASIA*, Gray.
magnifica, G.-A. Yun-nan.
venusta, Theob. Yun-nan.
- Genus *CRYPTOSOMA*, Theob.
imperator, Gould. Kwang-tung.
 v. *imperatrix*, West.
- Genus *HELICARION*, Fér.
setchuanensis, Hde. Sze-chuen.
fargesianus, Hde. Sze-chuen.
globus, Hde. Sze-chuen.
poma, Hde. Sze-chuen.
riparius, Hde. Kwei-chou.
resinaceus, Hde.
umbracultor Hde. Sze-chuen.
bulla, Hde. Sze-chuen.
dux, Hde. Kwang-si.
comes, Hde. Sze-chuen.
eques, Hde. Yun-nan.
miles, Hde. Yun-nan.
pulex, Hde. Yun-nan.
paulina, Hde. Sze-chuen.
- Genus *SITALA*, H. Ad.
turrita, Mdff. Kwang-tung.
trochulus Mdff. Kwang-tung.
trifilaris, Gredl. Hu-pe.
bilirata, Gredl. Kwang-si.
- Genus *KALIELLA*, W. T. Blanf.
costigera, Mdff.
gredleriana, Hde. Hu-nan.
rupicola, Mdff. Kwang-tung.
 v. *grandior*, Gredl.
lamprocystis, Mdff. Kan-su.
euconus, Mdff. Sze-chuen.
franciscana, Gredl. Hu-nan.

- v. planula, Gredl.
 monticola, Mdff. Kwang-tung.
 imbellis Hde. Ngan-whei.
 polygyra, Mdff. Kwang-tung.
 sculpta, Mdff. Kwang-tung.
 seckingeriana, Hde. Ngan-whei.
- Subfamily **Zonitinae**, Pils.
 Genus **VITREA**, Fitz.
 crystallodes, Gredl.
 perdita, Desh.
- Genus **EUCONULUS**, Reinh.
 sphaera, Hde. Sze-chuen.
 filovinctus, Hde. Sze-chuen.
 cuneus, Hde.
 pyramis, Hde. Sze-chuen.
 bifilaris, Hde. Sze-chuen.
 infracinctus, Hde. Sze-chuen.
 fulvus, Drap. Chi-li.
 spiriplanus, Gredl. Hu-nan.
 loana, Gredl.
- Genus **ZONITES**, Montf.
 ?? scrobiculata, Gredl. Hu-nan.
 v. hupeina, Gredl. Hu-pe.
- Genus **TROCHOMORPHA**, Alb.
 samara, Hde. Yun-nan.
 borealis, Hde. Sze-chuen, Hu-pe.
- Family **Endodontidae**, Pils.
 Group **Haplogona**, Pils.
 Genus **PYRAMIDULA**, Fitz.
 Section **GONYODISCUS**, Fitz.
 bianconi, Desh. Sze-chuen.
 pauper, Gld. Chi-li.
 = striatella Mdff. non
 Anth.
 = rudrata, Mdff. non
 Stud.
 potanini, Mdff. Kan-su.
 pallens, Gredl. Hu-pe.
 atoma, Gredl. Hu-nan.
 sanctimonialis, Gredl. Shan-
- tung, Hu-pe.
 orphana, Hde. Chi-Kiang.
 ? kuangtunensis, Gredl.
 Kwang-tung.
- Family **Helicidae**.
 Genus **PLECTOPYLIS**, Bens.
 Section **CHERSAECIA**, Gude.
 andersoni, W. T. Blf. Yun-nan.
 Section **SINICOLA**, Gude.
 emoriens, Gredl. Chi-li.
 azona, Gredl. Hu-pe.
 pulvinaris, Gld. Kwang-tung.
 v. continentalis, Mdff.
 fimbriosa, Mts. Hu-nan.
 v. nana, Mdff.
 v. continentalis, Mdff.
 reserata, Hde. Sze-chuen.
 laminifera, Mdff. Hu-pe.
 jugatoria, Anc. Kwei-chou.
 diptychia, Mdff. Kwei-chou.
 biforis, Hde.
 stenochila, Mdff. Hu-pe.
 v. basilia, Gude.
 alphonsi, Desh. Sze-chuen.
 murata, Hde. Sze-chuen.
 cutisculpta, Mdff. Fo-kien.
 invia, Hde. Sze-chuen.
 secura, Hde. Kwang-si.
 multispira, Mdff. Hu-nan.
 schistoptychia, Mdff. Hu-nan.
 vallata, Hde. Sze-chuen.
- Genus **TRAUMATOPHORA**, Anc.
 triscalpta, Mts. Hu-pe, Che-kiang.
 v. fraterminor, Gredl.
- Genus **STEGODERA**, Mts.
 angusticollis, Mts. Kiang-si,
 Kiang-su.
- Group **Epiphallogona**, Pils.
 Genus **CAMAENA**, Alb.
 Sub-genus **CAMAENA**, s.s.
 cicatricosa, Müll. Kwei-chou,

- Kwang-tung.
 = senegalensis, Fér.
 = chinensis, Voigt.
 = himalayana, Lea.
 v. inflata, Mdff. Kwei-chou.
 v. ducalis, Anc. Kwei-chou.
 vulpis, Gredl. Hu-nan.
 leonhardti, Mdff. Kwang-tung.
 subgibbera, Mdff. Kwang-tung.
 seraphinica, Hde. Kwang-si.
 xanthoderma, Mdff. Kwang-tung.
 v. polyzona, Mdff.
 rugata, Mdff. Sze-chuen.
 v. humilis, Mdff. ♀
- Genus **CHLORITIS**, Beck.
 Sub-genus **TRICHOCHLORITIS**, Pils.
 hungerfordiana, Nev. Kwang-tung.
 percussa, Hde. Hu-pe, Sze-chuen.
 franciscanorum, Gredl. Hu-nan.
 v. purpurea, Gredl. Hu-pe.
 submissa, Desh. Sze-chuen.
- Genus **GANESELLA**, Blf.
 brevibarbis, Pfr. Ngan-whei.
 alveolus, Hde. Sze chuen.
 ternaria, Hde. Hu-pe.
 micacea, Hde. Ngan-whei.
 phyllophaga, Hde. Ngan-whei.
 dormitans, Hde. Kiang-su.
 arbusticola, Desh. Sze-chuen.
 v. chrysomphala, Mdff.
 bizona, Gredl. Shen-si.
 squamulina, Gredl. Hu-nan.
 trochacea, Gredl. Hen - san, Sze-chuen.
 microtrochus, Mdff. Kwei-chou.
 vitreola, Hd. Sze-chuen.
- ingloria, Hde. Kwang-si.
 subsquamulata, Hde. Sze-chuen.
 subparasitica, Hde. Yun-nan.
 subgriseola, Hde. Yun-nan.
 peraeruginosa, Hde. Yun-nan.
 radulina, Hde. Yun-nan.
 virilis, Gredl. Hu-pe.
 v. subfusca, Gredl.
 laurentii, Gredl. Hu-pe.
 millepunctata, Mdff. Kan-su, Shen-si.
 kutupaensis, Stur. Kan-su.
- Group **Belogona**, v. Iher.
 Belogona Euadenia, Pils.
 Genus **BULIMINOPSIS**, Hde.
 Section **SEMBULIMINUS**, Mdff.
 beresowskii, Mdff. Kan-su.
 Section **BULIMINOPSIS**, s.s.
 pinguis, Anc. Shen-si.
 v. gracilis, Mdff.
 buliminus, Hde. Sze-chuen.
 = Buliminus helicopsis, Anc.
 v. strigata, Mdff.
 pseudobuliminus, Hde. Ngan-whei.
 = Buliminus macrogonus Anc.
 buliminoides, Hde. Ngan-whei.
 = Buliminus tropidophorus, Anc.
 quaternaria, Hde.? Ngan-whei.
 = borealis, Hde.
 conoidea, Hde. Sze-chuen.
 gracilispira, Mdff. Sze-chuen.
 piligera, Mdff. Kan-su.
 subcylindrica, Mdff. Kan-su.
 cylindrus, Mdff. Kan-su.
- Section **FUNICULUS**, Hde.
 hirsuta, Mdff. Kan-su.
 delavayana, Hde. Sze-chuen.
 squamosula, Hde. Yun-nan.

- asbestina*, Hde. Yun-nan.
debilis, Hde. Yun-nan.
doliolum, Gredl. Hu-pe.
 = *rudens*, Hde. Yun-nan.
probata, Hde. Yun-nan.
coriacea, Hde. Yun-nan.
larvata, Hde. Yun-nan.
pupata, Hde. Yun-nan.
achatinina, Hde. Kan-su, Sze-
 chuen.
 Section *STENOGYROPSIS*, Mdff.
 potanini, Mdff. Kan-su.
 Section *SECUSANA*, Mdff.
 cerasina, Gredl. Hu-pe.
 Genus *LAEOCATHAICA*, Mdff.
 christinae, H. Ad. Hu-pe,
 Kan-su.
 filippina, Hde. Hu-pe.
 = *christinae* v. *carinifera*,
 Anc.
 subsimilis, Desh. Sze-chuen,
 Shen-si, Hu-pe.
 subchristinae, Anc. Sze-chuen.
 stenochoone, Mdff. Kan-su.
 amdoana, Mdff. Kan-su,
 distinguenda, Mdff. Kan-su.
 tropidoraphe, Mdff. Kan-su.
 prionotropis, Mdff. Kan-su.
 v. *albocincta* Mdff. Sze-
 chuen.
 leucoraphe, Mdff. Sze-chuen.
 phaeomphala, Mdff. Kan-su.
 potanini, Mdff. Kan-su.
 odophora, Mdff. Kansu.
 pewzowi, Mdff. Kan-su.
 polytyla, Mdff. Kan-su.
 dityla, Mdff. Kan-su.
 Genus *METODONTIA*, Mdff.
 houaiensis, Crosse. Shang-
 tung, Shan-si, Shen-si, Kan-
 su, Ho-nan.
 = *huaiensis*, Crosse.
 v. *obstructa*, Hde.
 v. *hemipleuris*, Mdff. Hu-
 pe, Shen-si.
 = *moltneri*, Gredl. (juv.)
 yantaiensis, Cr. and Deb.
 Chi-li.
 v. *tetrodon*, Mdff.
 diodontina, Hde. Sze-chuen.
 griphodes, Stur. Kan-su.
 Genus *EULOTA*, Hartm.
 Section *Eulota*, s.s.
 acustina, Mdff. Sze-chuen.
 billeana, Hde. Sze-chuen.
 bocageana, Cr. and Deb.
 ? China.
 burtini, Desh. Sze-chuen,
 Shen-si.
 = *phragmitum*, Hde.
 buxina, Hde. Yun-nan.
 dichroa, Pfr. Che-kiang.
 fortunei, Pfr. Che-kiang.
 v. *meridionalis*, Mdff.
 fuchsi, Gredl. Ngan-whei.
 haesitans, Hde. Yun-nan.
 impatiens, Hde. Ngan-whei.
 improvisa, Hde. Sze-chuen.
 inopinata, Desh. Sze-chuen.
 jourdyi, Mor. Kwang-si.
 = *vorticellina*, Hde.
 latrunculorum, Hde. Sze-
 chuen.
 leprosula, Hde. Sze-chuen.
 = *leprosa*, Hde.
 maackii, Gerstf.
 v. *depressor*, Pfr. Man-
 churia.
 = *conrauxiana*, Hde.
 miliaria, Gredl. Yu-nan.
 mimicula, Hde. Sze-chuen.
 mola, Hde. Ngan-whei.
 ravida, Bens. Che-kiang.
 = *helvacea*, Phil.

- = redfieldi, Hde. non Pfr.
 v. lineolata, Mdff. Chi-li.
 ravidula, Hde. Kan-su.
 redfieldi, Pfr. Kan-su, Che-
 kiang.
 = frilleyi, Cr. and Deb. Kwang tung.
 = huberiana, Hde. Kwang tung.
 ruppelli, Desh. Sze-chuen.
 secusana, Gredl. Hu-pe.
 straminea, Hde. Kiang-su.
 thibetica, Desh. Sze-chuen.
 tourannensis, Soul. Kwang tung.
 uncopila, Hde. Kiang-su.
 vagoina, Gredl. Hu-pe.
 v. aloysii, Gredl.
 Section EULOTELLA, Mts.
 similaris, Fér. Hu-pe, Kwang-
 tung, Che-kiang, Fo-kien.
 = translucens, King.
 = woodiana, Lea.
 = squalida, Ziegl.
 = addita, Fér.
 = epixantha, Pfr.
 = striatissima, Desh.
 v. hongkongensis, Desh.
 v. obscura, Desh.
 v. arcasiana, Cr. & Deb.
 v. graminum, Hde.
 v. arundinetorum, Hde.
 v. assimilaris, Gredl. Hu-
 nan, Hu-pe.
 v. nucleus, Desh. Sze-
 chuen, Che-kiang.
 v. cathaiana, Mdff. Hu-pe.
 v. stimpsoni, Pfr. Kan-su.
 v. infantilis, Gredl. Hu-nan.
 magnaciana, Hde. Sze-chuen,
 Hu-pe.
 v. major, Hde.
 poecila, Mdff. Sze-chuen,
 Hu-pe.
 diplodesma, Mdff. Sze-chuen
 or Hu-pe.
 constantiae, H. Ad. Sze-chuen.
 Section ARMANDIA, Ancey.
 davidi, Desh. Sze-chuen.
 calymna, Schm. and Bttgr.
 Sze-chuen.
 plicatilis, Desh. Sze-chuen.
 sarelii, Mts. Sze-chuen,
 Hu-pe.
 = nora, H. Ad.
 Section COCCOGLYPTA, Pils.
 dimidiata, Hde.
 pinchoniana, Hde. Sze-
 chuen.
 Section MASTIGEULOTA, Pils.
 kiangsinensis, Mts. Hu-pe,
 Ngan-whei.
 = maacki v. unizonalis,
 H. Ad.
 v. major, Mdff.
 v. cerasina, Gredl.
 v. hilberi, Kob. Che-
 kiang.
 Section EUHADRA, Pils.
 caspari, Mdff. Hu-nan.
 pantheia, Mab.
 granulifera, Mdff. Hu-pe.
 cyclolabris, Mdff. Kan-su.
 renaltiana, Hde. Kwang-si.
 schmackeri, Mdff. Kwang-
 tung.
 ammiralis, Pfr.
 cecillei, Phil.
 moreletiana, Hde. Ngan-whei.
 stenzona, Mdff. Fo-kien.
 haematozona, Hde. Kwei-
 chou.
 cremata, Hde. Che-kiang.
 seguiniana, Hde. Yun-nan.

- delavayana, Hde.
 ? sanata, Hde. Kwang-si.
 hemiclista, Schm. and Bttgr.
 Sze-chuen.
 latilabris, Mdff. Che-kiang.
 tenuitesta, Mdff. Sze-chuen.
 v. taeniata, Mdff.
 carpochroa, Mdff. Sze-chuen.
 stictotaenia, Mdff. Kan-su.
 pseudocampylaea, Mdff. Sze-
 chuen.
 strauchiana Mdff. Kan-su.
 amphidroma, Mdff. Sze-chuen.
 haplozona, Mdff. Sze-chuen.
 eris, Mdff. Kan-su.
 v. pachychila, Mdff.
 v. nana, Mdff.
 micromphala, Mdff. Kan-su.
 anceyi, nom. nov.
 = pseudocampylaea, Ancey
 non Mdff. Sze-chuen.
 Genus CATHAICA, Mdff.
 Sub-genus EUCATHAICA, Andreae.
 fasciola, Drap. Chi-li, Shen-si,
 Kan-su, Shan-tung, Shan-si,
 Ho-nan, Sze-chuen, Hu-pe,
 Hu-nan, Kiang-su.
 = pyrrozoza, Phil.
 = striatula, Müll.
 cardiostoma, Mdff. Kan-su.
 subtilistriata, Andr.
 pekingensis, Desh. Chi-li.
 = tchiliensis, Mdff.
 v. conoidea, Mdff.
 transitans, Mdff. Kan-su.
 brevispira, H. Ad. Sze-chuen.
 anceyi, Mdff.
 Sub-genus, PLIOCATHAICA, Andr.
 pulveratrix, Mts. Kan-su, Shen-
 si, Chi-li, Hu-nan, Shan-si.
 v. bizona, Gredl. Kan-su
 Shan-si, Chi-li.
 v. shensiensis, Hilb. Shen-si.
 orithya, Mts. Ho-nan. Shan-si.
 v. confucii, Hilb. Kan-su,
 Shen-si.
 v. montana, Mdff. ? Kan-su.
 corrugata, Mdff. Ho-nan.
 janulus, Mdff. Kan-su.
 richthofeni, Mts. Chi-li, Shan-
 tung, Shan-si, Ho-nan, Shen-
 si, Kan-su.
 = buvigneri, Desh.
 v. kalganensis, Mdff.
 = subrugosa v. minor, Mdff.
 subrugosa, Desh. Chi-li.
 gansuica, Mdff. Kan-su.
 perversa, Stur. Kan-su.
 nodulifera, Mdff. Kan-su.
 Sub-genus XEROCATHAICA, Andr.
 kreitneri, Hilb. Kan-su.
 v. subangulata, Mdff.
 v. nana, Mdff.
 siningfuensis, Hilb. Kan-su.
 nanschanensis, Mdff. Kan-su.
 pulveratricula, Mts. Kan-su,
 Shen-si.
 = loczyi, Hilb.
 samarella, Hde. Yun-nan.
 iacosta, Mdff. ? Kan-su.
 ochtheophiloides, Mdff. Kan-su.
 lutuosa, Desh. Chi-li.
 sempriniana, Hde. Hu-nan.
 Sub-genus PSEUDIBERUS, Ancey.
 tectum-sinense, Mts. Shang-
 tung.
 futtereri, Andr.
 zenonis, Gredl. Shan-tung.
 plectotropis, Mts. Tien-shan.
 mongolica, Mdff. Chi-li.
 dejeana, Hde. Sze-chuen.
 Sub-genus CAMPYLOCATHAICA,
 Andr.
 przewalskii, Mts. Kan-su, Sze-

- chuen, Yun-nan.
 = menciï, Hilb.
 v. minor, Andr.
 v. bizona, Andr.
 v. gredleri, Hilb. Kan-su,
 E. Thibet.
 = stoliczkana, Hilb. non
 Nev.
 = menciï, var Hilb.
 = buddhae, Hilb.
 v. carinata, Andr.
 v. exigua, Andr.
 v. gracillima, Andr.
 v. heudei, Hilb.
 v. depressa, Andr.
 connectens, Mdff. Kan-su.
 polystigma, Mdff. Kan-su.
 v. amdoana, Mdff. Sze-
 chuen.
 obrutschewi, Stur. Kan-su.
 Genus PLATYPETASUS, Pils.
 innominata Hde. Sze-chuen,
 Hu-pe.
 ? = mariella v. aquila,
 H. Ad.
 v. duplicata, Mdff. Hu-pe.
 mariella, H. Ad. Hu-pe.
 v. submariella, Pils.
 castanopsis, Mdff. Hu-pe, or
 Sze-chuen.
 trochomorpha, Mdff. Sze-
 chuen.
 causia, Mdff. Sze-chuen.
 obrutschewi, Stur. Kan-su.
 encaustochila, Mdff. Kan-su.
 strophostoma, Mdff. Kan-su.
 Genus PLECTOTROPIS, Mts.
 mackensii, Ad. and Rve.
 v. mystagoga, Mab.
 gerlachi, Mdff. Hu-nan.
 v. granulosostriata, Mts.
 v. abrupta, Mts.
 v. hunancola, Gredl.
 lacinosula, Hde.
 = laciniosa, Hde.
 trichotropis, Pfr. Hu-pe.
 v. laciniata, Hde. Che-
 kiang.
 v. shanghaiensis, Pfr. Che-
 kiang.
 ciliosa, Pfr. North China.
 ningpoensis, Btgr. Che-kiang.
 esau, Gredl. Hu-pe.
 patungana, Gredl. Hu-pe.
 piligera, Gredl. Kwei-chou.
 hupensis, Gredl. Hu-pe.
 = orthocheilis, Hde.
 barbosella, Hde. Che-Kiang.
 lofouana, Mdff. Lo-fou-shan.
 subconella, Mdff. Kwang-si.
 sterilis, Hde. Hu-pe.
 demolita, Hde. Sze-chuen.
 lithina, Hde. Hu-pe.
 = calculus, Hde.
 sedentaria, Hde. Kwei-chou.
 parasitarum, Hde. Hu-pe.
 parasitica, Hde. Hu-pe.
 catostoma, Blf. Yun-nan.
 lepidostola, Hde. Hu-pe.
 v. trochospira, Mdff.
 squamosella, Hde. Ngan-whei
 pentagonostoma, Mdff. Kan-
 su.
 diploblepharis, Mdff. Kan-su.
 comata, Stur. Kan-su.
 pseudopatula, Mdff. Sze-chuen.
 ? applanata, Mdff. Fo-kien.
 Genus AEGISTA, Alb.
 chinensis, Phil. Ngan-whei.
 = vermis, Hde. non Rve.
 v. minor.
 pseudochinensis, Mdff. Hen-
 san.
 = chinensis, Hde. non

- Phil.
 platyomphala, Mdff. Kwan-tung.
 serpestes, Hde. Hu-pe.
 herpestes, Hde. Sze-chuen.
 furtiva, Hde. Kwei-chou.
 aubryana, Hde. Kwei-chou.
 accrescens, Hde. Hu-pe, Kwei-chou.
 = accedens, Schm. and Bttgr.
 v. initialis, Hde.
 hupeana, Gredl. Hu-pe. Hu-nan.
 megacheila, Mdff. Kan-su
 v. alticola, Mdff. Sze-chuen.
 subcinctula, Hde. Yun-nan.
 = subcincta, Hde.
 mensalis, Hde. Yun-nan.
 thoracica, Hde. Hu-pe.
 secundaria, Hde. Sze-chuen.
 mellita, Hde. Yun-nan.
 mellitula, Hde. Yun-nan.
 permellita, Hde. Yun-nan.
 rebellis, Hde. Sze-chuen.
 languescens, Hde. Sze-chuen.
 vicinella, Hde. Hu-pe.
 aranaetela, Hde. Sze-chuen.
 radulella, Yun-nan.
 turbo, Pils. Hu-pe.
 = turbinella, Hde. non Morel.
 taliensis, Hde. Yun-nan.
 = talifouensis, Hde.
 puberosula, Hde. Yun-nan.
 = pulverulenta, Hde. non Lowe.
 amphiglypta, Anc. Sze-chuen.
 szechenyi, Anc. Sze-chuen.
 tenerrima, Mdff. Sze-chuen.
 Genus STILPNODISCUS, Mdff.
- verniginus, Mdff. Kan-su.
 euphyes, Stur. Kan-su.
 scassianus, Mdff. Kan-su, Sze-chuen.
 entochilus, Mdff. Kan-su.
 Genus CHALEPOTAXIS, Anc.
 infantilis, Gredl. Kwang-si, Hu-nan.
 BELOGONA SIPHONADENIA, Pils.
 Genus HYGROMIA, Risso.
 Section FRUTICIOLA, Held.
 subechinata, Desh. Sze-chuen.
 tchefouensis, Cr. and Deb. Shan-tung, Sze-chuen.
 = tchefouensis, Mts.
 = munieriana, Cr. & Deb.
 puberula, Hde. Sze-chuen.
 horripilosella, Hde. Sze-chuen.
 nautarum, Hde. Hu-pe.
 semihispida, Anc. Shen-si.
 sitalina, Gredl. Hu-pe.
 reformata, Gredl. Hu-pe.
 Genus VALLONIA, Risso.
 costata, Müll. Chi-li.
 patens, Reinh. Chi-li.
 tenera, Reinh. Che-kiang, Sze-chuen, Kan-su.
 declivis v. altilis, Sterki, Sze-chuen.
 ladacensis v. tibetana, Mdff. Sze-chuen.
 Genus HELICODONTA, Fér.
 subobvoluta, Anc. Shen-si.
 molina, Hde. Hu-pe.
 biconcava, Hde. Hu-pe.
 omphalospirum, Mdff. Hu-pe.
 diplomphala, Mdff. Hu-pe.
 uninodata, Gredl. Hu-pe.
 binodata, Mdff. Hu-pe.
 bicallosula, Hde. Sze-chuen.
 Sub-genus MOELLENORFFIA, Anc.

trisinuata, Mts.	Kwang-tung.	biscalpta, Hde.	Sze-chuen.
v. sculptilis, Mdff.		SPECIES OF UNCERTAIN POSITION.	
hensaniensis, Gredl.	Hu-nan.	Helix keratina, Hde.	Kwang-si.
erdmanni, Schm. and Bttgr.		„ ostreola, Hde.	Kwang-si.
faberiana, Mdff.	Sze-chuen.	„ jacob, Gredl.	Hu-pe.

ON THE ANATOMY OF THE GENUS MYOTESTA, Cllge.

BY WALTER E. COLLINGE.

(Plate i.)

THE genus *Myotesta* was established in 1901¹ for the reception of two interesting slug-like molluscs, received from and collected by, Mr. H. Fruhstorfer of Berlin, in Tonkin.

On further examination, the anatomical characters and general structure prove so very different from any known family of pulmonates, that it has been considered expedient to propose for the reception of this interesting genus a new family, to which the name *Myotestidae* is given.

Until more material is obtained, and the form and structure of the pallial organs, free muscles, and digestive system are worked out, it is not possible to say with any certainty, what relations this peculiar family has to other families of slug-like molluscs. The material at my disposal has not enabled me to investigate satisfactorily these organs, but I am able to give details of the generative organs and a general description of others.

MYOTESTIDAE, n. fam.

Myotesta, Cllge.

Myotesta, Cllge. : Journ. of Malac., 1901, vol. vii., p. 118.

Animal slug-like, with the mantle conspicuously elevated into a non-spiral visceral hump, and completely enclosing a flat, somewhat ovoid, non-spiral, plate-like shell. Dorsum posteriorly sharply keeled, Respiratory orifice in front of the middle of right margin of mantle. Generative orifice below and immediately behind the right upper tentacles. The foot-fringe is continued posteriorly to form the overhanging caudal lobe. Caudal mucous pore. Foot-sole narrow, divided into median and lateral planes. Viscera elevated into a non-spiral dorsal hump, and posteriorly lying in a triangular depression of the dorsum. Body-cavity not extending into the tail portion, which is solid.

¹ Journ. of Malac., 1901, vol. viii, p. 118.

Jaw crescentic, with ten broad ribs, slightly denticulating the basal margin.

Generative system crowded into the right anterior portion of the body-cavity, excepting the hermaphrodite gland, which lies embedded in the "liver," in the folds of the intestinal tract, dorso-posteriorly. Well developed penis, passing into an epiphallus. Origin of retractor muscle on the anterior portion of the right body-wall. Receptaculum seminis with duct.

Externally the members of this genus remind one somewhat of those of *Parmarion*, Fischer, and *Mariaella*, Gray, but this is only a superficial resemblance.

When first examined the large shell-cavity seemed to have a small irregular opening, but the examination of further and better material leaves no doubt but that this opening was due to damage. *The cavity is completely closed*, and contains at its anterior end, a flat, non-spiral, plate-like shell; it is extremely thin, ovoid in outline, covered by a thin periostracum, and composed of numerous minute, irregularly shaped, calcareous particles. Immediately under this plate-like shell lies the heart, and a little posterior to it, the kidney and ureter; whilst beneath the extreme posterior end of the shell-cavity, the rectum is seen crossing from left to right. The lung is very small, and its exact extent difficult to trace.

Externally one notices that the visceral hump lies in a triangular depression of the dorsum, so that the keel of the dorsum seems to divide anteriorly in a Y-shaped manner. On the right side of the body a deep groove passes from the respiratory orifice to the generative orifice (Pl. 1, fig. 7, *gr.*).

Myotesta fruhstorferi, Cllge.

Pl. 1, figs. 1-4.

Myotesta fruhstorferi, Cllge.: Journ. of Malac., 1901, vol. vii, p. 118.

Animal yellowish-brown, with brown mottling; head and tentacles light-blue; mantle yellowish-brown with faint, net-like, brown markings. Caudal mucous pore small. Peripodial groove very distinct. Foot-fringe deep yellow with a few brownish splashes; lineoles brown, broad and irregular, with finer lighter coloured lines intervening. Foot-sole dirty yellow.

Length (in alcohol) 39 millim., breadth of foot-sole 3 millim.

The Generative Organs (Pl. 1, fig. 4).--The vagina is a thick walled tube, slightly bent and twisted, at its distal end a small receptaculum

semis opens into it, the receptacular duct imperceptibly passing into the expanded head. The free-oviduct is short. The penis is a long, thick-walled, muscular organ, at its distal end there is a short, thick, retractor muscle which arises from the right body-wall at the anterior end of the body-cavity; beyond the region of insertion of this muscle the lumen of the penis is continued into the epiphallus from which two small diverticula arise (Pl. 1, fig. 4, *dic.*), the first and smaller is a simple caecal outgrowth, the second is slightly larger, thicker, and more muscular, both were very carefully examined but were not found to contain anything. Beyond these diverticula the epiphallus expands, into a club-shaped body and contains a few, irregular shaped, calcareous particles. From the inner side of the epiphallus a short vas deferens connects this organ with the prostatic canal. When dissected the penis is seen to have a lumen agreeing closely with its external form. The oviducal portion of the common duct is large and folded upon itself. The hermaphrodite gland lies embedded in the "liver," and occupies a position considerably more posterior than the rest of the generative organs; the duct is short and slightly convoluted. The albumen gland is comparatively small.

***Myotesta punctata*, Clge.**

Pl. 1, figs. 5—11.

Myotesta punctata, Clge.: Journ. of Malac., 1901, vol. vii, p. 119.

Animal a deep brown with a few yellowish, somewhat stellate spots; head and tentacles dark blue; mantle brown with few dark blotches and spotted with yellow. Peripodial groove ill-defined. Foot-fringe yellowish-brown with closely set lineoles. Foot-sole, lateral planes brownish with yellow maculations, median plane dirty brown and smooth.

Length (in alcohol) 34 millim., breadth of foot-sole 4 millim.

The Generative Organs (Pl. 1, figs. 8-11).—In this species the generative organs differ considerably from those in *M. fruhstorferi*. There is a wide vestibule into which the short vagina opens on the left, the penis papilla protruding into it on the right (Pl. 1, fig. 9). The receptaculum seminis is much larger than in the preceding species, as also its duct, which is probably due to the fact that here it was fully distended by its contents, and contained a well-developed spermatophore (Pl. 1, fig. 10). This body consists of a spirally wound tube with numerous, and variously shaped, spines studded over its surface; some of these spines are quite simple (Fig. 11a.), while others are much more complicated (Fig. 11 b-f.), the most varied consisting

of three branches rising from a common stem, each branch bifurcating at its free end. The penis, proximally, consists of a wide, sac-like sheath, into which the penis papilla protrudes, beyond this it narrows and just before joining with the epiphallus widens out into a bulbous head. The epiphallus is slightly longer than in *M. fruhstorferi* and it exhibits no diverticula; it is widest about its middle. The vas deferens is longer than in the preceding species. The common duct exhibits two sharp folds. No retractor muscle of the penis could be traced. The hermaphrodite duct is rather longer than in *M. fruhstorferi*, so that the hermaphrodite gland lies embedded in the "liver," close to the side of the intestine, much more dorsally and posteriorly than the remaining portions of the generative organs.

Since the above description was written, I have received from Dr. H. Simroth a short paper² on a remarkable new species of Stylommatophora, to which he gives the name *Ostracolethe fruhstorferi*, gen. et sp. nov., and from his description I am inclined to think that this animal is what I have named *Myotesta fruhstorferi*, although there are certain features in the anatomy described by him, which I have failed to find in my specimen. In both cases the specimens were received from Mr. Fruhstorfer, and collected in Tonkin.

Describing the generative organs Dr Simroth writes, "The vas deferens has, before it passes into the penis, three short, thick flagella; the penis resembles that of the *Parmarion* group, such as *Microparmarion*. Its retractor originates neither on the left, nor by the diaphragm, but further forward, quite close to the inner root of the right ommatophore. The vas deferens, after running separately for a time near the oviduct, enters and is blended with it. This portion, which is attached by muscles to the right-wall of the body, is I regret not clearly defined in this specimen, although it has been most carefully dissected. However, the following facts are clear: From the point of origin there proceed two cords, of which one is the normal seminal duct, which can be traced as far as the near end of the penis, the other turns to thick muscle underneath and penetrates to the distal extremity of the penis. This muscle seems to contain a fine canal, which may serve for internal impregnation, as is the case with many other robber pulmonates, but in a somewhat different fashion. But the most remarkable peculiarity lies in the fact that, near the point of origin, in the adhering muscle, there are a number of plate-shaped discs

2. Zool. Anz., 1901 (Dec. 30), Bd. xxv, pp. 62-64.*

(14) which can best be likened to trowser buttons, which are concave on one side. They are arranged on one base. Each disc has a narrow central, cloven lumen, and arises out of cruciform muscle fibres, of which the radiating bundles are enclosed. One might very well imitate this structure, by dissecting out in large portions a number of cross sections of the thick penis muscle and by placing them close to each other upon a flat surface. It is this penis muscle which I wished to bring into connection with the attraction and dart-glands of the *Vitrinae*, which species together with others of the Atlantic members of this genus, discharge upon themselves from the penis, and must necessarily be more or less permeated by the seminal fluid. Although it is quite certain that the lumenae of the discs must be connected by a canal, I have as yet unfortunately failed to distinguish any such canal in the muscular tissue. The functions of the organ are presumably the same as in other muscular penes. Still we do not know precisely whether it performs the function of discharging the spermatozoa, or whether it brings about impregnation by some specialised fluid; we can only conjecture that its function is of some such nature judging from its form and structure."

On reading the above description, I re-examined the material I have, but was unable to trace the disc-like bodies. The retractor of the penis, when carefully dissected away and teased, was similar to that in other molluscs. Further, Dr. Simroth, is very definite in his statement respecting the perforation of the mantle by the shell, he writes (p. 62) "at the hinder end on the posterior of the [shell] sac, somewhat to the left, a very fine cleft is observable, which cannot, however, with certainty be traced as far as the opening of the mantle. *But the striking peculiarity is, that, through this cleft, there projects outward in the perfect snail, the fine point of the conch-like shell.*" The enclosed shell is composed of an anteriorly situated calcareous plate, on which an extraordinarily, thin, wide, and structureless conch-like shell fits close, and covers the sac."

In *Myotesta* there is no conch-like shell, nothing beyond the flat, plate-like shell, and this, in perfect specimens, is entirely covered and enclosed by the mantle.

Possibly *Myotesta* and *Ostracolethe* are distinct, but no doubt Dr. Simroth will later give figures and a further description.

I have to acknowledge with grateful thanks a grant from the Royal Society, which has enabled me to obtain the material here described and figured.

* The italics are mine, W.E.C.

EXPLANATION OF PLATE I.

Myotesta fruhstorferi, Clg.

- Fig. 1. View of the animal from the right side. $\times \frac{1}{2}$.
 Fig. 2. Dorsal view. $\times \frac{1}{2}$.
 Fig. 3. Jaw, considerably enlarged.
 Fig. 4. Generative organs.

Myotesta punctata, Clg.

- Fig. 5. View of the animal from the right side. $\times \frac{1}{2}$.
 Fig. 6. Dorsal view. $\times \frac{1}{2}$.
 Fig. 7. Anterior end of body showing lateral groove and genital orifice.
 Fig. 8. Generative organs.
 Fig. 9. Proximal portion of penis opened to show penis papilla.
 Fig. 10. Spermatophore.
 Fig. 11. Different forms (a-f.) of spines on the spermatophore.

REFERENCE LETTERS.

<i>alb. gl.</i>	Albumen gland.	<i>p.</i>	Penis.
<i>div.</i>	Diverticula of epiphallus	<i>p.p.</i>	Penis papilla.
<i>ep.</i>	Epiphallus.	<i>pr.</i>	Prostate.
<i>f. ov.</i>	Free-oviduct.	<i>r.d.</i>	Receptacular duct.
<i>gr.</i>	Groove.	<i>r.s.</i>	Receptaculum seminis.
<i>g.or.</i>	Generative orifice.	<i>r.m.</i>	Retractor muscle.
<i>n.d.</i>	Hermaphrodite duct.	<i>r. or.</i>	Respiratory orifice.
<i>h. gl.</i>	Hermaphrodite gland.	<i>v. d.</i>	Vas deferens.
<i>ov.</i>	Oviduct.	<i>vg.</i>	Vagina.



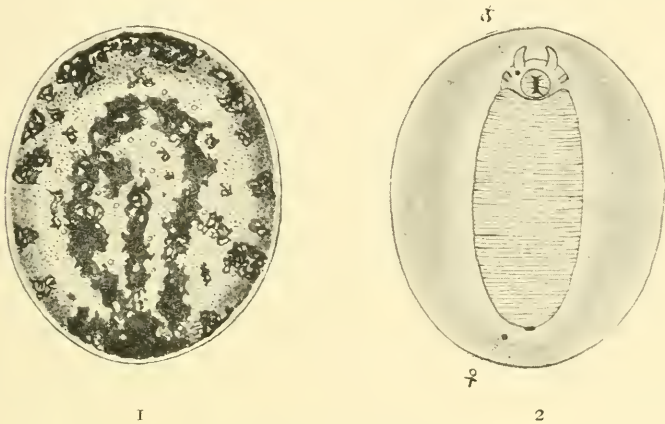
DESCRIPTION OF A NEW SPECIES OF ONCHIDIUM FROM SOUTH AFRICA.

BY WALTER E. COLLINGE.

THE only species of *Onchidium* at present known from South Africa, is the *O. peroni* of Cuvier.

In November 1900, Mr. Henry C. Burnup very kindly sent me two examples of a small species, which upon examination prove to belong to a new species. It gives me much pleasure to name this addition to the South African fauna after Mr. Burnup, as a mark of appreciation of the valuable assistance he has at all times so willingly rendered me, in connection with my studies on the slug fauna of South Africa.

Onchidium burnupi, n. sp.



Onchidium burnupi, n. sp.

Fig. 1—Dorsal view,

Fig. 2—Ventral view,

Notum finely granulated, yellowish irregularly blotched with blackish-green, these blotches being most prominent at the edge and in the middle of the notum. Dorsal eyes irregularly scattered. Head large. Hyponotum greenish-grey. Foot-sole greyish-yellow, faintly marked with fine transverse wrinkles. Male generative orifice on the right side of the head, on the inner side of the right upper and lower tentacles. Female generative orifice, in front of the anus, partially hidden by the posterior border of the foot-sole. Anal aperture slightly to the right of the median line.

Length of notum (in alcohol) 11 millim. ; breadth 9 ; hyponotum 3 millim. broad ; foot-sole 8.5 millim. long, 3 broad.

Hab.—Umlaas Lagoon, Natal.

THE ANATOMY OF THE BRITISH SPECIES OF THE GENUS SOLEN. Pt. iii.*

BY H. H. BLOOMER.

(Plate ii.)

NERVOUS SYSTEM.

Solen ensis, L. (Pl. ii., figs. 18—20.)

The cerebro-pleural ganglia (Figs. 18-19, *C. P. G.*) are situated under the anterior bifurcated parts of the anterior retractor pedis muscles, just in front of the mouth. The two ganglia can be seen *in situ* through the transparent ventral integument. They lie some distance apart, but are connected by a commissure (Figs. 18 and 19, *C. P. C.*). Anteriorly each ganglion gives rise to an anterior pallial nerve (*A. P. N.*) running in an antero-lateral direction, towards the posterior edge of the anterior adductor muscle; some distance before reaching the latter, a large branch (*V. A. N.*) leaves the nerve on its inner side, and traverses the whole length of the ventral surface of the muscle close to the lateral edge, innervating it with a number of small branches. About one-third of its course along the muscle it gives off a large branch which passes along the transparent portion of the mantle-lobe. Both nerves eventually join the outer circumpallial nerve (*O. C. N.*).

When the anterior pallial nerve reaches the transparent portion of the mantle-lobe, a large branch leaves it and crosses the mantle in a ventral direction and divides, both portions joining the outer circumpallial nerve. This latter nerve, shortly after leaving the main pallial nerve is connected with the inner circumpallial nerve (Fig. 18, *I. C. N.*), which proceeds in a posterior direction, and curving ventrally joins the posterior pallial nerve.

The main anterior pallial nerve (*A. P. N.*) pursues an anterior direction. From it four large branches originate, all of which pass ventrally and eventually join the outer circumpallial nerve (*O. C. N.*).

Each cerebro-pleural ganglion also gives rise to another anterior nerve (Figs. 18 and 19, *D. A. N.*), which passes along the ventral surface of the anterior bifurcation of the retractor pedis anterior muscle, and then along the dorsal surface of the anterior adductor muscle, on its course giving a number of small branches to both muscles, the liver, and the dorsal integument. The ganglia also give off several small nerves which pass direct to the muscles and viscera.

Posteriorly a connective joins each cerebro-pleural with the

* See ante, vol. viii. p. 97.

viscero-parietal ganglion. The direction of the connective after leaving the ganglion is, for a short distance, between the retractor pedis anterior muscle, and the ventral integument, then close to the side of the muscle, and crossing over it continues along the side of the viscera, afterwards passing through the wall of the retractor pedis posterior muscle, and finally under the bifurcated portion of the muscle, to the viscero-parietal ganglion (Figs. 18 and 20, *V.P.G.*).

On the inner side of each cerebro-visceral connective runs a cerebro-pedal connective (Figs. 18 and 19, *Ce. P.*). On leaving the cerebro-pleural ganglion, the cerebro-pedal connective traverses a short distance under and then on the inner side of the retractor pedis anterior muscle, it then buries itself in the tissues of the foot, and emerging into the pedal sinus, passes close to the longitudinal muscle to the pedal ganglion. From this connective a nerve arises which passes to the viscera.

The pedal ganglia (Fig. 18, *P.G.*) are situated in the proximal part of the foot, near its dorsal surface, and close to the most ventral fold of the intestine. From them a number of nerves radiate which innervate the viscera and the muscles of the foot. Passing along the latter are four pairs of nerves, four nerves traversing each side, between the longitudinal and transverse muscles, to the distal end. From these a number of small branches arise.

The viscero-parietal ganglia (Fig. 18 and 20, *V.P.G.*) are situated between the bifurcated portions of the posterior retractor pedis muscle, and anterior to the posterior adductor muscle; like the cerebro-pleural ganglia they can be seen through the transparent ventral integument. Anteriorly they give rise to two branchial nerves (Figs. 18 and 20, *B.N.*), one curving to the right and the other to the left, passing to the base of the inner gills. They run immediately beneath the afferent branchial vessels.

From the posterior part of the ganglia the two posterior pallial nerves arise (Figs. 18 and 20, *P.P.N.*). Each nerve passes underneath the posterior adductor muscle, and along the inner surface of the dorsal portion of the muscular part of the mantle lobes, formed by their conrescence. On their way each gives off a large inner nerve, and from both a series of smaller branches pass to the surrounding tissue.

Near the muscular fringe of the posterior pallial band the posterior pallial nerve divides, the outer branch crossing the mantle lobe ventrally and first joining the inner circumpallial nerve, and afterwards the outer circumpallial nerve. The other branch, in all probability, passes around the base of the siphon, sending out branches to it and the muscles of the mantle, and then joins the outer circum-

pallial nerve, but I have not been able to trace the complete connection.

The posterior portion of the outer circumpallial nerve joins the anterior portion close to the fourth aperture (Fig. 18, F.A.).

The inner circumpallial nerve proceeds from a branch of the anterior pallial nerve, and passes in a curved direction to the posterior pallial nerve.

The outer circumpallial nerves and the nerves of the anterior adductor muscle converge and apparently join at the point where the dorsal integument is connected with the teeth of the shell (Fig. 18, D.I.S.).

S. siliqua, L.

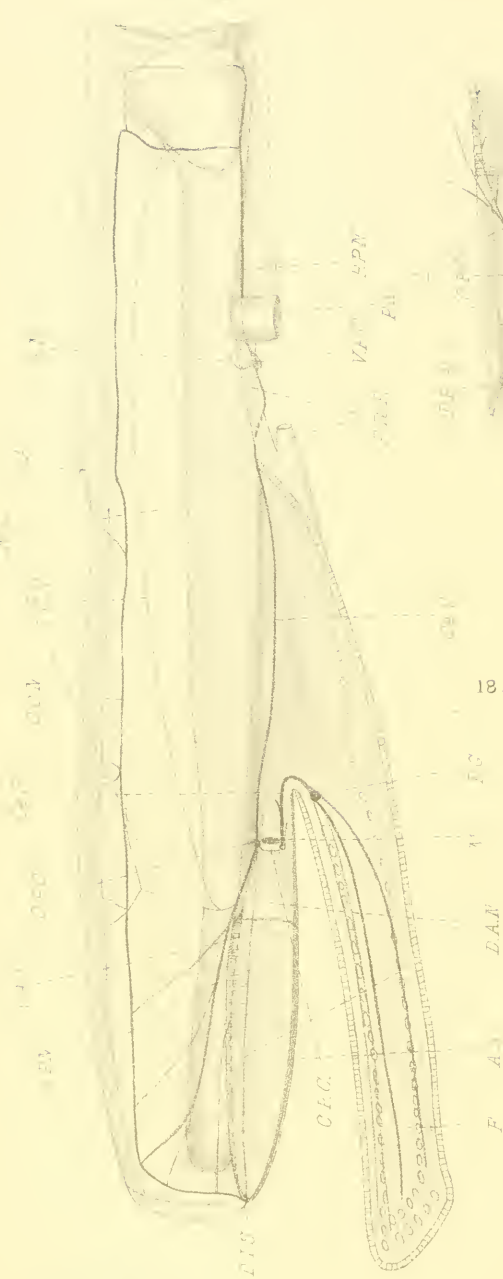
The nervous system of this species is similar to that of *S. ensis*, and only differs from it in minor details.

S. marginatus, Pult. and Don.

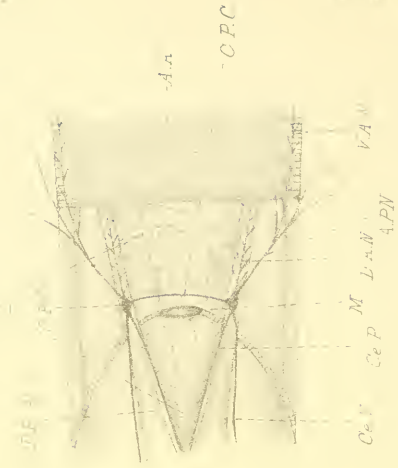
The cerebro-pleural ganglia are not discernable through the ventral integument, owing to the forward projection of the lips formed by the labial palps. Anteriorly each ganglion only gives rise to one nerve, the anterior pallial nerve. It proceeds to the postero-lateral edge of the anterior adductor muscle, then along the ventral surface of the muscle near its lateral edge, but when about one-third of the distance it divides, the inner branch continuing under the muscle, and eventually reaching the point where the dorsal integument is attached to the teeth of the shell. The outer branch passes along the transparent portion of the mantle lobe, and joins the circumpallial nerve.

The pedal ganglia are similar in position to those of *S. ensis*, but owing to the position of the viscera in the foot, a portion of the intestine and the caecum of the crystalline style lie distal to them. A number of nerves radiate from the ganglia to the viscera and the muscles of the foot.

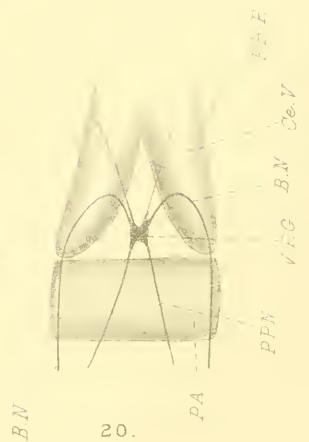
The position of the visceroparietal ganglia is discernable through the transparent ventral integument as in *S. ensis*. Passing from them posteriorly are two large pallial nerves, each of which, shortly after passing under the posterior adductor muscle, bifurcates, the inner branch of the one converging towards the inner branch of the other, and both proceed to the base of the siphon. The outer branch pursues a ventro-lateral direction across the muscular portion of the mantle lobe. Both nerves apparently join the circumpallial nerve, though I have not been able to clearly trace the connection. There is evidently only one circumpallial nerve, the same being equivalent to the outer circumpallial nerve of *S. ensis*.



18.



19.



20.

EXPLANATION OF PLATE II.

- Fig, 18, *Solen ensis*, L, Semi-diagrammatic figure of the nervous system, seen from the left side.
- Fig, 19, do The Cerebro-pleural ganglia, viewed from the ventral surface. $\times 2$,
- Fig, 20, do The Viscero-parietal ganglia, viewed from the ventral surface. $\times 2$,

REFERENCE LETTERS.

- | | |
|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <i>A.A.</i> Anterior adductor muscle. | <i>L.</i> Liver. |
| <i>A.P.N.</i> Anterior pallial nerve. | <i>M.</i> Mouth. |
| <i>B.N.</i> Branchial nerve. | <i>M.L.</i> Mantle lobe. |
| <i>Ce.P.</i> Cerebro-pedal connective. | <i>O.C.N.</i> Outer circumpallial nerve. |
| <i>Ce.V.</i> Cerebro-visceral connective. | <i>P.A.</i> Posterior adductor muscle. |
| <i>C.P.C.</i> Cerebro-pleural commissure. | <i>P.G.</i> Pedal ganglion. |
| <i>C.P.G.</i> Cerebro-pleural ganglion. | <i>P.P.N.</i> Posterior pallial nerve. |
| <i>D.A.N.</i> Dorsal nerve of the anterior adductor muscle. | <i>P.R.A.</i> Bifurcated parts of retractor pedis anterior muscle. |
| <i>D.I.S.</i> Point where the dorsal integument is connected with the teeth of the shell. | <i>P.R.P.</i> Bifurcated parts of retractor pedis posterior muscle. |
| <i>F.</i> Foot. | <i>S.</i> Siphon. |
| <i>F.A.</i> Fourth aperture. | <i>V.A.N.</i> Ventral nerve of the anterior adductor muscle. |
| <i>I.C.N.</i> Inner circumpallial nerve. | <i>V.P.G.</i> Viscero-parietal ganglion. |

DESCRIPTIONS OF SIX NEW LAND SHELLS FROM THE MALAY PENINSULA.

BY E. R. SYKES, B.A., F.L.S.

THE following are bare diagnoses; it is proposed that figures shall follow later.

Rhodina (?) mirabilis, n. sp.

Shell recalling in form *Rhodina perakensis*, de Morgan, but the earlier whorls increase more rapidly, and the lower half of the shell has a more cylindrical appearance. The columella is twisted, and a revolving keel encircles the base and ascends spirally into the shell, about half way up the columella wall; in addition, another keel is visible from the junction of the suture line and the outer lip until, revolving round the periphery, it fades out where it bisects the outer lip. Whorls 13, earlier ones smooth, later ones strongly striate.

Alt. 2.45; diam. max. 3.5 millim.

Hab.—Kelantan, Malay Peninsula.

Streptaxis collingei, n. sp.

Shell openly umbilicated, well depressed, costulated, the costa being fine and regular, hyaline or yellowish white; whorls, $6\frac{1}{2}$ —7, somewhat convex, suture well marked, the last whorl being considerably distorted. Aperture oblique, sub-quadrate, peristome expanded and reflected; parietal lamella oblique and curved, palatal teeth generally four, sometimes only three, the uppermost and lowest being the largest.

Alt. 5; diam. max. 9 millim.

Hab.—Kelantan, Malay Peninsula.

A well-depressed shell, which, in the form and position of the teeth, recalls *S. siamensis*, Pfr.

Opisthostoma laidlawi, n. sp.

Shell ovate-conic, pale reddish horn-colour, apex obtuse; whorls 6- $6\frac{1}{2}$, strongly convex, the lower ones being regularly, but finely and somewhat distantly, marked with lamellae. The last whorl is solute, rounded, and bent backwards nearly to the suture of the fourth whorl.

Alt. 2; diam. max. 2.5; diam. min. 1.5 millim.

Hab.—Kelantan, Malay Peninsula.

Recalls in form several of the Bornean species, but the apex is much depressed, the shell is not so pyramidal, and the whorls very conic.

Clausilia (Pseudonemia) kelantanese, n. sp.

Shell elongately fusiform, dark chestnut brown, with 11-11 $\frac{1}{2}$ whorls; protoconch large, cylindrical, and smooth, the later whorls being closely, finely striate, with traces of spiral sculpture crossing the striae;

suture well marked; last whorl very slightly narrower than the preceding one. Mouth ovate-pyriform, chestnut within, the peristome being solute, thickened and reflexed. Parietal lamella nearly vertical and reaching to the lip, columellar lamella moderately deeply seated, twisted, and ascending fairly rapidly; plica principalis medium in size, with two small palatal plicae (upper one the largest) below.

Alt. 31.8; diam. max. 5 millim.; alt. apert. 6.5, lat. apert. 4.8 millim.

Hab.—Kelantan, Malay Peninsula.

Related to *C. filicostata*, Stol., and *C. kapayanensis*, de Morgan; from the latter it may readily be separated by its size, and from the former, in addition to the characters of the plicae and lamellae, the much larger protoconch will readily separate it. The specimens were collected with *C. filicostata*.

Platyrrhaphé chrysalis, n. sp.

Shell moderately depressed, with $4\frac{1}{2}$ whorls, largely and openly umbilicated, horny brown in colour, but incrustated all over with a yellowish covering, which nearly fills the umbilical area. The suture is very deep, the whorls being strongly convex, and the protoconch acute. The aperture is round, thickened within, and not reflected. Compared with *P. lowi*, de Morgan, the species differs in the greater diameter of the mouth in proportion to the width of the shell, and the last whorl is not solute. Judging from de Morgan's figure, the present shell is also not so widely umbilicated.

Alt. 9; diam. max. 4.5; diam. apert. 3.8 millim.

Hab.—Kelantan, Malay Peninsula.

Opisthoporus dautzenbergi, n. sp.

Shell much depressed, whitish, irregularly dotted and streaked with reddish brown; whorls $4\frac{1}{2}$, protoconch smooth, the residue of the shell being closely and regularly striate, umbilicus large and open, suture deep. The last whorl descends in front; the lip is double, the edge of the incrassated portion being dark brown, while the reflected portion is white. The operculum is solid, many-whorled, white outside and horn-colour within. The tube is narrow, situated about 2 millim. from the outer lip, and bends backwards.

Alt. 5; diam. max. 13, min. 10.5 millim.

Hab.—Kelantan, Malay Peninsula.

Related to *O. penangensis*, Stol., of which I have specimens from Kinta Valley, and which I suspect will prove to equal *O. rostellatus*, Pfr., but the present species is larger, more solid, differs in ground colour, also the pattern of the colour marking is not carried all over the shell, and the lip is larger and more reflected.

OBITUARY.

C. A. F. WEIGMANN.

WE regret to note the death of F. Wiegmann which occurred at Jena on November 9th, 1901.

Carl Arend Friedrich Wiegmann, was born at Berlin on March 1st, 1836, and was son of the well-known Professor of Zoology, Dr. A. F. Aug. Wiegmann. He prepared himself for the career of apothecary, studied at the University of Berlin, and travelled afterwards in different countries of Europe and in the United States of America. In 1866 he bought a dispensary at Jüterbog, near Berlin, and settled in 1877 at Jena in order to devote his time exclusively to zoological studies.

Wiegmann was an ardent student of malacology, and all his zootomical researches are distinguished by accuracy and thoroughness. Besides numerous short articles in scientific periodicals, he published the following works :

Beitraege zur Anatomie der Landschnecken des Indischen Archipels, in W. Weber, Zool. Erg. einer Reise nach Niederl. Ind., 1893 vol. ii., pp. 112-259, 8 pls.

Landmollusken Zootomischer Theil. Abh. d. Senckenberg. Nat. Ges., Frankfurt, 1898, vol. xxiv., 3, pp. 289-557, 11 pls.

Voyage of Kükenthal. Land u. Süswasser-Mollusken der Seyschellen. II. Zootomischer Theil. Mitth. aus d. Zool. Samml. des Mus. f. Naturk. Berlin, 1898, pp. 37-96, 2 pls.

Binnenmollusken aus Westchina und Centralasien. Zootomische Untersuchungen. I. Die Heliciden. Ann. d. Mus. Zool. Acad. Imp. des Sci. St. Petersb., 1900. II. Die Buliminiden. Ibid., 1901.

O.F. v. M.

PROCEEDINGS OF THE MIDLAND MALACOLOGICAL SOCIETY.

33RD (ANNUAL) MEETING, DECEMBER 13TH, 1901.

The President in the chair.

In the absence of any demand for a ballot, Mr. Hugh McClelland was elected a member of the Society.

The Annual Report of the Council and the Treasurer's Statement were read and adopted.

The Secretary reported that as no amendments had been received to the Council's nominations, the following would constitute the Council and Officers for 1902 :—

President—Walter E. Collinge.

Vice-President—E. R. Sykes, B.A., F.L.S.

Treasurer—H. H. Bloomer.

Hon. Secretary—H. Overton.

Librarian and Curator—Guy Breeden.

Other members of the Council—Messrs. G. Breeden, H. Willoughby Ellis, F. J. Partridge, and Bromley Peebles.

The President's Address was postponed until the February meeting.

EXHIBITS.

By Mr. Bloomer : Sixteen species of foreign Clausiliae.

By Mr. Breeden : *Unio margaritifera* from Barnstaple.

By Mr. Overton : *Amalia gagates* and *Acicula lineata* from Sutton Coldfield.

ANNUAL REPORT, 1901.

In presenting their Fourth Annual Report your Council have again to record a satisfactory year's work.

During the year one new member has been elected, and three have resigned.

Eight meetings have been held, at which four papers have been read, whilst the exhibits have been numerous and some of great interest.

The financial condition of the Society stands as follows : there is a balance due to the Treasurer of 2s. 10d., and the outstanding subscriptions amount to £1 5s. od.

Donations to the Library have been received from Professor L. Plate and Mr. H. H. Bloomer, the number of works and pamphlets now numbering 91. Your Council regret that no additions to the Society's Collection of British Molluscs have been received during the year.

Your thanks are due to the Council of the University of Birmingham, and Professor T. W. Bridge, for the facilities they have so kindly given in permitting our meetings to be held in the Zoological Department.

34TH MEETING, FEBRUARY 21ST, 1902.

The President in the chair.

PAPERS READ.

"Some Aspects and Problems of Malacology."

By Walter E. Collinge.

"A Preliminary account of the minute anatomy of *Helix acuta*."

By H. Overton.

EXHIBITS.

By Mr. Overton : Anatomical preparations and drawings illustrating his paper, also specimens of *Paludestrina taylori*, E. A. Smith.

CURRENT LITERATURE.

Pilsbry, Henry A.—Tryon's Manual of Conchology, ser. ii., vol. xiv. (pt. 54), pp. 129—192, pls. 22—36. Philadelphia: Academy of Natural Sciences.

Continuing the "Appendix to Bulimoid Snails," the following genera are dealt with, and the undermentioned new species, etc., described:—*Plekocheilus*, Guild, *Auris*, Spix, *Xenothauma*, Fult., *Bulimulus*, Leach, with *B. stilbe*, n. sp. from Brazil, *Xcophetracus*, Marts., *Oxyctona*, Mörch, *Drymacus*, Albers, with *D. cognatus*, n. sp. from Colombia, a species closely related to *D. zoogeographicus*, Orb., and *D. membielinus*, Crosse. *D. succinea*, n. sp. from the Amazon river, resembling in contour *D. colmeiroi*, Hid., but differing from that species in sculpture and colour. *D. roseatus* var *montanus*, nov. and *D. sanctaemarthae*, n.sp., both from Colombia, the latter, in the spotted pattern of the spire recalls some forms of *D. trigonostomus*, but in the structure of the aperture and columella it is near *D. castus*. Other genera are *Porphyrobaphe*, Shuttl., *Oxystyla*, Schlüter, *Bothriembryon*, Pils., *Placostylus*, Beck, *Amphidromus*, Alb., and *Odontostomus*, Beck., with *O. gemellatus*, Ancy, n.sp. from Goyaz, Central Brazil. The Appendix concludes with a list of undetermined *Bulimulidae*.

In the present part the *Cerionidae* are commenced. The genus *Cerion*, "Bolton," Mörch, has by most authors, been associated with the *Pufidae*, but Dr. Pilsbry shows that there is little in the anatomy to justify such an association, while the pallial and generative organs show it to belong to a widely different group.

The genus is diagnosed as follows:—"Lung macroscopically plain except for the pulmonary vein. Kidney oblong, with large cavity, and excreting apparently by a secondary ureter. Genital system having a wide atrium, short penis with terminal retractor, the *epiphallus* entering near or below the middle of the penis sac. *Vas deferens* extremely long. Spermatheca on a long duct which bears a long *diverticulum*. A vaginal retractor arises from the right *tentacular muscle*. Free retractor muscles independent to their posterior ends except the right tentacular and tail retractors, which are shortly united. Jaw smooth. Teeth of the normal type in Holopoda, the ectocones developed. External anatomy as in Holopoda generally; the labial processes well developed." Type *C. urva*, L.

The species are subject to a remarkable range of individual and local variation, both in size, colour and external markings, and this has led to an undue multiplication of species and sub-species.

The following sub-genera are recognised:—*Cerion*, s.str., *Strophiofs*, Dall, *Diacerion*, Dall, and *Eostrophia*, Dall; the species therein being classified in fifteen groups.

Biedermann, W.—Untersuchungen über Bau und Entstehung der Mollusken-schalen. Jena. Zeit., 1901, Bd. xxxvi., pp. 1—164, Tafn. i—vi.

The author of this bulky paper starts with the postulate that it is a question of fundamental importance what may be the nature of the process by which, through incalculable time, vast masses of carbonate of lime have been formed by plants and the frame work of animals, accumulations such as we meet with in every geological formation, and in the sediments of the sea-floor. He then proceeds to discuss the derivation of the lime by organisms from the sea-water, and announces his intention of furnishing an opinion, to be based on his own

researches, on the most noteworthy examples of shell formation among the Mollusca. To this end he passes in review the researches of previous writers on (1) the intimate structure of the shells of *Anodonta*, *Pinna* and *Melcaग्रina*, (2) the origin of the "prisms" in *Anodonta*; (3) the physical and especially the optical characters of the "prisms" and pearly-layer; (4) the intimate structure of the Gastropod shell; (5) the character and growth of the Gastropod shell; and finishes with a lengthy summary.

In the concluding paragraphs of the summary he points out that the deposition of carbonate of lime on the part of an animal organism is less than ever to be regarded as the result of a simple chemical reaction, but is manifestly a question of highly complicated chemical processes on the part of living cells without, however, a direct formative influence on the part of the latter. It is further beyond doubt that each shell layer having a special structure arises as a specially constituted secretion derived from special cells: the conditions under which these characteristic structures arise is at present by no means sufficiently clear, but have nothing to do with any albuminoid replacement consequent on putrefaction.

In a subsequent paper the author intends to treat of the artificial production of shell-structure.

We have failed to find anything new in this treatise which, however, appears to form an admirable summary of the present state of our knowledge on the subject of molluscan shell structure, and as such to be of value. The plates which illustrate it reproduce many familiar figures, and there is a useful little bibliography, which, however, is not, and evidently does not pretend to be, as complete as that given by Moynier de Villepoix, whom the author cites, or by Dr. Stempell (*Biol. Centralbl.*, Bd. xx.), to whose interesting and important paper, the author strangely enough does not allude.—B. B. WOODWARD.

Kowalevsky, A.—Sur le genre *Chaetoderma*. *Arch. Zool. exp. et gen.*, 1901 (s. 3), T. ix., pp. 261—283, pl. x—xii.

The author describes two exceedingly interesting new species of *Chaetoderma*, dredged in the Sea of Marmara. The first, *C. radulifera*, is characterised by a complex radula, bearing nine rows of teeth, which is described and figured in great detail. The second species, *C. gutturosium*, so named from a curious habit it has of inflating the head-region, which aids the animal in burrowing, resembles externally, both *C. productum* and *C. nitidulum*, but differs from both of these species in the structure of the radula.

Simroth, H.—Ueber die Raublungenschncken. *Naturwissensch. Wochens.*, 1901, Bd. xvii., pp. 109—114, fig. 1—14, pp. 121—127, fig. 15—18, pp. 137—140, fig. 19.

As is well known to all malacologists, there are certain families of molluscs which, according to some authors, are widely separated from one another structurally, but contain genera possessing certain characteristic features in common. One such group, continental malacologists have termed "Raublungenschncken" (Agnathous Pulmonates).

In the present important series of papers, Dr. Simroth has brought together an enormous mass of facts, and has attempted a classification of these particular molluscs. Further he has put forward certain views as to the affinities of the different genera and their phylogenetic origin, and generally summarised our knowledge of numerous rare and imperfectly known genera.

The subject is dealt with in the author's usual masterly manner; his long experience and erudite grasp of the many perplexing problems in malacology, render him peculiarly fitted to deal with so difficult a subject as the present one.

Commencing with a brief historical resumé, the author passes on to the consideration of the food and digestive organs, the muscles of the buccal cavity, the shell, the metamorphoses of the soft body, the generative organs, the geographical distribution, and the phylogeny.

As the author points out, we have to deal with a group not of like origin, but one illustrating the phenomenon of convergence.

The absence of any accessory reproductive organs is regarded as due to the habits and habitat of the different forms. Where the conditions to fertilisation are so unfavourable, by reason of the individuals not meeting each other in worm-burrows, etc., it would not be practical to waste time in preliminaries, further, it seems very probable that self-fertilisation is very common. Among the many peculiar characters common to these molluscs, may be mentioned the presence of a free pedal-gland in the body-cavity, a third pair of feelers or lips, the reduction and position of the shell and mantle, and (in *Tectacella*) the presence of a sense-organ—osphradium—in the lung. (Plate).

Assuming that all land molluscs were originally carnivorous, Dr. Simroth explains the changes which have taken place in the "Robber-Slugs," by presuming that they had an innate capacity for evolutionary modification, while at the same time special characteristics, which involve vital changes in the organism, have been acquired and transmitted, so as to conform to the new environment.

Very interesting are the author's views as to the ancestral groups from which the various Agnathous genera have arisen. The *Glandinidae*, a very primitive family, are of Achatinoid origin. The origin of the *Helicoidae*, owing to their great variety of form, and their extreme divergence from the *Helicidae*, is difficult to determine, it can, however, be asserted that they have sprung from the primitive groups of the Southern Hemisphere. The Selenites are derived from *Zonites*; *Plutonina* from the Atlantic *Vitrinac*; *Daudebardia* possibly from *Hyalinia*. The origin of the Limacoids is more clearly indicated, excepting perhaps that of the genus *Selenochlamys*. *Hyrcaolestes*, *Phrixolestes*, *Pseudomilax*, and *Trigonochlamys*, all show relationship with *Parnacella* and *Amalia*. *Apera* (which is wrongly stated to have no shell) is thought to belong to one of the scattered heterogenous branches of primitive molluscs, possibly related to the *Janellidae*; *Atopos* and *Veronicella* probably belonging to the same category.

Widely differing opinions are naturally held by different malacologists, as to the phylogenetic relationships of these different genera, and not until more detailed researches have been made can the majority of them be regarded as other than very wide guesses, still Dr. Simroth's views are sure to command the careful consideration they undoubtedly deserve.

Simroth, Heinrich.—Über eine merkwürdige neue Gattung von Stylomatophoren. *Zool. Anz.*, 1901, Bd. xxv., pp. 62—64.

Dr. Simroth describes an interesting slug-like mollusc to which he gives the name *Ostracolelle fruhstorfferi*, gen. et sp. nov. It was received from Mr. Fruhstorfer, who collected it in Tonkin. It measures 2.6 cm. in length, and is remarkable on account of the shell, the relative position of the pallial organs to the mantle, and partly on account of an obscure appendage of the generative

organs. Externally it somewhat resembles a *Parmarion*, but here the mantle-sac is more prominent. The mantle is perforated on the left posterior surface, and through the opening the shell projects. The shell consists of a basal, calcareous plate, upon which an extraordinarily thin, wide, and structureless conch-like shell fits close. The hermaphrodite gland lies embedded in the liver, much more posteriorly than the remaining parts. Before the vas deferens passes into the penis it gives off three short, thick flagella. The retractor muscle originates quite close to the inner root of the right ommatophore. From the point of origin proceed two cords, one the normal seminal duct, the other a thick muscle, consisting of a series of plate-shaped discs, perforated by a canal (?)

The author proposes a new family for the reception of this peculiar genus, the *Ostracotellidae*.

Dean, Bashford.—Notes on living *Nautilus*. Amer. Nat., 1901, vol. xxxv., pp. 819—837, 15 figs.

The author contributes some very welcome and interesting notes, made whilst on a visit to Negros. In the straits between this island and that of Cebu, *Nautilus* seems to flourish in abundance.

In examining fresh specimens the author noticed that there appeared to be sexual differences in the shells, although in as many instances as three out of ten these were not distinguishable. The irregular growth lines frequently exhibit an undulation of a somewhat regular pattern, reminding one of the markings present at the septal rims in *Ceratite* or *Goniatite*. It is suggested that, although these cannot be directly related to those of the fossil forms, they may represent "a tendency during special periods of shell-forming activity, . . . for the mantle to contract in crenulate lines, a tendency which during the descent of the tetrabranchs may well have been seized upon by selection and made of use in the formation of the specialised margins of the septa. And from this standpoint the recent markings may be regarded as related to the curiously expressed lines on the ancient shells."

The general appearance of the living animal is next described, and illustrated by capital figures, also the tentacles and their movements. Although Professor Dean was not able to induce the animals to feed, from observations on the living and dead specimens, he thinks that there is little doubt but that the jaws can be used in a position which one would hardly be led to expect from an examination of preserved specimens. Accordingly he infers that the tentacles are of less importance in the mechanical operation of feeding than is popularly believed.

If the information supplied by the fishermen in the region of the southern Negros is to be relied upon, there should be no difficulty in securing the eggs and embryos of *Nautilus* in abundance.

Dupuis, P. et Putzeys.—Diagnoses de quelques espèces de coquilles nouvelles et d'un genre nouveau provenant de l'état indépendant du Congo, suivies de quelques observations relatives à des espèces déjà connues. Ann. Soc. roy. Malac. Belgique, 1901, T. xxxvi—xlii., figs. 1—18.

The new species and varieties are *Peridicropsis formosa* and var. *fallida*, *P. humicola*, *P. diaphana*, *Subulina (Subulona) marlesi*, *Ceras* (gen. nov.) *dautzenbergi*, *C. manyemacense* and var. *cingulata*. The following three

varieties of *Perideriopsis umbilicata*, Putz., v. *usudkewensis*, *albida* and *lowacensis*, are described, also var. *cingulatus* of *Cycloph. intermedius*, Marts.

Baker, F. C.—Some interesting molluscan monstrosities. Trans. Acad. Sci. St. Louis, 1901, vol. xi., pp. 143—146, pl. xi.

The author describes certain abnormal shells of *Lamphis alata*, Say, *L. ligamentina*, Lam., and *Unio gibbosus*, Barnes.

Robert, A.—Sur la ponte des Troques. Compt. Rendus, 1901, vol. cxxxii., pp. 850, 851.

The author draws attention to the interesting fact that whereas in certain species of *Trochus* (*T. granulatus*, Born., *T. striatus*, L., *T. conuloides*, Lam., and *T. cvasperatus*, Penn.) the eggs are deposited in agglomerated masses, the matrix being a mucous secreted by an ampulla-like swelling on the excretory duct of the right kidney, in the females; in other species (*T. magus*, L., *T. cinereus*, L., and *T. crassus*, Pult.) the eggs are deposited singly.

Hedley, C.—Studies on Australian Mollusca. Part iv. Proc. Linn. Soc. N.S.W., 1901, pp. 16—25, pl. ii.

The following new species are described and figured: *Liotia venusta*, L. *deceva*, *Tecinosoma vesta*, and *Lima brunnea*. Illustrations of some hitherto unfigured species are also given. Discussing the "Challenger" Station 164B, Mr. Hedley thinks that possibly "164B" might be a mistaken label for "64," in any case it seems to us that he is perfectly justified in eliminating the series from the Australian fauna.

Hedley, Charles.—A Revision of the Types of the marine shells of the "Chevert" Expedition, Rec. Aust. Mus., 1901, vol. iv., pp. 121—130, pls. xvi—xvii.

Mr. Hedley points out that since the collection made by the Staff of the "Chevert," and now in the Macleay Museum, Sydney, was described, later writers have failed to identify the species, and have complained of the inadequate descriptions. He now amplifies these descriptions by giving dimensions and figures, and corrects the synonymy.

Hedley, Charles.—The Marine Wood-borers of Australasia and their work. Austr. Assoc. Adv. Sci., 1901, vol. viii., pp. 237—255, pls. vii—x.

The author gives an interesting account of what are popularly termed ship-worms, designed rather for the engineer and general student than the zoologist.

Knight, G. A. Frank.—Marine Mollusca and Brachiopoda. Brit. Assocn. Handbk. on the N.H. of Glasgow, 1901, pp. 189—208.

The author records no less than 393 species of molluscs, of these 23 are doubtful or insufficiently attested. A bibliography containing 43 titles prefaces the list, and useful notes are appended to the various species. To all interested in the distribution of the Marine Mollusca of the West of Scotland this valuable, but unpretentious publication, will prove of great service.

Fischer, H.—Liste des coquilles recueillies par M. de Gennes à Djibouti et Ali-Sabich, avec la description de plusieurs formes nouvelles. Journ. de Conchyl., 1901, vol. xlix., pp. 96—130, pl. iv., et 9 figs.

The author enumerates 65 species, of which the following species and varieties are new: *Marginella gennesi*, *Clauculus gennesi*, *Pinna cochlearis*, *Basterotia (Anisodonta) caledonica*, P. Fisch. v. *djiboutiensis*, *Cerithium caeruleum*, Sby. v. *minima*, Fisch. et Vignal, *C. yerburyi*, E. A. Sm. v. *djiboutiensis* F. et V., *C. petrosum*, Wood, v. *gennesi*, F. et V. Emended descriptions and figures are given of *Rissoina bertholleti*, Aud., and *R. rissoi*, Aud.

Bouvier, E. L. et Fischer, H.—Sur l'organisation interne du *Pteurotomaria beyrichii*. Hilg. Compt. Rendus, 1901, vol. cxxxii., pp. 845—847.

Continuing their studies upon this interesting mollusc, the authors deal in the present paper with the digestive tract and nervous system. The former in general resembles that of other Diotocardia, but it is characterised by a number of peculiar twists, and buccal and oesophageal pouches of a very primitive nature. The hind part of the intestine has a remarkable branch, which extends forward and lies at the side of the oesophagus. In the main the nervous system agrees with that of *P. quoyana*, the essential characters are: (i.) The absence of all differentiation in the pallial ganglia, and the condescence of pedal and pallial cords, as in *Chitonidae*; (ii.) the origin of the visceral commissure on the cerebro-pallial connectives, and not, as in other Diotocardia, on the ganglionated pallial cords; (iii.) the development of a very large ganglion at the origin of the osphradial cord, representing, in part, the point of origin of the pallial nerves; (iv.) the very feeble development of the secondary pallial nerves; and (v.) the strong development of the primary pallial nerves.

Collinge, Walter E.—On a further Collection of South African Slugs, with a Check-list of known Species. Ann. S. Afr. Mus., 1901, vol. ii., pp. 229—236, pl. xiv.

In this interesting paper we find much new information about the peculiar genus *Oopecta*, with excellent illustrations. The little-known *O. aterrima* (Gray) is re-described, and *O. polyfauclata* is proposed as a new species, making the fifth species of the genus. The *Oopectinac* are ignored in Pilsbry's (1898) paper on the phylogeny of the *Arionidae*, and the author of the present paper does not inform us how he would place them in the Pilsbryan scheme; it is to be presumed that something on this subject will be forthcoming later, as our author must certainly have had it under consideration. We should suppose that *Oopecta* might be the end of a series of forms diverging from *Arion*, and it is interesting to speculate on the possibility of several of the links of the chain being still extant in the vast regions of Africa so far unexplored for slugs.

A new *Apera (A. furcelli)* from Table Mountain is described and illustrated. We wonder that such an interesting animal should so long have been overlooked in this locality. The Cape forms of *Limax maximus* and *Amalia gagates* are found to differ somewhat from European examples. It is of much interest to inquire whether (as the present writer is quite willing to suppose) these differences may have arisen since the introduction of the slugs into South Africa. If so, we have proof of the rapidity of evolution under suitable conditions. We may recall in this connection that Allen and Chapman (1897) have had the courage to describe and name a new subspecies of *Mus musculus* from Jalapa, Mexico; this animal is of course the descendant of mice introduced by man, no true *Mus* existing in America except through introduction.

In the Check-list 28 S. African slugs are catalogued, but some of these are very imperfectly known. "*Urocyclus*" *kraussianus* is almost certainly not of

the genus *Urocyclus*, which appears not to occur in Cape Colony proper. Krauss gave a very poor description, but he stated the mantle had *no shell*, and that the creature was abundant in gardens in Cape Colony. Possibly it was an *Oopelta*; its colour was said to be greyish-black.—T. D. A. COCKERELL.

Collinge, Walter E.—On the Anatomy of a Collection of Slugs from N.W. Borneo; with a List of the Species recorded from that Region. Trans. Roy. Soc., Edinr., 1901, vol. xl., pp. 295—312, pls. i—iii.

The present communication, the author points out, is to be regarded more in the light of a preliminary notice of species, which, as further material is obtained will receive more exhaustive treatment.

After a short introduction on the Bornean Slug-fauna, the author re-describes the genus *Danayaulia*, Issel, and gives coloured figures of *D. dilecta*, Issel; a new species, *D. carinata*, is described and figured, as also the generative organs and dart. *Wiegmannia* is a new genus containing *W. dubius*, Wgm., *W. gigas*, *W. ponsonbyi*, and *W. borneensis*, nn. spp. The generative organs of *Collingea smithi*, Cltge. and Godw.-Aust., are next described and figured. A further new genus, *Isselcentia*, containing two new species, *flicata* and *globosa*, is next dealt with, and *Veronicella shetfordiana*, *V. exima*, and *Oculidium ponsonbyi*, nn. spp. are figured and described.

A list of the species of slugs recorded from Borneo, twenty-seven in number, with the original references concludes the paper.

Williamson, M. Burton.—How *Potamides (Cerethidea) californica*, Hald., travels. Naut., 1901, vol. xv., pp. 82, 83.

Mrs. Williamson has noticed that in travelling over the mud-flats, this mollusc leaves a zig-zag pattern, which is made by the apical whorls of the shell as it is dragged forward, or sideways. From a series of observations upon its mode of crawling, the authoress concludes that the foot movement is somewhat secondary. The animal pushes its head forward, expands its tentacles to their full extent, then with an effort raises the body whorl, and the shell is propelled forward before the foot advances. Immediately following these movements, the foot is spread out and drawn forward.

Kennard, A. S. and Woodward, B. B.—The Post-Pliocene non-marine Mollusca of the South of England. Proc. Geol. Assoc., 1901, vol. xvii., pp. 213—260, figs. 32—37.

This valuable and important paper is, apart from its geological interest, full of interest to the student of recent shells. While endeavouring to avoid alterations in the nomenclature, a few wise changes have been made, thus we read *Pomatias reflexus* (L.), in lieu of *Cyclostoma elegans*, Müll., *Paludestrina stagnalis* (Bast), in place of *Hydrobia uvae*, Pemm.; *Sphyradium edentulum* (Drap.), is removed from *Vertigo*, while *Helicella barbara* (L.) replaces *Bulinus acutus*, Müll.

In all the authors' list 138 species of non-marine Mollusca as existing in this country, and 10 extinct forms, of these 129 occur in the South of England, and 7 of the extinct forms.

In this and preceding papers the authors have accumulated a large mass of evidence, which now enables them to speculate on the origin and duration in this country of the various constituents of our molluscan fauna. It must, however, be borne in mind that these speculations are only tentative. The

oldest inhabitants of these islands are *Paludestrina ventrosa* and *stagnalis*, with which may be associated *Billynia tentaculata* and *Valvata piscinalis*, all of which probably had their origin in the Aralo-Caspian basin. The Lusitanian is also regarded as one of the oldest in these islands, no evidence of boreal species being found until the later Red Crag of Butley. The Southern Group is composed of species with various sources of origin. Finally, such forms as *Hygromia fusca*, *Acanthinula lamellata*, *Vitrea excavata*, *V. alliaris*, and *Azeca tridens*, may be endemic; all as yet being unknown in a fossil state on the Continent.

A bibliography and table of the distribution complete this very welcome memoir.

Dall, W. H. and Simpson, C. T.—The Mollusca of Porto Rico. U. S. Fish Commis. Bull for 1900, 1901, pp. 351—524, pls. 53—58.

This valuable and interesting work treats of, in a very full manner, the mollusca of the island of Porto Rico, and forms the most complete account yet published. The total number of species recorded is 653, of which 42 are new. The land-snail fauna is not especially striking. The solitary *Circinaria concolor*, if it be a genuine *Circinaria*, is a remarkable case of geographical distribution. Equally remarkable is the *Clausilia bicanaliculata*, found only in Porto Rico, and the only representative of this genus known from the West Indian region. Very fine and large species of *Pleurodonte*, a single species of *Stoastoma*, four species of *Gacolis*, and nine species of *Planorbis*, are also present.

Numerous changes in nomenclature have been made, but the law of priority has not in all cases been adhered to.

A brief description of the different genera and species, with references to the original descriptions and figures, greatly adds to the value of this work. While several species hitherto unfigured, have now been figured from the authors' types.

Dall, W. H.—Mollusks from the vicinity of Pernambuco. Proc. Wash. Acad. Sci., 1901, vol. iii., pp. 139—147.

Dr. Dall here enumerates 91 species obtained during Dr. J. C. Branner's expedition to Brazil. Deducting from them four species confined to land or fresh water, there remain 87, of which 13 alone are peculiar to the eastern coast of South America south of the West Indies, and 74 are common Antillean shells. Two new species are described, viz. *Mulinia bianneri* and *Drillia greceleyi*.

Andreae, A.—Untermiocäne Landschneckenmergel bei Oppeln in Schlesien. Mith. a. d. Roem.-Mus., Hildesheim, 1902, nr. 16, pp. 1—8, figs. 1—5.

The new species described and figured are: *Dandebardia praecursor*, *Archazonites subangulosus* (Benz.) var. *conica*, n.v., *Helix* (*Galactochilus*) *silesiaca*, and *Cyclostoma schrammeni*. *Clausilia* (*Triptychia*) *suevica*, Sandberger, and *Craspedopoma leptopomoides* (Reuss.) are also recorded.

Dall, W. H.—Synopsis of the *Lucinacca* and of the American species. Proc. U.S. Nat. Mus., 1901, vol. xxiii., pp. 779—833, pls. xxxix—xlii.

Continuing his valuable series of synopses Dr. Dall here treats of the *Lucinacca*, a group of families, apparently of very ancient lineage if the Silurian type referred to it is really allied. The systematic arrangement of the group, appears to be exceptionally confused. Many of the commonest species the

author states, go by names to which they have no sufficient claim, and it is surprising how unlike things have been lumped together.

In the present revision the following families are included: the *Thyasiridae* (with 35 species), the *Diplodontidae* (with 20 species), the *Lucinidae* (with 63 species), the *Corbidae* (Exotic?—Eastern Tertiaries), and the *Cyrenellidae* (with 2 species); 81 of these 120 species belong to the Atlantic, 45 to the Pacific, and 5—or possibly 6—are common to the two sides of the American continent.

Many new species are figured and described, and numerous changes have been made in the nomenclature.

Hall, T. S.—Growth stages in modern *Trigonias*, belonging to the section *Pectinatae*. Proc. R. Soc. Victoria, 1901, vol. xiv., pp. 17—21, fig.

Steinach, E.—Studien über die Hautfärbung und über den Farbenwechsel Cephalopoden. Nebst Versuchen über die autogene Rhythmicität der Chromatophoren-Muskeln. Arch. ges. Physiol., 1901, Bd. 87, pp. 1—37, T.

Rottmann, G.—Ueber die Embryonalentwicklung der Radula bei den Mollusken. Theil i. Die Entwicklung der Radula bei den Cephalopoden. Zeit. f. wiss. Zool., 1901, Bd. lxx., pp. 236—262, Tfn. xi-xii.

Simroth, H.—Über das Problem früheren Landzusammenhangs auf der südlichen Erdhälfte. Geograph. Zeitsch., 1901, pp. 665—676, T. v.

Meek, A.—The Mussel Experiment on the Coquet. Rpt. Northumberland Sea Fish Comm., 1901, pp. 35, 36.

Lebour, Marie V.—The Marine Mollusca of Northumberland. Ibid., pp. 49—53.

Tobler, Max.—Zur anatomie von *Parmophorus intermedius*, Reeve. Jena. Zeit., 1901, Bd. xxxvi., pp. 229—274, Tafn. xiii—xv.

Kennard, A. S. and Woodward, B. B.—Further notes on the British Pliocene non-marine Mollusca. Proc. Malac. Soc. Lond., 1901, vol. iv., p. 183.

EDITOR'S NOTES.

Only quite recently have we learnt of the death of Carl Arend Friedrich Wiegmann of Jena, which took place on November 7th, 1901. His decease robs us of a valued correspondent, and malacology of a patient, diligent, and gifted worker.

We should like to remind those Subscribers who have not yet sent us their subscriptions for volumes 7 and 8, that they are considerably over due. It would greatly assist us if all subscribers would forward their subscriptions at the commencement of each year.

THE
JOURNAL OF MALACOLOGY.

NO. 2.

JUNE 30th, 1902.

VOL. IX.

NOTES ON THE BRITISH SPECIES OF BUCCINUM,
FUSUS, ETC.

BY J. T. MARSHALL.

CASSIDARIA TYRRHENA, Chemn.—Since my account of this species was published (1), Mr. F. W. Wotton has obtained several very fine living specimens which were obtained by trawling off the south-west of Ireland in 50-60 fathoms, two of which he very generously presented to me. His largest specimen measured $3\frac{1}{2}$ -in. by $2\frac{1}{2}$ -in., and contained the animal still showing signs of life. I have another fine specimen exceeding 3-in. by 2-in., dead but perfect, trawled in 50 fathoms south of the Scilly Islands in 1900. A fragment was dredged by the "Porcupine" Expedition of 1870 on the Channel slope off the Scillies in 539 f., and another fragment of *C. echinophora* by the 1869 expedition off Donegal Bay in 183 f. Mr. E. A. Smith has conclusively shown (2) that *Morio*, Montf., has the preferential claim for recognition over *Cassularia*, if the coleopterists will only adopt some other name than the former for the beetles.

BUCCINUM UNDATUM, L.—This is a most instructive species, no other affording better evidence of the effects of environment. Any one interested in the variation of species will find the study of this one most fruitful and interesting, while a series from various localities and depths will impart a good-object lesson in the variability of species.

(1) JOURN. COCHL., 1893, vol. vii, p. 260, and 1894, p. 380.

(2) JOURN. MALAC., 1895, vol. iv, p. 11.

These variations and mutations are without end, and all graduate one into the other. The form, texture, size, sculpture, etc., appear to depend entirely on habitat, and an experienced collector can readily tell, from the appearance of the specimen, the nature of the sea-bottom and the probable depth from which it had been procured. The Rev. Professor Gwatkin gives the radula of *Buccinum* a very bad character as a help to specific distinction; he writes me that "the radula varies so much in *Buccinum* that consider it, for that family, worthless as a character, the individual variations being greater than the specific." *B. undatum* is very scarce in the Channel Islands except at one part of Jersey facing the French coast, and I have never met with a specimen from the other Islands; it is equally scarce in the Scillies. Pure white specimens occur occasionally, but they are rare.

Var. *flexuosa*, Jeffr.—Very variable in size and texture, sometimes attaining a length of 5½-in. in the West Orkneys and off Wick, while a small thin form lives in the former district and in the Shetlands with the var. *zelandica*, and has the same silky epidermis.

Var. *littoralis*, King.—The interior of this variety is sometimes orange coloured, but more frequently purplish-brown.

Var. *pauperula*, Jeffr.—Specimens from Southampton Water do not exceed an inch in length: many are smaller.

Var. *striata*, Penn.—Off Cork Harbour (Wotton)! off Aberdeen, (Simpson)! North Rona, 45 f.: Doggerbank, 30 f.

Var. *pelagica*, King.—Aberdeenshire (Simpson)! off Unst (Coulson); Shetlands (coll. Mac Andrew). In this variety the last whorl is smaller and narrower proportionally, hardly projecting beyond the penultimate, and in British specimens the longitudinal ribs are evanescent or wholly wanting. My largest examples exceed 6½-in. in length. It occurs in Norway, but of a smaller size and strongly ribbed.

Var. *zelandica*, Jeffr.—Gwyn Jeffreys has described this variety as "destitute of ribs," whereas he figures it with rather prominent ones, and this has given rise to some doubts as to whether the var. *zelandica* is ribbed or not, especially as he compares it with *B. humphreysianum*, which is ribless, while this is rendered more confusing by its living on the some fishing-grounds with a dwarf and thin form of var. *flexuosa*, which is ribbed, in the Orkneys and Shetlands. But the real truth is, that the presence or absence of ribs is not a criterion of this variety, its only permanent characters being that it is dwarfed and thin. It is almost as variable as the type, and really runs into many forms when collected from different parts of the Shetland seas. It is seldom without traces of longitudinal ribs, especially on the upper whorls, and there is considerable variation in the size, comparative length of spire,

and degree of sculpture. To give an idea of its extreme variability, I may say that I have specimens of it corresponding not only to the ribbed type, but to the var. *striata*, the var. *flexuosa*, the var. *pelagica*, and the var. *acuminata*. In rare instances it is as finely striated as *B. humphreysianum*, while on the other hand I have examples which are as much ribbed as any typical shell. Nor is Gwyn Jeffreys' white specimen at all singular: I have a series of them; while a very pretty form from the East Shetlands, 60-90 f., is also white, very finely striated, extremely thin, with a cinereous, silky, deciduous epidermis, a form which also occurs at Vardö, Finmark, in 100-150 f.; this is *B. schneideri*, Verk. The same form was also trawled off S.W. Ireland, in 55 f., by the Rev. W. S. Green, and off the south and west of Ireland, in 90-180 f., by the "Porcupine." *B. parvulum*, Verk., is different from this, and is a white variety of *B. groenlandicum*, its specific identity being indicated by the size, contour, spire, embryo, and micro-sculpture. Jeffreys' figure is much too large and the spire too long for var. *zethaulica*: that figure more correctly represents the thin deep-water form of var. *flexuosa* mentioned above; Sowerby's figure would do for var. *paupercula*, but not this; while the figure in "British Mollusca" (pl. cix, fig. 4) is perfect, as most of them are in this well-illustrated work.

The Leckenby collection contained an adult specimen little more than half an inch in length, one of a pair said by Mr. Robert Damon to have been dredged in Weymouth Bay, and which changed hands for 10/- On the other hand, specimens from Thurso and Wick are very large, coarse, and solid, attaining 6-in. by 3½-in.; this is the var. *incrassata* of King; but coarse and solid examples occur of every size.

Monstrosities are numerous, and many of them have received special names. Two splendid figures of Turton's *B. carinatum* will be found in Brown's "Recent Conchology," and "Science Gossip" for April, 1894, contains figures of the curious malformation called *monst. bioperculatum*. As to the *monst. trioperculatum*, Jeffr., that was the outcome of a too eager inquiry, accompanied by a liberal offer, made many years ago to the whelk-dealers for a specimen, and with the inevitable result—as nature could not produce one to order, a counterfeit was manufactured and successfully palmed off to a dealer, but it did not travel any further. No genuine specimen of this "sport" has been recorded.

In dealing with the phenomena of sinistral shells, Gwyn Jeffreys says that the animal "may be compared to the case of a man having his heart on the right and his lungs on the left side of his body. The structure of a mollusc is however not so complicated, and the con-

sequence of such a reversal in the position of its organs is probably not very important to its economy." (1) I do not know how Gwyn Jeffreys came to regard the lungs as being on one side only of the body, for as a matter of fact one lung is on the right and another on the left side, and in a sinistral specimen the right and left lungs would presumably be simply transposed.

B. HUMPHREYSIANUM, Penn.—S. W. Ireland, 80 f. (R. I. A. cruise); the Minch off Loch Boisdale, 72 f., a very young specimen (J. T. M.): between the Butt of Lewis and St Kilda. (Simpson)!

Var. *ventricosum*, Kien. (Journ. Conch., 1893, vol. vii, p. 261.)—South of Ireland (R. I. A. cruise). Gwyn Jeffreys records in "British Conchology" a var. *lacteum*, but without locality; that locality should be "Shetlands." A pretty variety, also from the Shetlands, has a white zone below the suture of each whorl, as well as on the outer lip. This species can scarcely be mistaken for *B. unilatum* var. *zelandica*; it has no palpable epidermis at any stage of growth, the aperture is reflected outwards, and the embryo is different. Sowerby's is the better figure, but the apical whorls are incorrect; they should be as Jeffreys'.

The *B. hydrophanum* of Hancock, was dredged by the "Triton" in the Shetland-Faroe Channel, and the same species, with *B. mörchi*, Friele, by the "Knight Errant" in the same district.

BUCCINOPSIS DALEI, J. Sow.—Atlantic off Ireland 345 f. (R. I. A. cruise); west of St. Kilda 100 f. (Hoyle); Aberdeenshire, 40 miles off Rattray Head; (Kelly)! Buchan Deeps, 70 miles east of Aberdeen. (Simpson)!

There is considerable difference between the shells of the male and female of this species, the former being oblong and the latter oval. Sowerby's figure well illustrates the female form, and Jeffreys' *generic* figure the male, though the latter has the whorls too convex and the operculum is wrongly shaped. Jeffreys' *plate* figure is much too broad, and it should not be spirally striated nor have such a broad glaze on the pillar.

Gwyn Jeffreys recorded a *Buccinopsis striata* in the "Depths of the Sea," which he vaguely assigned as "another interesting addition to the Shetland fauna."

TRITON CUTACEUS L.—A very fine living specimen, dredged by me off St. Martin's Point, Guernsey, in 22 fathoms, in 1885, exceeds the dimensions given by Jeffreys. This is the only example that has been obtained alive in recent years. Nor has any addition been made

(1) Brit. Conch., vol. i, Introduction, p. xxi.

to the "three living specimens" of *T. nodiferus* found off Guernsey in 1832.

FUSUS ANTIQVUS L.—A "young and dead specimen" has been dredged by the Rev. J. Smart at Scilly; this is its furthest southern limit. The operculum is triangularly oval, dark horn-colour, very coarsely wrinkled, with a few faintly-impressed lines, and often a flexuous depression down the centre. Very rarely the shell is snow white; I have two from deep water off the Shetlands, but these do not belong to the next variety.

Var. *alba*, Jeffr.—Off Cork (Wotton)! off Aberdeen (Simpson)! the Irish Sea, and off Peterhead in 60 fathoms. All the specimens I have seen of this variety are very finely striated, and one from Peterhead is entirely devoid of sculpture except the lines of growth. It attains 6½-in by 3-in., but one form of it from the Irish Sea, with the aperture expanded and reflected, is 6½-in. by 4-in. Some aged specimens of the latter have the outer lip formed of half-a-dozen separate layers added one over the other, making the edge a third of an inch in thickness.

Var. *ventricosa*, Jeffr.—Great Fisher Bank, off Aberdeenshire (Simpson)! Doggerbank, 30 f. This varies in the length of the spire, but the last whorl is always tumid and greatly expanded, trumpet-shape, like *Limnaea auricularia*. Some of my specimens have hardly any spire, and the largest, from the Doggerbank, are 7-in. by 4½-in. It is yellowish-white externally, with the inside of a rich deep orange colour, and occasionally the upper whorls are carinated as in the var. *carinata*. One monstrous specimen from Aberdeenshire has all the whorls strongly carinated.

Var. *gracilis*, Jeffr.—I know this from S. W. Ireland only. It is a very handsome shell, characterised by a long slender spire, a thin texture, and tumid whorls. Its dimensions are 6-in. by 2½-in.

Var. *carinata*, Turt. = var. *striata*, Jeffr.—Bantry Bay, Irish Sea, and Bristol Channel. My finest are from S. W. Ireland, and measure 6½-in by 3-in. Some specimens approximate to *F. despectus*, L., in sculpture, but the two forms can always be readily separated. Gwyn Jeffreys admits that this is *F. carinatus*, Turt., but gives no reason for substituting a varietal name of his own, which was clearly not required. Var. *carinata* is also a more suitable name, as all the forms of *F. antiquus* are striated.

F. DESPECTUS, L., although a northern species, has been dredged by the "Porcupine" in the Atlantic off Ireland, and by the "Challenger" as far south as Portugal in 470 f. (a young specimen). I have examples from shallow water in the Faroe Isles, where it seems, however, to be

only partially established, and to be small and scarce. As a general rule, and comparing large series with *F. antiquus*, *F. despectus* will be found to be appreciably longer in the spire and shorter in the body-whorl, in some instances very much so. The carinated sculpture is always present and conspicuous in *F. despectus*, and is a prominent feature of the shell, it is only now and again that a specimen with *less* prominent carinations approximates to one of *F. antiquus* var. *carinata* that is *more* than usually carinated. Professor G. O. Sars and Mr. E. A. Smith consider the two forms distinct species, as to which I do not think there can be much doubt. Miss Elliott's examples of var. *carinata* in the National Collections are as characteristic as any that may be found, but these could never be mistaken for *F. despectus*; while Sars' figures are excellent representations of *F. despectus*, yet could not be mistaken for the most extreme examples of var. *carinata*. The Rev. Boog Watson writes with respect to *F. despectus*:—"The identity of this species with *F. antiquus* is very strongly supported, and is an opinion deserving the utmost respect. If it has not been followed here, the reason is that though my opportunities for comparison have been rather limited, I have an impression that the apex in the two species is different. On this point I had hoped for fuller information from Mr. Friele in his great work on the mollusca of the Norwegian Northern Expedition." (1) But that work was not forthcoming. It has subsequently been published, and Herr Friele has figured the apices of both *F. despectus* and *F. antiquus*, but his figures are not convincing. I have an uninterrupted series of all ages of both species, and I must confess to finding the evidence negative, notwithstanding that there is an unusual amount of individual variation in the apex of both species. The most that can be said is that the extremes of both forms nearly approximate; but they are not singular in that respect, nor would the mere presence or number of carinations in the var. *carinata*, however closely resembling those of *F. despectus*, of itself constitute that species. The extreme variability of these striations and carinations (hardly two specimens being alike) demonstrate their varietal character. *F. turtoni* has a correlative variety.

F. NORVEGICUS, Chemn.—Great Fisher Bank, and from Aberdeen trawlers. (Simpson)! None of the figures or descriptions of this species indicate the presence of a large swollen excrescence on the upper part of the pillar, just at the entrance of the aperture, which occurs in about 50 per cent. of adult specimens. This excrescence if examined is found to wind itself inwardly round the pillar. I cannot

(1) "Challenger" *Gastropoda*, p. 159.

imagine its utility, nor why it is present in only half the specimens. Jeffreys' dimensions are extreme; the usual size is $4\frac{1}{4}$ -in. by 2-in. A dwarf form from the Doggerbank does not exceed 3-in. by $1\frac{1}{2}$ -in.

F. TURTONI, Bean.—Aberdeenshire coast, 70 miles from land, in 40 f., and from trawlers (Simpson)! Peterhead, 43 f. ("Triton" Exp.)! East Shetland fishing-banks, from trawlers. This species lives in muddy ground in deep water far from land, rare; more often procured by deep-sea fishermen than by the dredge. The colour is yellowish-white under the epidermis, and occasionally the inside is more or less tinged with purple; epidermis rather thin, deciduous, ranging from light-brown to olive-green, and frequently stained with ferruginous deposit. Round the periphery the spiral riblets are more prominent and irregular, and these sometimes develop into ridges or carinations (as in *F. antiquus* var. *carinata*), thus making the whorls more or less angular at that part. The operculum is large, elongated, and obliquely triangular (but varies greatly in length and width), dark horn colour, highly glossy, closely wrinkled with semi-circular striations, and having impressed lines (variable in number) radiating from the nucleus.

This species is subject to more extreme variation than is generally supposed, and I regard it as by far the most variable of the genus, while the differences between the male and female forms are more than usually apparent. My smallest adult specimen, from the Shetlands, is only 3-in. by $1\frac{1}{4}$ -in., while the other extreme is represented by examples exceeding $5\frac{1}{4}$ -in. by $2\frac{1}{2}$ -in., and there is every intermediate gradation of length and breadth. The whorls also are of every degree of convexity, and the aperture is especially variable according to age, as after it has reached maturity the outer lip is added to and reflected. The shell of the male, correctly figured by Sowerby and Jeffreys, has a comparatively small body-whorl and an elongated spire, and rarely exceeds $4\frac{1}{2}$ -in. by $1\frac{1}{2}$ -in. The young of this up to 2-in. in length present a very droll appearance, being all spire. An extreme example of this male form from the Shetlands, having the spire abnormally elongated, now in the collection of Mr. James Simpson of Aberdeen, has been named (in MS.) var. *attenuata*. The shell of the female, well figured by Forbes and Hanley (¹) is larger and broader throughout, the spire is not nearly so attenuated, the last whorl is very much larger and swollen, and the shell attains $5\frac{1}{4}$ -in. by $2\frac{1}{2}$ -in. The young of both forms are easily distinguished at all ages, and the adult have each the same number of whorls, $7\frac{1}{2}$.

Bean founded this species on a specimen found in a Scarborough fishing-boat, but I have not been able to refer to his original description and figure to see which of these two forms is the type. (Jeffrey's

reference in "British Conchology" is wrong; instead of "Bean in Mag. N. Hist., viii," it should be "Bean in Loudon's Journal, vol. vii, p. 493, fig. 61.") Canon Norman says the slender or male shell is the "typical Doggerbank form,"⁽²⁾ but both forms occur on the Doggerbank, as well as in the Shetlands and off the Aberdeenshire coast. He also adds that it is "well figured by Forbes and Hanley," but a comparison of the latter's figures and measurements will demonstrate that their type is the large and broad female form.

Northern specimens are smaller than ours generally, rarely exceeding 4-in. in length, and these exhibit a still further range of variation. Sars figures several; Friele has described one as *F. ossiani*, and Middendorff another as *F. schantaricum*, while Canon Norman has also described two specimens from Norway, apparently immature, one as var. *brevispira* and the other as var. *tumida*.⁽³⁾ Specimens, however, the exact counterparts of the two latter are also found in our seas, some of them much more tumid than his figure, while as regards the short-spined form, some of my British specimens have very little spire indeed, measuring only 4-in. in length by 2½-in. in width. That both slender and broad specimens also occur in Norway is evident from Sars' figures, as he gives the immature forms both of the male (t. 14, f. 3b) and female (t. 25, f. 10).

F. schantaricum, Midd.⁽⁴⁾ possesses no generic attribute apart from *F. turtoni*, and though Canon Norman "lays chief stress on the spiral grooving of the inside of the lip" (p. 354), that is merely the impress of the ordinary outer sculpture, which is occasionally observable (also with the purple interior) in the immature stage of *F. turtoni*, and more frequently in *F. islandicus*, a species similarly sculptured. Sars' figure 3 (pl. xiv.) clearly shows the connection between the two forms. *F. turtoni* also rejoices in several generic names. Professor Dall has conferred on it that of *Beringius*, Herr Friele that of *Junala*, and Canon Norman that of *Ulko*.

F. islandicus, Chemn.—Off Milford Haven, the Bristol Channel as far as Lundy Island, and the Wexford and Waterford coasts, procured by trawling (Wotton)! S. W. Ireland 345 f. (R. I. A. cruise); Porcupine Bank off the West of Ireland 85 f., and North of the Hebrides 185 f. ("Porcupine"): S. and S. E. Shetlands, procured from trawlers (Simpson)! S. Ireland, a trawled specimen, and E. Orkneys,

(1) B. it. Moll., vol. iii, p. 432; vol. iv, pl. cv., fig. 4; and pl. cvi, fig. 3 (the same figure reversed).

(2) "A Month on the Trondhjem Fjord," Ann. Mag. Nat. Hist., vol. xii, p. 352.

(3) Loc. cit., p. 352, pl. xvi, figs. 1, 2.
Loc. cit., p. 353, pl. xvi, fig. 3.

another trawled specimen (J. T. M.); Shetland-Faroe Channel 640 f. ("Triton"). The records given in the Linnean Society's Journal ⁽¹⁾ as to *F. islandicus* being dredged by the "Triton" off Peterhead were *lapsus pennæ* of mine for *F. gracilis*. The operculum of *F. islandicus* is obtusely triangular, dark horn-colour, large, solid, and closely and coarsely wrinkled in the line of growth. *F. islandicus* has a broad as well as a narrow variety. Some from the Shetlands are unusually slender measuring 5-in. in length by 1¼-in. only in the widest part; but rougher ground in the same seas yields a much more robust form, some of my specimens thence being fully 6-in. by 2-in. These forms will no doubt in time receive distinct varietal names. The normal dimensions of the type are 5 in. by 1¾ in., though a specimen in Mr. F. W. Wotton's fine series of this handsome shell, from the Irish Channel, is 5¾ in. in length, and is unique in having the epidermis perfect throughout. Another specimen from the same seas, in the collection of Mr. Bartlet Span of Tenby, is just short of 6-in. in length, but has lost the bulbous apex. In these large specimens the epidermis is usually more or less abraded. Mr. Bartlet Span found a specimen in Tenby harbour some years ago, which had most probably been cleaned out of a trawl-boat.

The peculiar bulbous apex, which is supposed to be a specific character of this species, is locally variable. Specimens from Greenland, Finmark, and the Shetlands have the spire gradually tapering to a blunt point, while those from S. W. Ireland, the Irish Channel, and adjacent coasts have the prominent bulbous apex depicted in Jeffreys' figure, which is much broader than the following whorls. The shell is more attenuated than either Jeffreys' or Sowerby's figures, especially the lower half, and has a much longer canal; Sowerby's figure should also have the suture oblique and the whorls less tumid. An actual specimen placed over these figures will show how very much they are drawn out of scale. Sars gives an excellent figure of the northern form (*minus* the bulbous apex) where, as in our seas, it is less rare than it used to be. Dr. Mörch many years ago brought about 20 specimens from Greenland when on a visit to England, and these sold at from 20/- to 60/- each.

F. GRACILIS, Da Costa.—South Devon is the limit of this species, where it becomes rare.

Var. *convoluta*, Jeffr.—Scilly Islands (Smart and others); the Smalls Light (Span); and various other places, but sparingly. Variable in length and slenderness. My largest are 3½-in. in length by 1-in. only in the widest part, and have a deeply-channelled suture. A dwarf

(1) Zoology, vol. 17, 1883, pp. 95, 9*, 97.

form from the Shetlands is half this size with a finer apex, the young of which have the same proportions and might easily be mistaken for *F. propinquus* var. *turrita*, but they are more coarsely sculptured. Some Scillonian specimens have a light yellow epidermis, with the sculpture less marked. This variety is well illustrated by Forbes and Hanley (pl. ciii, fig. 3) and by Captain Brown (pl. vi, figs. 7, 9).

Var. *celliana*, Jord. (Journ. Conch., 1890, vol. vi, p. 232).—Larger and broader. Off the Wexford and Waterford coasts 20-30 f. (Jordan and others); off Galley Head, S. Ireland (Wotton)! Doggerbank 30 f.; Moray Frith 24 f. This is the form figured by Forbes and Hanley (though not the type) as "dredged from the Doggerbank at the depth of 50 f." (1)

Var. *coulsoni*, Jord. (Journ. Conch., vol. vi, p. 232, 1890).—Smaller and narrower; the usual deep-water form. Shetlands, from trawlers (Jordan and others); the Smalls Lighthouse (Span); off Peterhead 60 f.; West Orkneys 45 f.

Var. *glaber*, Verk. (2)—New to Britain. This was first recorded from Finmark by Mr. T. A. Verkrüzen. My specimens are small and thin, the epidermis very delicate, silky, and highly polished, resembling gold-beater's skin, and the spiral striae slight or totally absent. I have three specimens trawled from deep water in the Shetlands, and their appearance suggests a habitat in deep and still water on fine sand or mud. Canon Norman dredged a small form of it at Drontheim, which is figured in the "Annals" for November, 1893, and Mr. James Simpson, of Aberdeen, has a specimen from the north side of the Shetland-Faroe Channel 60-70 f. (!) The original Finmark specimens, of which Sars' figure is a good representation, have an unusually short base and canal somewhat similar to *F. curtus*, Jeffr., from North America and the Crag, but that character is not uniform in this variety.

I do not know of any good typical figure of this common shell. Shetland specimens of *F. gracilis* (as in the last species and the next) are more slender than usual, and Gwyn Jeffreys figures this slender form as his type; Sowerby figures an immature shell, the base being angulated in consequence of the last whorl not being fully developed; while Forbes and Hanley describe as their type "the beautiful slender form that is most commonly preserved in cabinets," but their figures illustrate the vars. *belliana* and *convoluta*. Mr. H. K. Jordan's collection contains a reversed example. Specimens of this and the next species are occasionally dredged which are denuded of the epidermis and

(1) Brit. Moll., vol. iii, p. 418, pl. ciii, fig. 1.

(2) Sars Moll. Reg. Arct. Norv., pp. 271-2, tab. 4, fig. 7 (as *Sipho glaber*, from Vadsö and the Lofotens).

apparently dead and water-worn, yet still containing the animal and operculum. As I have explained with regard to examples of *Trochus* in a similar condition, these have been swallowed by fish and voided again, the action of the gastric fluid having meanwhile destroyed the epidermis.

F. PROPINQUUS, Ald.—Not Dublin Bay nor Cork, which localities belong to the next species (Jeffreys); Birkdale (Heathcote); Llandulas (Archer); St. Andrew's (M'Intosh); off Peterhead 60 f. ("Triton")! West Orkneys 45 f.; and North Rona. In the Report of the "Valorous" Expedition, Gwyn Jeffreys has mistakenly recorded this species from the Bay of Biscay 109-1380 f., by the "Porcupine" Expedition of 1870, instead of from the West of Ireland, Stations 24 and 30, by the expedition of 1869; and Canon Norman has also mistakenly recorded it from "N. of Hebrides, 189-530 f., "Porcupine" 1869," instead of "Lightning" Expedition 1868.

Var. *turrita*, Sars.—East Shetlands, several specimens from Aberdeen trawl-boats (Simpson)! Its dimensions are $1\frac{1}{4}$ -in. by $\frac{3}{8}$ -in., the apex is much more pointed than in the type, and it is very rare on our Shetland coasts. One of my specimens is almost smooth. Searles Wood figures a specimen from the Red Crag (pl. ii, fig. 15) as what he considers "an abnormal form of *F. propinquus*." It is not very well executed, but fairly represents this variety. Various misconceptions have centred round the identity of this shell. The specimens ascribed to it by Mr. H. K. Jordan ⁽¹⁾ are not this variety, but small typical specimens. Some writers prefer to consider it a variety of *F. tortuosus*, G. O. Sars, and it is so described and figured by him, though from a poor specimen minus the apex. ⁽²⁾ The difference between Sars' var. *turritus* and var. *attenuatus* ⁽³⁾ is not apparent, certainly not in the figures, and I consider them the same thing; while Gwyn Jeffreys held that *F. tortuosus*, G. O. Sars (non Reeve, which is *F. sabini*, Gray) is another variety of *F. propinquus* ⁽⁴⁾. However that may be, from my own specimens I can easily graduate vars. *turritus* and *attenuatus* into typical *F. propinquus*, from which they do not differ in any particular except that of proportion. Sars was mistaken in quoting *F. attenuatus*, Jeffr. as a synonym of his var. *attenuatus*; they have nothing in common except the name. The latter, as well as *tortuosus* and *turritus*, are attenuated at each end, which gives them a cylindrical outline, whereas *F. attenuatus*, Jeffr., and *F. consimilis*, Marsh., are attenuated in the spire only, but have a

(1) Journ. Conch., 1890, vol. vi, p. 233.

(2) Moll. Reg. Arct. Norv., p. 272, t. 25, fig. 11 (printed 10 in error).

(3) Loc. cit., p. 273, t. 15, fig. 5.

(4) Moll. "Triton" Exp., Proc. Zool. Soc., 1883, p. 395.

short and broad base, which imparts a conical outline in comparison with the others. The two latter are also much larger shells, with a glossy surface and compressed whorls. Canon Norman is also "inclined to add as a wider variety" *F. delicatus*, Jeffr. (5), but that again is quite distinct from *F. propinquus* or any of its varieties, all its affinities (except size) being with *F. sabini*, Gray.

Var. *lavis*, Marsh. n. var. — This is a small, delicate form, with a light, silky, polished epidermis, and the whorls partially or entirely without the usual spiral sculpture. It corresponds with *F. gracilis* var. *glaber*, but is still smoother than that variety, and comes from the same British locality.

As in the last three species, there is a broad as well as a slender variety, the result of depth and habitat. It flourishes best on the Doggerbank, where I have dredged it in comparative abundance and of large size, the largest attaining 2¼-in. by 1-in.; but on the edge of the Doggerbank and in the Silver Pits, where the water is deeper, they become smaller and narrower, like the Shetland form, although the latter district produces large specimens also in places. Mr. Richard Howse (6) first noticed and figured the small deep-water form, but mistakenly under the name of *F. gracilis* var., which he described as "hispid, 1¼-in. by ½-in., with seven whorls"; and if it merits a varietal name that of var. *howsei* would be appropriate. Some of my Shetland specimens do not exceed an inch in length by half that width. Searles Wood records and figures a reversed specimen found by Mr. A. Bell in the Red Crag (pl. 27, fig. 21).

This is another instance in which Forbes and Hanley, Jeffreys, and Sowerby are at variance as to the type form, and unfortunately the author did not accompany his description with a figure. Gwyn Jeffreys' figure, description, and dimensions belong to the Shetland and deep-water form, while the other authors figure more southern examples as the type; and although Forbes and Hanley give the dimensions as 1½-in. by ½-in. their figured specimen is 2⅓-in. by 1-in. Captain Brown's figures are not this, but the next species.

F. JEFFREYSIANUS, Fisch.—Bristol Channel (Wotton)! the Smalls Lighthouse (Span)! Milford Haven (Jordan); Tenby and Laugharne (Williams-Vaughan)! Brixham in S. Devon, from trawlers; and occasionally cast ashore in Torbay by storms. It has been dredged on the north coast of Spain (Locard, "Travailleur" Exp.), and I have a young specimen dredged by the "Porcupine" off Cadiz in 386 f.

(5) Ann. Mag. Nat. Hist., 1899, p. 142.

(6) "Notes on a Dredging Excursion off Dunbar," Ann. Mag. Nat. Hist., vol. xix, p. 161, pl. 10, fig. 5.

I incline to the opinion of Canon Norman, that this is "a large variety of *F. propinquus*." It is not only larger generally, but is much more solid and robust, and commences where the latter leaves off, viz. in the Bristol Channel, *F. propinquus* tending north, and *F. jeffreysianus* to the south. Its British range is from Exmouth in South Devon (Clark) to both sides of St. George's Channel as far as the Smalls Lighthouse off the Pembrokeshire coast, which is its northernmost limit, meeting here and mingling with *F. propinquus*, and so partaking somewhat of each other's characteristics. From a series of specimens from this district it is not difficult to graduate one form into the other, or to meet with examples that may be ascribed to either. Moreover, none of the characters ascribed to it by Jeffreys mark it off as a distinct species. The comparative length of the spire is too variable to make it a specific test, and as to that of the smooth epidermis, Gwyn Jeffreys would probably now qualify his description after admitting that *F. sabini*, *F. pygmaeus*, *F. propinquus*, and *Buccinum grandaedicum* are occasionally "finely and closely ciliated, though the epidermis is usually smooth," for some *F. jeffreysianus* are certainly hispid even to the unaided eye. It is quite true that the young and fry "are as distinct from those of *F. propinquus* as the adult of each from the other," but neither is that a specific test. (It is curious, by the way, that the shape of the young are the reverse to the adult shell, those of *F. jeffreysianus* being long and narrow, while those of *F. propinquus* are short and stumpy.) The shell becomes larger and more solid as it proceeds south, and attains its greatest development in Torbay and at Exmouth, my largest thence being $2\frac{5}{8}$ -in. by $1\frac{1}{4}$ -in., while the smallest, from the south of Ireland and the Pembrokeshire coast, are $1\frac{5}{8}$ -in. by $\frac{3}{4}$ -in. All the published figures correctly represent the shell, the best perhaps being those of Captain Thomas Brown, (1) who was the first to figure it, though mistakenly as the last species. His description, however, is unreliable, and he says a specimen was "found at Seaton, Northumberland, by Walter Trevelyan, Esq., and in the cabinet of Sir John Trevelyan at Wallington;" but the figures are undoubtedly those of *F. jeffreysianus*, and of the South Devon form. Sir Walter may without doubt have picked up a specimen of *F. propinquus* at Seaton, but that cannot be the shell figured by Brown, and it is surprising to find Gwyn Jeffreys and others failing to recognise the figures. Sowerby figures the Irish form well.

F. BERNICIENSIS, King.—Aberdeenshire (Simpson and others): Channel slope 539 f. ("Porcupine"); Atlantic off Ireland 345 f. (R. I. A. cruise); Shetland Faroe Channel 570 f. ("Triton"). The finest came

(1) *Illust. Rec. Shells*, 2nd ed., 1845, p. 8, pl. vi, figs. 11, 12.

from the Doggerbank, and measure $4\frac{1}{4}$ -in. by $1\frac{7}{8}$ -in. Four prominent ridges (sometimes only three) encircle the periphery of each whorl. A specimen from the Doggerbank is peculiar in having the very different smooth and spiral embryo of *F. norvegicus*.

Var. *elegans*, Jeffr.—East Shetlands 70 f. (Simpson and others)! North of Unst (Jordan); Doggerbank 30 f., North Rona 45 f., and East Shetlands 100 f. Also N. of Hebrides 530 f. ("Knight Errant"); Shetland Faroe Channel 608 f. and 640 f. ("Triton"); between the Hebrides and Faroes 155-632 f. ("Porcupine.") L. 4-in., b. $1\frac{5}{8}$ -in. This lives with the type on the Shetland deep-sea fishing-grounds, whence Barlee and Jeffreys first procured it, and I have several specimens from the same locality. From the same region I have a fully adult specimen which is only half the usual size— $2\frac{1}{2}$ -in. by $1\frac{1}{8}$ -in. Another variety (²) with more tumid whorls and shorter spire, has been dredged by the "Porcupine" 50 miles west of the Shetlands in 203 f., and north of Scotland in 290 f. (Jeffreys), but which does not differ, except in texture, from var. *solida*, G. O. Sars (³). I have two specimens that may pass for either of these varieties, one from the Shetlands and the other from the Doggerbank. All three varieties gradually merge from the type, and are only the extreme forms common to all the *Fusus* family, and indeed to all univalves.

F. FENESTRATUS, Turt.—The Minch 72 f. a young specimen (J. T. M.); S. of Ireland 110 f. (E. A. Smith); S. W. Ireland 50 f. (R. I. A. cruise); Channel slope 539 f., off Cape Clear 180 f., S. of Ireland 725 f. and W. of Ireland 90 f., ("Porcupine"); off the Butt of Lewis 530 f. ("Knight Errant"); Shetland-Faroe Channel 530 f. ("Triton"). Two or three specimens have also been trawled in recent years between the Pembrokeshire and Waterford coasts; one of these is $2\frac{1}{4}$ -in. in length, and has seven whorls besides the apical ones; but for many years previously the only specimens known had their source from old Mr. Humphrey's, the dealer, of Dublin, who obtained altogether during his career eight specimens, one of which is in my collection. My young specimen from the Minch has only $3\frac{1}{2}$ whorls, but is interesting as showing the embryonic sculpture, which is usually worn down in the adult. The first whorl is quite smooth, the second has spirals only, and the third initiates the longitudinals and spirals which characterise the adult. Gwyn Jeffreys gives an excellent figure, but Sowerby's is not like. *F. fenestratus* was also dredged by the "Porcupine" off the coast of Portugal in 220 f.

(2) Var. *infata*, Jeffr., "Valorous" Moll., Ann. Mag. N. Hist., 1877, p. 327.

(3) Moll. Reg. Arct. Norv., p. 272, tab. 14, fig. 2.

A good many outlying members of this genus have been dredged between the Hebrides and Shetlands and the Feroes, as well as in the Atlantic, by the "Lightning," "Knight Errant," "Triton," and "Porcupine," expeditions, including *F. delicatus*, Jeffr., *F. hirsutus* Jeffr. *F. lachesis*, Mörch, *F. sarsii*, Jeffr., *F. sabini*, Gray, *F. concinnus*, Jeffr., *F. turgilulus*, Jeffr., *F. togatus*, Mörch, and *F. noebii*, Dunk. and Metz. But it should be noted as a significant fact that the discoverer and author of most of these species did not attempt to claim for them a British origin.

To the foregoing may be added another species, closely allied to *F. attenuatus*, Jeffr.,⁽¹⁾ which was trawled in 1897 by an Aberdeen steam-trawler "on the north side of the Shetland-Faroe Channel, on a small bank 60 to 70 fathoms deep, with very deep water on either side," and which I propose to name **F. consimilis**, n.sp. With two exceptions, it agrees in every respect with Gwyn Jeffreys' description of *F. attenuatus*, so closely indeed as to suggest at first that those two exceptions may possibly be reconciled if more specimens come to hand; but one of them is fundamentally distinct. Gwyn Jeffreys writes that the spire of *F. attenuatus* tapers "to a very blunt and regularly spiral point, which is not mammillar nor twisted," while my specimen has a twisted and bulbous apex wider than the following whorl, and similar to that of *F. istanlicus*, but not stiliform. He also describes the canal as "straight," while in my shell it is much curved. All the other characters given to *F. attenuatus* may be applied to this species—shape, size, measurements, sculpture, epidermis, colour, etc. This specimen came into the hands of Mr. James Simpson of Aberdeen, who generously gave it to me. *F. attenuatus*, Jeffr., is a very rare species, only one living and two dead adult specimens having been dredged by the "Valorous" in mid-Atlantic, and by the "Porcupine" in the Atlantic off Ireland, while no figure of it has yet been published. The correct "Porcupine" localities for *F. attenuatus* are S. W. Ireland off Cape Clear 1207 f., and N. W. Ireland off Rockall 1215-1380 f., and not those recorded in error by Gwyn Jeffreys.⁽²⁾

A specimen of *F. concinnus*, Jeffr.,⁽³⁾ was found some few years ago on an Aberdeen trawl-boat by Mr. J. Simpson. It was an adult example, perfect but dead. The species was described by the author from a single specimen dredged by the "Triton," in the Shetland-Faroe Channel, in 608 f., but this specimen more probably came from the deep-sea fishing-grounds 70 miles east of the Shetlands, as trawlers

(1) Proc. Roy. Soc., vol. 18, p. 434, 1870, name only; and Ann. Mag. N. Hist. 1877, (misprinted 1876 in private copy), p. 326.

(2) Moll. "Valorous" Exp., Ann. Mag. N. Hist., 1877, p. 326.

(3) Moll. "Triton" Exp., Proc. Zool. Soc., 1883, p. 397, pl. xlv, figs. 8, 8a.

cannot work their trawl deeper than about 100 f., and rarely at that. On another occasion, from the same source, Mr. Simpson found a living but immature specimen of another *Fusus* different from any species that I know. It is nearest to *F. laterivexus*, Möll., but differs from that shell in being still more slender, with more compressed whorls, no longitudinal ribs, and a bulbous apex. I am informed that of late years several species of the Echinodermata have been brought into Aberdeen, from the same fishing-grounds, which had only been previously dredged in the Shetland-Faroe Channel, and I have myself described an *Adula* (4) from these fishing-grounds which, if not well authenticated, might have been relegated to the Shetland-Faroe Channel. In this connection I may add that a more recent discovery of *A. simpsoni* in a Teredo-pierced piece of wood brings its habitat into complete harmony with that of *A. argenteus*, Jeffr., from frigid water in the Shetland-Faroe Channel.

The results of the exploration of the Shetland-Faroe Channel by various expeditions has of course brought the question of the limits of the British area for Zoological purposes into urgent prominence, and it is to be hoped that the British Association will soon take it in hand and issue some authoritative Rules on the subject, as they have done in the matter of the Rules of Priority and Nomenclature. This boundary or zone must in any case be an arbitrary one, and for that very reason individual opinion cannot be expected to carry any weight. It is also the more necessary not only because some rather wild ideas appear to be entertained as to what constitutes a British species or what are the limits of the British seas, but more especially because steam-trawlers are rapidly taking the place of the old sailing craft, and are now working nearly all the year round up to Iceland and the Faroes, bringing back with them various genera of marine animals; while the change from sailing to steam trawlers is still more accelerated owing to the growing reluctance of fishermen to remain at sea more than from Monday to Saturday; they are all learning to appreciate their week-end on shore, and, once enjoyed, cannot be induced to sacrifice that privilege; so that while steam-trawlers are easily manned, and can run home when they like, there is a difficulty in shipping hands for the sailing craft, who have to come home when they can.

(4) *Adula (Myrina) simpsoni*, Marsh., Journ. Malac., 1900, vol. vii, p. 167, figs. 1-3.

A CLASSIFIED LIST OF THE HELICOID LAND SHELLS OF ASIA.

(PART II.)*

By G. K. GUDE, F.Z.S.

i. THE CHINESE EMPIRE (*continued.*)

B. TIBET.

This mysterious country is, conchologically, as in other respects, still practically a *terra incognita*, chiefly owing to the difficulties which attend travel, and more especially to the absolute prohibition by the Government to Europeans of entering the central parts. Since, in 1845, the two French missionaries, Huc and Gabet, made their famous journey, no European has succeeded in reaching Lhasa. The most recent attempt, in 1901, by the intrepid Swedish explorer, Dr. Sven Hedin, to enter the capital, has again ended in failure, for when within five days' journey from his goal he was turned back by the authorities to the frontier.

Considerable exploration has, however, been done in the eastern, northern, and western parts by English, French, and Russian travellers, and it is principally to those of the latter nationality that we are indebted for a glimpse of the molluscan fauna of this region. Foremost among these, ranks the Russian General Prejevalski, who made four expeditions between 1870 and 1885, to the eastern and north western districts. The Russian travellers Potanin, Beresowski, and Obrutschew, the Austrian explorer Loczy, the Hungarian Count Bela Szechenyi, and more recently the German savants Professor Futterer and Dr. Holderer, have all contributed to a partial knowledge of the mollusca of these parts.

It may be remarked that the physical conditions of a great portion of north-west Tibet do not favour molluscan life, barren, uninhabitable country, interspersed by salt lakes, stretching for hundreds of miles.

Many of the mollusca originally attributed to Tibet, i.e. those collected near Moupin by the Abbé Armand David, and described by Deshayes, have had to be eliminated from the Tibetan fauna, for the locality named, though ascribed by Deshayes to eastern Tibet, has been shown by Dr. von Möllendorff to be in China (Province of Sze-chuen).

Some shells collected about Yerkalo and Tse-kou by the Abbé Desgodins and Monseigneur Biet, have been described by Mr. Ancy, who states these localities are in Tibetan territory, and although the

* See Ante, p. 1.

maps to which I have access show these places on the Chinese side of the frontier, I have accepted Mr. Ancey's view and have included these shells in the Tibetan list.

The species described by Dr. von Möllendorff from the Koko-nor district are also included here, for, although Dr. von Möllendorff is inclined to consider this district outside Tibet. Prejevalski, Bonvalot, Wellby, and Hedin all show it on their maps within the boundaries of north Tibet.

On glancing at the known Tibetan Helicoids, one feature is striking, viz., the absence of *Zonitidae*; and we have also a preponderance of the typical genus *Cathaica*. That the *Zonitidae* will be found on further exploration, however, may be inferred from the fact that they have been recorded from all the surrounding countries.

As a case of apparent erratic distribution may be cited *Cathaica stoliczkana*, Nevill, recorded originally from eastern Turkistan, and which has been found in the extreme east of Tibet, near Yerkalo.

Family Helicidae	pulveratricula, Mts. Nan-shan
Group Belogona , v. Iher.	Range.
BELOGONA EUADENIA , Pils.	ohlmeri, Andr. Koko-nor.
Genus EULOTA , Hartm.	fedtschenkopsis, Anc.
Section EULOTELLA , s.s.	Yerkalo.
physeta, Anc.	reneana, Anc. Yerkalo.
pandynama, Mab.	Sub-genus CAMPYLOCATHAICA ,
= poirieri, Bourg.	Andreae.
desgodinsi, Anc. Yerkalo.	cunlunensis, Mdff. Di-chu.
Genus CATHAICA , Mdff.	N. Tibet.
Sub-genus EUCATHAICA , Andreae.	przewalskii var. minor, Andr.
giraudeliana, Hde. Yerkalo.	Nan-shan Range.
Sub-genus XEROCATHAICA , Andr.	Genus PLECTOTROPIS , Mts.
holdereri, Andr. N.E. Tibet.	hilberi, Anc. Ta-t sien-lou.
stoliczkana, Nev. Yerkalo.	BELOGONA SIPHONADENIA , Pils.
eucunorica, Mdff. Koko-nor.	Genus VALLONIA , Risso.
siningfuensis, Hilb. Nan-shan	asiatica, Nev. South Koko-nor
Range.	Range.
v. brunnescens, Mdff.	ladacensis, Nev. Narka,
nanschanensis, Mdff. Nan-	W. Tibet.
shan Range.	v. tibetana, Mdff. Burhan
kreitneri, Hilb. N.E. Tibet.	Bota, south of Tsaidam.

C. EASTERN TURKISTAN.

The earliest records from this region are by von Martens, based on the collection of Fedtschenko, and by G. Nevill, from specimens obtained

by Stoliczka during the second Yarkand Mission. One species we owe to Prejevalski : while the remaining, species have been contributed by the travellers Kasnakow and Stenroos, and were described by Dr. Westerlund. Here the *Zonitidae* are represented by one species, and the Chinese genus *Cathaica* again preponderates : but *Fruticicola* has one and *Vallonia* two representatives, showing relationship with the European Antarctic fauna.

- Family **Zonitidae**. plectotropis, Mts. Yarkand ;
 Sub-family **Zonitinae**. Karghalik.
 Genus **POLITA**, Held. uniformis, Anc. ArassanCulak.
 kasnakowi, West. Aksu. anisopleuros, Anc. (?) Central
 Asia.
 Family **Helicidae**.
 Group **Belogona**, v. Iher. Sub-Genus **CAMPYLOCATHAICA**, Andr.
BELOGONA EUADENIA, Pils. capusi, Villeserre.
 Section **EULOTA**, s.s. palmeni, West. Kashgar.
 stenroosi, West. (Pomatia). v.accinta, West. Djuka-Djok
 Terskii-Alatau. Valley.
 v. tetrica, West. scythica, West. Dgehularik.
 Genus **CATHAICA**, Mdff. opposita, West. Djuka-Djok
 Sub-genus **EUCATHAICA**, Andr. Valley.
 funki, Anc. Karghalik. Genus **EULOTA**, Hartm.
 Sub-genus **PLIOCATHAICA**, Andr. **BELOGONA SIPHONADENIA**, Pils.
 rossimontana, Mdff. Kerija Genus **HYGROMIA**, Risso.
 Darja Valley, Russian Section **FRUTICICOLA**, Held.
 Range. mesoleuca, Mts. Kizyl, Yarkand
 phaeozona, Mts. Pasrobat ; district.
 Karghalik ; Sasak Taka. Genus **VALLONIA**, Risso.
 Sub-genus **XEROCATHAICA**, Andr. costata, Müll. Pasrobat.
 stoliczkana, Nev. Sasak Taka ; asiatica, Nev. Pasrobat ; Sasak
 Pasrobat. Taka.
 Sub-genus **PSEUDIBERUS**, Anc.

D. MONGOLIA.

This country as might be expected from its position shows affinity with northern Tibet. Our knowledge of the Helicoids is at present confined to the genus *Cathaica*, the shells having been collected by Prejevalski, Regel and Obrutschew.

- Genus **CATHAICA**, Mdff. semenowi, Mts. Kuldja, Ili
 Sub-genus **PLIOCATHAICA**, Andr. and Kunges Valley.
 rubens, Mts. v. concolor, Mts. v.depressa, Mouss. Kuldja.
 Mount Tarbagatai. paricincta, Mts. Kuldja ; Kasch ;
 v. regeliana, Mts. Kuldja. Ili and Kunges Valley.

- v. *bisbicincta*, Mts. Valley.
 v. *ambicincta*, Mts. Sub-genus *CAMPYLOCATHAICA*,
 v. *incincta*, Mts. Andr.
 v. *bilaticinincta*, Mts. *rufispira*, Mts. Kuldja.
duplocincta, Mts. Kuldja ; v. *albidorsalis*, Mouss.
 Pilutschî : Kasch ; Ibi and Kuldja.
 Kunges Valley. *prezewalskii* v. *alascanica*,
 Sub-genus *NEROCATHAICA*, Andr. Mdff. Alashan district.
cavimargo, Mts Kuldja ; Kunges obrutschewi, Stur. Alashan.

E. COREA.

Our knowledge of the Helicoids of this region is very scanty. A few species were described by Pfeiffer and Reinhardt ; one was collected by the naturalists of the Samarang, and described by Adams and Reeve ; while Dr. von Möllendorff more recently has described a few shells collected by Dr. Gottsche. The paucity of the Molluscan fauna has already been remarked upon by Dr. von Martens (1886). Its affinities are with north China and Japan.

- Family **Zonitidae**. Section *EULOTA*, s.s.
 Sub-family **Zonitinae**. *coreanica*, Ad. and Rve.
 Genus *EUCONULUS*, Reinh. *siboldiana*, Pfr.
coreanus, Mdff. Seoul. Section *EUHADRA*, Pils.
 Family **Endodontidae** *purpurascens*, Pfr.
 Group **Haplogona**, Pils. *luhuana*, Sow. Corea ; Dagelet
 Genus *PYRAMIDULA*, Fitz. Island.
 Section *PYRAMIDULA*. *hermannseni*, Pfr. Imgin.
amblygona, Reinh. = *coreana*, Pfr.
 v. *conoidea*, Mdff. = *connivens*, Reeve var.
 Section *GONVODISCUS*, Fitz. Genus *PLECTOTROPIS*, Mts.
elator, A. Ad. Corea, Dagelet *mackensii*, Ad. and Rve.
 Island. Cone Island.
costulata, Mdff. *ciliosa*, Pfr. Port Hamilton.
 Family **Helicidae**. Genus *AGISTA*, Alb.
 Group **Epiphalllogona**, Pils. *gottschei*, Mdff. Seoul.
 Genus *GANESELLA*, Blf. *BELOGONA SIPHONADENIA*, Pils.
gradata, Mdff. Hatong ; Thosan. Genus *VALLONIA*, Risso.
 Group **Belogona**, v. Iher. *tenera*, Reinh.
BELOGONA EUADENIA, Pils. = *pulchellula*, Hde.
 Genus *EULOTA*, Hartm.

F. CHUSAN.

Our knowledge of the Helicoids of this group of islands is extremely meagre. A few shells were collected by Dr. Cantor 1840-42, and

enumerated by Benson. The only other contribution is by A. A. Fauvel, who recorded four species. Of Benson's records two are doubtful : (1) *Hemiplecta striata*, Gray, a Singapore shell, and in Dr. von Martens' opinion included in the present fauna owing to an accidental change of label ; and (2) *Plectotropis tapeina*, Bens., believed by the same authority to be a mistake in identification for *P. osbeckei*, Phil.

Family **Helicidae**.
 Genus **TRAUMATOPHORA**, Anc.
 triscapta, Mts.
 Group **Belogona**, v. Iher.
BELOGONA EUADENIA, Pils.
 Genus **EULOTA**, Hartm.
 Section **EULOTA**, s.s.

ravida, Bens.
 Genus **CATHAICA**, Mdff.
 Sub-genus **PSEUDIBERUS**, Anc.
 tectum-sinense, Mts.
 Genus **PLECTOTROPIS**, Mts.
 ciliosa, Pfr.
 ? *osbeckei*, Phil.(? *tapeina*, Bens.)

G. FORMOSA.

Extensive collections were made in this island in the sixties of last century, by the then British Consul, Robert Swinhoe, and were described by Henry Adams, and by Pfeiffer. Quite recently Schmacker collected a number of shells, and described them in conjunction with Professor Boettger ; his lamented death has deprived us of an ardent field naturalist, from whom considerable additions to our knowledge were expected.

Several genera, both of *Zonitidae* and *Helicidae* are represented, many showing close affinity with Chinese forms.

Family **Zonitidae**.
 Sub-family **Ariophantinae**.
 Genus **ARIOPHANTA**, Desm.
 taivanica, Mdff.
 Sub-family **Macrochlaminae**.
 Genus **MACROCHLAMYS**, Bens.
 formosana, Schm. and Bttgr.
 vesta, Pfr.
 Genus **MICROCYSTINA**, Mörch.
 ? *par*, Schm. and Bttgr.
 ? *spadix*, Schm. and Bttgr.
 v. cinctus, Pils.
 Genus **SITALA**, H. Ad.
 trochulus, Mdff.
 v. formosana, Schm.
 and Bttgr.
 Genus **KALIELLA**, Blanf.
 depressa, Mdff.

Sub-family **Zonitinae**.
 Genus **TROCHOMORPHA**, Alb.
 haenseli, Schm. and Bttgr.
 Family **Helicidae**.
 Group **Epiphallogona**, Pils.
 Genus **CHLORITIS**, Beck.
 Sub-genus **TRICHOCHLORITIS**, Pils.
 hungerfordiana, Nev.
 Genus **GANESELLA** Blanf.
 fulvicans, H. Ad.
 albida, H. Ad.
 sphaeroconus, Pfr.
 v. camPOCHILUS, Pils.
 Group **Belogona**, v. Iher.
BELOGONA EUADENIA, Pils.
 Genus **BULIMINOPSIS**, Hde.
 Section **BULIMINOPSIS**, s.s.
 incerta, Pfr.

- = taivanica, Mdff. (Tryon).
 Genus EULOTA, Hartm.
 Section EULOTA, s.s.
 redfieldi, Pfr.
 sieboldiana, Pfr.
 [= ?Nanina sieboldiana, Kobelt] Section DOLICHEULOTA, Pils.
 touaannensis, Soul.
 Section EULOTEELLA, Mts.
 similaris, Fér.
 assimilis, H. Ad.
 Section EUHADRA, Pils.
 luhuana, Sow.
 swinhoei, Pfr.
 bairdi, H. Ad.
 formosensis, Pfr.
 bacca, Pfr.
 v. pancala, Schm. and Bttgr.
 succincta, H. Ad.
- v. amblytropis, Pils.
 sargentiana, Pils.
 mellea, Pfr.
 friesiana, Mdff.
 nux, Mdff.
 Section DOLICHEULOTA, Pils.
 swinhoeana, Pils.
 = Bulimus swinhoei, Pfr.
 elongata, Pfr.
 = Bulimus (Amphidromus)
 formosensis, H. Ad.
 Genus PLECTOTROPIS, Mts.
 mackensii, Ad. and Rve.
 shermani, Pfr.
 v. lautsi, Schm. and Bttgr.
 granti, Pfr.
 Genus AEGISTA, Alb.
 subchinensis, Pfr.

H. HONG-KONG.

As its close proximity to the Chinese mainland would lead one to expect, the mollusca of this island are essentially Chinese. No less than nine genera of Helicoids are represented, including such typically Chinese as *Plectopylis* and *Moellendorffia*; but *Cathaira* is absent. The majority of the species were described by Dr. von Möllendorff, who collected there extensively himself, as did Dr. Hungerford and Mr. T. W. Eastlake. Some remarks by the latter are worth quoting here: "It is remarkable that the Island of Hong-kong should have produced so many indigenous species. A British possession for more than thirty years, hardly one scientific expedition has touched the shores of this 'barren rock in the ocean' without discovering a new species.

"There are only a few places where shells are to be found, as the larger part of the island consists of naked rocks, or is sparsely covered by *Gleichenia dichotoma*—a fern, which is a sure indication of the absence of terrestrial mollusca. In the valleys, however, vegetation is luxuriant, and it is in these places that most of the shells are to be found. The dense woods of Little Hong-kong (a Chinese village about six miles from the colony) and the little valley near Sheko (ten miles from the colony), are favorite resorts for collectors. Curiously enough, one of the highest peaks on the island, known as High West (1608') is the only place where some of the rarest species are to be found; in especial *Helix pulvinaris*, Gould." [*Plectopylis*]. . . .

"The whole eastern side is covered with a dense growth of small ficus, acanthaceae, and orchidaceous plants, and these, protected from the violence of the north-east monsoon, form a favorite shelter for the mollusca. Unluckily, the peak is only accessible from the south, and thus almost the entire eastern side is beyond reach. Still one can descend safely thirty or forty yards below the peak, although great precaution is necessary, for granite boulders abound, and the slippery, as well as insecure footing these afford, renders a greater descent impossible."

Family **Zonitidae.**Sub-family **Macrochlaminae.**Genus **MACROCHLAMYS**, Bens.

discus, Mdff.

superlita, Morel.

nitidissima, Mdff.

Genus **MICROCVSTINA**, Mörch.

schmackeriana, Mdff.

eastlakeana (Mdff.), Eastlake

(nom. nud.).

stenomphala, Mdff.

Sub-family **Helicarioninae.**Genus **CRYPTOSOMA**, Theob.

v. imperator, Gld.

imperatrix, West.

Genus **KALIELLA**, Blf.

depressa, Mdff.

hongkongensis, Mdff.

Family **Helicidae.**Genus **PLECTOPYLIS**, Bens.Section **SINICOLO**, Gude.

pulvaris, Gould.

Group **Epphallogona**, Pils.Genus **CAMAENA**, Alb.Sub-genus **CAMAENA**, s.s.

cicatricosa, Müll.

xanthoderma, Mdff.

v. minor, Eastlake.

Group **Belogona**, v. Iher.**BELOGONA EUADENIA**, Pils.Genus **EULOTA**, Hartm.Section **EULOTELLA**, Mts.

similaris, Fèr.

v. hongkongensis, Desh.

Genus **PLECTOTROPIS**, Mts.

gerlachi, Mdff.

BELOGONA SIPHONADENIA, Fèr.Genus **HELICODONTA**, Fèr.Sub-genus **MOELLENDORFFIA**, Anc.

eastlakeana, Mdff.

trisinuata, Mts.

I. HAINAN.

Most of the Helicoids of this island were described by Dr. von Möllendorff from O. Herz's collections. Of *Zonitidae* seven species are known, and of *Helicidae* six species, all exhibiting decided affinity with the forms from southern China and Indo-China.

Family **Zonitidae.**

sinica var. hainanensis, Mdff.

Sub-family **Macrochlaminae.**Genus **HEMIPLECTA**, Alb.Genus **MACROCHLAMYS**, Bens.

filicostata, Mdff.

cincta, Mdff.

Sub-family **Helicarioninae.**Genus **MICROCVSTINA**, Mörch.Genus **SITALA**, H. Ad.

- hainanensis, Mdff.
 Genus **KALIELLA**, Blanf.
 depressa, Mdff.
 trochospira, Mdff.
 ? *costigera*, Mdff.
 Family **Helicidae**.
 Group **Epiphallogona**, Pils.
 Genus **CAMAENA**, Alb.
 Sub-genus **CAMAENA**, s.s.
 hainanensis, Mdff.
 Sub-genus **CAMAENELLA**, Pils.
 platyodon, Pfr.
 = *tournoueri*, Crosse.
- Genus **CHLORITIS**, Beck.
 Sub-genus **TRICHOCHLORITIS**, Pils.
 herziana, Mdff.
 Genus **GANESELLA**, Blanf.
 schomburgiana, Mdff.
 = *trochulus*, Mdff.
 Group **Belogona**, v. Iher.
BELOGONA EUADENIA, Pils.
 Genus **EULOTA**, Hartm.
 Section **EULOTA**, s.s.
 tourannensis, Soul.
 Section **EULOTELLA**, Mts.
 assimilis, H. Ad.

DOUBTFUL AND SPURIOUS RECORDS.

Hemiplecta striata, Gray, = *naninoides*, Bens.—Recorded by Benson from Chusan (Dr. Cantor). Not since found. Dr. von Martens attributes this record to an accidental change of labels, since Dr. Cantor collected also in Singapore, where this shell is very common. (Ost-Asien, Zool. ii, 1867, p. 58.)

? *Euryypus Pfeifferi*, Phil.—Reached Europe with other shells from the Pacific Islands. Dr. von Martens thinks that in this case also the labels must have been misplaced. (Loc. cit., p. 58.)

Ganesella myomphala, Mts.—Recorded by Nevill from China (Hand List, I, 1878, p. 72.) If correctly identified, this record will probably be due to a mistake in labelling, since this common Japanese shell has not been found in China by any traveller.

Ganesella largillierti, Phil.—Doubtfully recorded as Chinese, has since been found in the Loo Choo Islands.

Eulota mercatoria, Gray.—Also recorded from China, and since found in the Loo Choo Islands.

Mantarina mantarina, Gray.—Like the two preceding species originally attributed to China, but has since been found in the Bonin Group.

Mantarina pallasiana, Pfr.—Recorded by Bland with some doubt from Corea, has since been found in the Bonin group.

Plectotropis tapeina, Bens.—Dr. von Martens is of opinion that this shell was wrongly identified and probably pertains to *P. osbeckei*, Phil.

Helix melanostoma, Sow.—Recorded by Fraser and Cuming as collected with other shells by Mr. Robert Swinhoe in Formosa (Proc. Zool. Soc., 1865, p. 197). It is impossible to conjecture what species was intended by this record, no such species was ever described by Sowerby.

Helix ruficrissa, Mdff.—A nude name published by T. W. Eastlake, (Proc. Acad. Nat. Sci. Philad., 1882, p. 235). I am unable to trace any species published by Dr. von Möllendorff under this name.

ADDITIONS AND CORRECTIONS.

On page 3 of my first paper *Sitala bilirata*, Grell., becomes a synonym. The specific name is preoccupied in the genus *Sitala* by Blanford (1861). Tryon proposed the name *kuangsiensis* (Man. Conch., ser. 2, 1886, ii. p. 55), and this name should be substituted.

On page 3, after *Helicarion setchuanensis*, Hde., add *H. sinensis*, Hde. Yang-tse district.

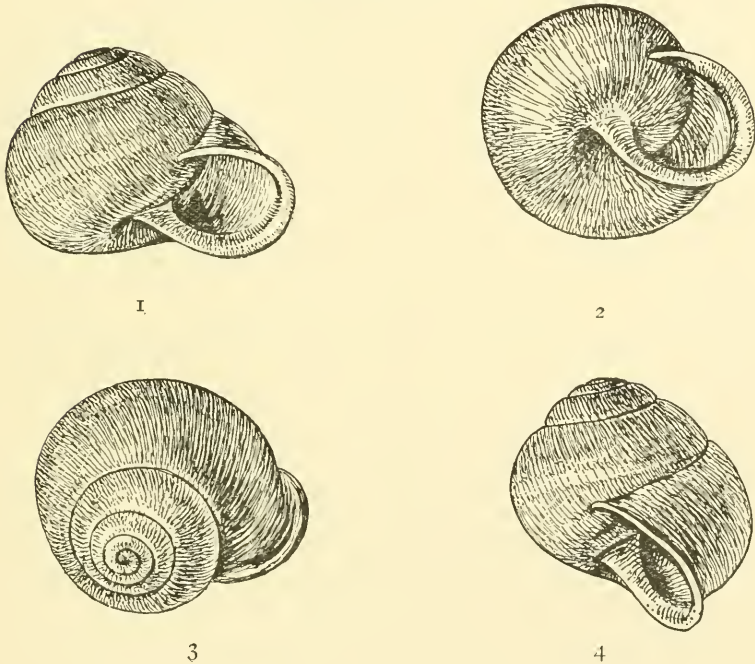
On page 3, after *Marrochlamys davidii*, Desh. add *M sinensis*, Hd.

DESCRIPTION OF A NEW SPECIES OF CHLORITIS
FROM NEW GUINEA.

BY G. K. GUDE, F.Z.S.

(Figures 1-4.)

Chloritis (Sulcobasis) prestoni, n. sp.



Shell globose, moderately umbilicated, blackish chestnut, of a deeper shade towards the mouth. Spire conical, apex sunk, suture impressed. Whorls $4\frac{1}{2}$, globose, the first $2\frac{1}{2}$ increasing slowly, the last 2 widening rather suddenly, the last dilated above and a little constricted below, behind the peristome, and flattened laterally for some distance further back; finely striated, the earlier $3\frac{1}{2}$ whorls with oblique rows of hair-scars; a shallow furrow encircles the body-whorl at the periphery. Last whorl decending shortly but rather deeply in front, angular round the funnel-shaped, deep umbilicus. Aperture semi-ovate; peristome thickened and shortly reflected, dark brown, the margins slightly convergent, columellar margin triangularly dilated and reflected over the umbilicus.

Diam. maj. 34, minor 28.5; alt. 30; apert. 14.5 millim.

Hab.—Collingwood Bay, British New Guinea. *Type* in my collection.

Compared with *Chloritis rehsei*, Mart., its nearest ally, the new species is darker in colour, smaller, the spire is more compressed and elevated, the last whorl decends more and is less globose, the peristome is much less reflected, dark brown instead of bluish, and the outer margin is not sinuous, while the umbilicus is narrower. The sudden deflection of the last whorl is not well shown in figure 4.

ON A COLLECTION OF LAND AND FRESH WATER SHELLS FROM KELANTAN, MALAY PENINSULA.

By E. R. SYKES, B.A.

(Plate iii.)

RECENTLY⁽¹⁾ I published a few brief diagnoses of some new shells from this district, collected by Mr. J. Waterstradt, and I am now enabled to give a fuller account of the collection, with illustrations. For the present, the Helicoids have been omitted, in the hope that some person, more conversant with the group than I am, may deal with them.

Streptaxis collingei, Sykes. Pl. iii, figs. 8—10.

Streptaxis collingei, Sykes: Ante, p. 22.

Amphidromus aureus, Martyn.

Both a dextral and sinistral form, bright yellow in colour, with a white zone below the suture, and no brown striping. One specimen, dextral, measures 62 millim. I have followed Pilsbry⁽²⁾ as I gather

1. Ante, p. 22.

2. Man. Conch., vol. xiii, p. 160.

that the name *perversus*, which I should otherwise have used for this shell, is to be restricted to forms found in Celebes, Java and Borneo.

Hypselostoma hungerfordianum, Mlldff.

A good series of this interesting shell.

Boysidia kelantanense, n.sp. Pl. iii, fig. 7.

Shell umbilicate, obliquely striated, chestnut brown. Whorls $4\frac{1}{2}$ -5, very convex and suture deep, apex blunt, the last whorl somewhat distorted, obscurely angulated at the periphery. Aperture rounded, with a sinus at the upper corner of the outer lip; lip well reflected, not solute from the last whorl. Parietal lamella strong, 3 other well marked teeth inside the outer lip, and one each side of the lamella.

Alt. 3; diam. max. 2 millim.

Belongs to the group of *B. boettgeri*, Mlldff., from Java, and *B. palmira*, Stol., from Penang; compared with the latter the last whorl is more distorted and gibbous and the relative proportions of height and breadth differ, the present species being also much larger.

Rhodina (?) mirabilis, Sykes. Pl. iii, fig. 2.

Rhodina (?) mirabilis, Sykes: Ante, p. 22.

Subulina octona, Chemn.

Clausilia filicostata, Stol.

Clausilia kelantanense, Sykes. Pl. iii, fig. 1.

Clausilia (Pseudolenia) kelantanense (err. typ.), Sykes: Ante, p. 22.

Cyclophorus saturnus, Pfeiffer.

Cyclophorus borneensis, Metcalfe.

Lagochilus townsendi, Crosse.

Opisthoporus dautzenbergi Sykes. Pl. iii, figs. 5, 6.

Opisthoporus dautzenbergi, Sykes: Ante, p. 23.

Opisthoporus tener, Menke.

Compared with specimens of this species from Annam (coll. Frühstorfer), I can trace but little distinction except size, one of the adult Kelantan shells, for example, only measuring diam. max. 13.5 millim. The tube is also slightly more parallel to the suture.

Platyrappe chrysalis, Sykes. Pl. iii, figs. 3, 4

Platyrappe chrysalis, Sykes: Ante, p. 23.

Alycaeus gibbosulus, Stoliczka.

With this occurs another form, much less gibbous, and which may belong to a different species, but the specimens before me show considerable variation.

Alycaeus kelantanense, n. sp. Pl. iii, figs. 13, 14

Shell conic, minutely umbilicate, white in colour, the upper whorls often being yellowish, apparently due to the animal within. Sculpture close well marked rib-striae, with microscopic spiral striation intersecting the ribs. Whorls 5, moderately convex, the last whorl gibbous, and constricted about 2 millim behind the lip, the sculpture being thence much finer and more remote. Aperture sub-circular, lip double, the upper outer margin forming a slight wing where it approaches the last whorl.

Alt. 3·8 : diam. max. 4 millim.

Opisthostoma laidlawi, Sykes. Pl. iii, figs. 13, 14.

Opisthostoma laidlawi, Sykes : Ante, p. 22.

Georissa monterosatiana, G.-Aust. and Nevill.**Ampullaria perakensis**, De Morgan.**Ampullaria ampullacea**, L.**Vivipara cingulata**, Martens.**Canidea bocourti**, Brot.**Faunus ater**, L.

In my view, *F. cantori*, Bens., is only a small form.

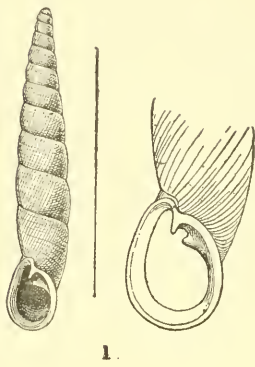
Melania variabilis, Bens.

There are also two other species of *Melania*, which I am unable to identify.

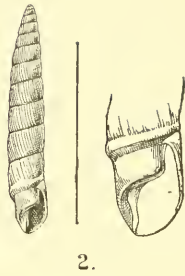
Septaria, sp.**Neritina crepidularia**, Lam.**Neritina zigzag**, Lam.**Unio (Nodularia) ingallsianus**, Lea.**Unio ascia**, Bens.

Identified from the tablet in the British Museum, no doubt that from which Hanley described the species in 1856 (Cat. Rec. Biv. Shells p. 385.)

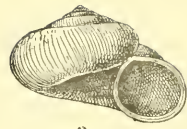
Monocondylaea chaperi, De Morgan (?)**Corbicula**, sp.



1.



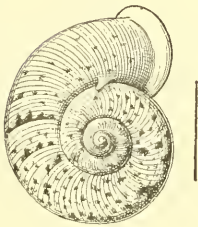
2.



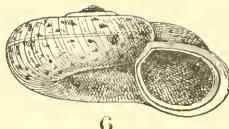
3.



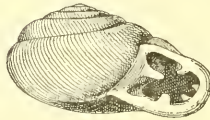
4.



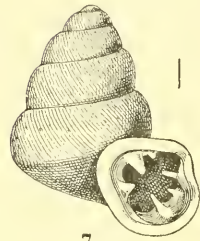
5.



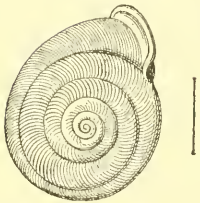
6.



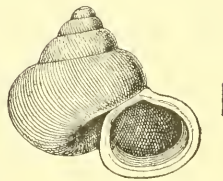
9.



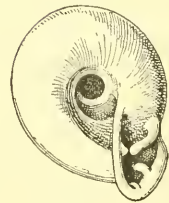
7.



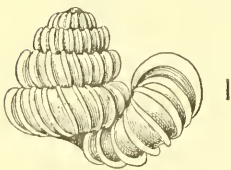
8.



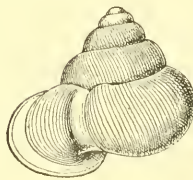
11.



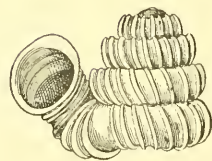
10.



13.



12.



14.

J. GREEN, del ad nat.

EXPLANATION OF PLATE III.

- Fig. 1. *Clausilia kelantanense*. Fig. 7. *Boysidia kelantanense*.
 Fig. 2. *Rhodina (?) mirabilis*. Figs. 8, 9, 10. *Streptaxis collingci*.
 Figs. 3, 4. *Platyrachis chrysalis*. Figs. 11, 12. *Alycaeus kelantanense*.
 Figs. 5, 6. *Opisthoporus dantzenbergi*. Figs. 13, 14. *Opisthostoma laidlawi*.

IS *AMALIA CARINATA*, RISSO, A BRITISH SLUG?

BY WALTER E. COLLINGE.

FOR some time I have been receiving (in connection with my proposed Monograph on the British Slugs) from various correspondents in different parts of the British Isles, numerous examples of *Amalia sowerbyi*, Fér. Amongst these a specimen collected by Mr. Bromley Peebles, near Birmingham, and two collected by Mr. F. J. Partridge in Devonshire, seemed to differ slightly from the ordinary form. These I have subjected to a rather more careful scrutiny, and have also compared them with Simroth's excellent figure of *A. carinata*, Risso,⁽¹⁾ also with the drawings and description of the internal structure of this species, as given by Simroth,⁽²⁾ and Lesson and Pollonera.⁽³⁾ I have now little doubt that these three specimens are not referable to *A. sowerbyi*, Fér., but are very closely allied, if not identical with, the *A. carinata* of Risso. On comparing them with specimens of this latter species from Algiers, they are scarcely distinguishable from them, excepting in size, the English examples being the smaller.

Amalia carinata was described by Risso⁽⁴⁾ in 1826, and has by most malacologists been regarded as a valid species. Bourguinat in 1862 described a *Milax carinatus*, and Paulucci in 1888 described a variety *fulva* of *A. marginata*, both of which have been regarded as synonyms of *A. carinata*, by Pollonera.

Externally there are few characters to distinguish *A. carinata* from *A. sowerbyi*, usually, however, it is darker than the typical form of *sowerbyi*, the mantle is longer, and the groove on the mantle extends further forward, this latter character being well shown in Lesson and Pollonera's figure.

Whether or not these three specimens are true *carinata*, and if so, does this species occur generally in this country, remains yet to be proved. With a view to working out this matter, I venture to appeal to malacologists for specimens of dark coloured forms of *A. sowerbyi*, from any part of the British Isles.

1. Abhandl. l. Senckenb. naturf. Gesell., 1891, Bd. xvi, p. 20, T. i, f. 7.

2. Zeit. f. wiss. Zool., 1885, Bd. xlii, p. 228, T. vii, f. xv, T. x, f. xvc, xv d.

3. Monog. d. Limacidi Italiani, 1882, T. i, f. 10-12, 30, 31, T. ii, f. 15.

4. Prod. Europe Mérid., 1826, p. 56.

ON A MALFORMED VARIETY OF LIMNAEA PEREGER, MÜLL.

By H. OVERTON,

SUTTON COLDFIELD.

IN May 1897, I collected from a pool in Sutton Coldfield, a very interesting malformed variety of the well-known *Limnaea pereger*, and as illustrations of such seem to be scarce, I have thought it of sufficient interest to figure. The specimen is of a dull brown colour with eight whitish bands, six above and two below the periphery. The first and third bands are faint, only showing half way round the penultimate whorl; the second, fourth, fifth and sixth are well pronounced, the fifth and sixth, which are the broadest, almost fusing with one another. The seventh and eighth are faint, and between these and the sixth and seventh are still fainter traces of several



Limnaea pereger, Müll.

broken bands. Towards the ventral margin of the lip there is a curious gap, as if a piece of the shell had been broken out, but that this is not so, is evidenced by the perfect growth of the lip.

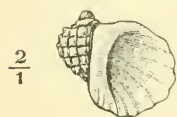
The shell was found in company with normal individuals and also with *Limnaea stagnalis*, both species, however, being much smaller than when I visited the spot three years previously, the former then were much larger and the outer lip remarkably expanded and reflected, whilst the latter were exceedingly large specimens. This feature appears strange, as the two visits were made as near as possible at the same time in each year.

DESCRIPTION OF A NEW SPECIES OF SEPARATISTA FROM NEW ZEALAND.

BY HENRY SUTER.

Separatista benhami. n. sp.

SHELL small, fragile, subdiscoidal, with a very short spire and broadly-expanded aperture, cancellated, and with deep umbilicus. Colour yellowish-white, semi-transparent, flinty. Pullus consisting of $1\frac{1}{2}$ whorls, which are smooth and glossy. Spire very low, conoidal. Whorls 3, rapidly increasing, body-whorl with a flat shoulder and



distinct angle, the larger lower portion strongly convex. Suture first impressed, then, on reaching the aperture, channelled. Spiral ornamentation, consisting of numerous distinct threads, about 12 on the body-whorl, but bifurcating and thus increasing in number on reaching the lip; in the shallow grooves between the riblets there is a fine median thread, recognisable only under the lens. Axial ornamentation represented by numerous, broad, rounded sinuated costae, which become more pronounced and more distant towards the aperture; points of intersection granulate. Fine equidistant and numerous incremental lines cross the spiral threads. Aperture widely expanded, oval, straight above, subangulated at the base. Outer lip patulous throughout, sharp, sinuated below the angle. Inner lip subvertical, slightly concave in the whole length, broadly reflected, continuous with the outer lip and very slightly detached from the penultimate whorl. Umbilicus not broad, but deep and carinated by the lowest spiral riblet. Operculum?

Height 6. 5; breadth 7 millim. Aperture: height 6; breadth 6 millim.

Hab.—Cape Maria van Diemen, New Zealand

Type in the Otago University Museum, Dunedin, New Zealand.

This interesting little shell was found by Mr. Rayner, formerly lighthouse keeper at Cape Maria, and sent to Prof. Benham, the curator of the Dunedin Museum, who kindly handed the specimen over to me for description. I have very great pleasure in associating the name of our distinguished scientist with the species.

The unique specimen is most likely not quite adult, and therefore has the last whorl but very little disunited. The genus *Separatista* is new to the fauna of New Zealand. The species is nearly allied to *S. separatista*, Dillw., and perhaps *S. grayi*, Ad., but may at once be distinguished by the beautiful and complicated sculpture.

Hedley⁽¹⁾ suggests that "*Trichotropis gabrieli*, P. and G., *T. grazilenta*, Braz., and *T. torcularis*, T. Woods, may conveniently be distinguished from the typical northern *Trichotropis*, and assembled under *Separatista*." I fully share Mr. Hedley's opinion with regard to the forms mentioned by him, but there is one stumbling block in the way as far as New Zealand is concerned, and this is *Trichotropis inornata*, Hutton (= *clathrata*, Sow.). If *Trichotropis* is an exclusively northern genus, the question arises: What is *inornata*? It is quite true that the membranaceous fringes of *Trichotropis* are wanting, but otherwise the shell has all the characters of that genus, and I cannot make up my mind to class it under *Separatista*. The species of the latter genus seem to be exceedingly variable, but to include our *T. inornata* would necessitate reforming Gray's diagnosis of *Separatista* to such an extent, that it would almost become a synonym of *Trichotropis*. So far as I can ascertain, the operculum and the animal of *Separatista* are unknown, and the same is the case with *T. inornata*, so that with the little knowledge that we possess at the present time we have to admit the occurrence of *Trichotropis* not only in the northern, but also in the southern hemisphere. It is represented by about seven species in Japan, and there seems to be no reason why it should not also be found in New Zealand.

PROCEEDINGS OF THE
MIDLAND MALACOLOGICAL SOCIETY.

35TH MEETING, APRIL 11TH, 1902.

The President in the chair.

EXHIBITS.

The evening was devoted to the examination of a collection of Algerian *Helicidae*, exhibited by Mr. H. H. Bloomer, who made some remarks upon the various species, and their range and character of variation.

Mr. Overton showed examples of *Physa hystrorum* from Tenby, *P. fontinalis* from Sutton Coldfield, *P. heterostropha* from South Staffordshire, and *P. acuta* from Kew.

36TH MEETING, MAY 9TH, 1902.

The President in the chair.

EXHIBITS.

By Mr. H. H. Bloomer: Sixty-nine species of *Achatinella*, from the Sandwich Islands.

By Mr. Breeden: Specimens of *Physa hystrorum*, *Helix pulchella*, *H. pygmaea*, *Vertigo minutissima*, and *V. pygmaea*, from Charmouth, Dorset.

By Mr. Overton: A curiously banded and malformed shell of *Limnaea pereger*, from Sutton Coldfield, also *L. glabra*, from Stafford.

CURRENT LITERATURE.

Pilsbry, Henry A.—Tryon's Manual of Conchology, ser. ii, vol. xiv (pt. 56), pp. 193—302, pls. 37—62. Philadelphia: Academy of Natural Sciences.

The author continues his enumeration of the *Cerionidae*, describing the following as new:—*C. caymanense*, from Grand Cayman Island; *C. crassiusculum* v. *smithii*, from Sagua de Tanamo; *C. longidens*, from Cuba; *C. eximium* v. *fraternum*, from San Salvador; *C. bryanti* v. *judicum*, and *C. rubicundum* v. *heterodon*, from Inagua.

The present part concludes volume fourteen, and includes an Index to *Cerion* and References to the sixty-two plates.

Dr. Pilsbry is to be congratulated on the completion of a further volume of this invaluable work, which is yet a desideratum in many of our museum and public libraries.

Gude, G. K.—Descriptions of new Helicoid land shells from Japan. Proc. Acad. Nat. Sci. Phila., 1901, p. 617.

The new species here described are:—*Chloritis (Trichochloritis) pumila*, making the third species of this genus recorded from Japan, and *Eulota (Aegista) minutoides*.

Stearns, R. E. C.—The Fossil Freshwater Shells of the Colorado Desert, their distribution, environment and variation. Proc. U.S. Nat. Mus., 1901, vol. xxiv, pp. 271—299, pls. xix—xxiv.

To all interested in the distribution and variation of the mollusca, Dr. Stearns' paper presents numerous points worthy of consideration, while the six beautifully clear plates, make the paper an exceedingly valuable one.

Stanton, T. W.—*Chondrodonta*, a new genus of ostreiform mollusks from the Cretaceous, with descriptions of the genotype and a new species. Ibid., pp. 301—307, pls. xxv, xxvi.

Dr. Stanton is of opinion that the *Östrca munsoni*, Hill, is not a member of the genus *Ostrca* nor referable to any described genus, he therefore proposes the name *Chondrodonta* as a new genus for this and a new species, *C. glabra*. The affinities of the new genus seem to be with the *Pectinacca*, which includes the *Spondyliidae*, *Limidae* and *Pectinidae*.

Williamson, M. Burton.—A Monograph on *Pecten acquisulcatus*. Cpr. Bull. S. Calif. Ac. Sci., 1902, vol. i, no. 5, pp. 51—61, pl. iv—vi.

Mrs. M. Burton Williamson gives an interesting account of this mollusc, and some notes on the various parts of its anatomy. The paper scarcely deserves the title of monograph, but we hope the authoress will later give us a more detailed account of the anatomy, including the nervous system, illustrated by clearer figures.

Möllendorff, O. von.—Binnen-Mollusken aus Westchina und Centralasien. II. L'Ann. du Mus. Zool. d l'Acad. Imp. Sci. St. Petersb., 1901 (1902), T. vi, pp. 299—412, Tafn. xii—xvii.

Continuing his work on the Mollusca of Western China and Central Asia, the author here devotes the greater portion to the genus *Buliminus*, of which he describes and figures upwards of 40 new species and a dozen sub-species. The following new subgenera are described:—*Pupinidius* (type *B. pupinidius n.sp.*), *Petracomastus* (type *B. hendeannus, Aucey.*) *Clausiliopsis* (type *B. szecchenyi*, Btg.), *Lophauchu* (type *B. cristatellus, n. sp.*), *Coccoderma* (type *B. granulatus*, Mdf.). Two new sub-species of *Pupilla*, 2 species of *Phacusa*, and 1 of *Limnaca* are also described.

Randles, W. B.—Meristic variation in *Trochus zizyphinus*. Nature, 1902, vol. 65, p. 535, figs. 1, 2.

The author records and figures the presence of two supernumerary eyes on the right ocular tentacle. So far as could be made out from the examination of an incomplete series of longitudinal sections, all the eyes seem to have been functional during life, each being provided with crystalline lens, retina and optic nerve. The innervation is derived from a single optic nerve arising from the right cerebral ganglion. This nerve bifurcates, one branch passing to the primary eye, and the other again dividing, supplies the two secondary eyes.

Kew, H. Wallis.—On the Mucus-threads of Land-Slugs. Journ. Conch., 1901, vol. 10, pp. 92—103, 4 figs; 1902, vol. 11, pp. 153—165, 3 figs.

Mr. Kew gives a very useful resumé of the published observations upon this subject, together with some observations of his own, and others communicated by correspondents.

Baker, F. C.—The Mollusca of the Chicago Area. The Gastropoda. Bull. Chicago Ac. Sci., 1902, pp. 131—118, pls. xxviii—xxxvi.

The treatment adopted in the present work is very similar to that employed by the author when dealing with the Pelecypoda in a previous part. Here, however, numerous extracts and figures from Pilsbry's work, add greatly to the general value.

Mr. Baker, in nearly all cases, has given very clear descriptions of the shell, the animal, jaw, radula, and notes on the generative organs, distribution, and habitat.

Referring to the speed of molluscs while in motion, the author gives the results of some of his own observations. A few species were timed whilst travelling a distance of two inches, with the following results:—

<i>Limnæa palustris</i> ...	45 seconds	<i>Polygyra profunda</i> ...	55 seconds
<i>Limnæa caferata</i> ...	50 "	<i>Polygyra albolabris</i> ...	60 "
<i>Limnæa cubensis</i> ...	50 "	<i>Polygyra monodon</i> ...	120 "
<i>Limnæa reflexa</i> ...	35 "	<i>Polygyra thyroides</i> ..	60 "
<i>Physa heterostropha</i> ...	30 "	<i>Circinnaria concava</i> ...	90 "
<i>Vivipara contectoides</i> ...	120 "		

In a work of this character, an author has often to rely upon the statements of other writers, and in consequence it behoves him to exercise every care and discrimination in selecting the same. The statements found on p. 197 *re Limax maximus*, L., are woefully inaccurate; it reads:—"In Europe it is solitary in habit and is found chiefly in the woods, under fallen trees and stones and near the sea shore. . . Its food consists principally of fungi. It is said to rarely to eat green plants (*vide Scharff*)."
Owners of vegetable gardens know to their cost how very plentiful this species is, and what damage it does to the produce.

In all 113 species are recorded comprised in 38 genera. The volume concludes with a useful Bibliography, Glossary, an Appendix, Index, and 9 plates.

Kennard, A. S. and Woodward, B. B.—Note on the occurrence of *Planorbis stroemii*, Westerlund in the Holocene deposits of the Thames Valley. Proc. Malac. Soc. Lond., 1901, Vol. iv, p. 236.

Collett, O.—Contributions to Ceylon Malacology. (3) The Terrestrial Mollusca of Ambagamuwa (Part II). Journ. R. Asiatic Soc, Ceylon Branch, 1901, vol. xvi, pp. 1—8.

Babor, J. F.—Mekkysi českého Plietocaenu a Holocaenu. Archiv pro prirodov. prozk. Cech, 1901, Dil. xi. pp. 1—83, 30 figs.

Robert, A.—La segmentation dans le genre *Trochus*. Compt. Rendus, 1901, vol. cxxxii, pp. 995—997.

Pannell, Jr. C.—The Land and Freshwater Mollusca of Surrey. Journ. Conch., 1902, vol. 10, pp. 168—179.

Cockerell, T. D. A. and Cooper, Mary.—Notes on *Asimunella*. Naut., 1902, vol. xv, pp. 109, 110.

GENERAL REVIEWS.

The Foraminifera : An Introduction to the Study of the Protozoa. By Frederick Chapman. 8vo. pp. xv and 354, pls. 1-14, and 42 figs. in text. London : 1902. Longmans, Green and Co.

Mr. Chapman's work supplies students of the Foraminifera with a concise and authoritative guide, which has long been desired, and will, we feel sure, meet with a ready welcome.

After a general introduction on the nature and occurrence of Foraminifera, their structure, classification and reproduction, the author devotes a chapter to the structure and plans of growth of the shell ; a further chapter deals in an interesting manner with the various ideas of the early writers concerning the nature of Foraminifera. Chapter vi is devoted to a consideration of the various classifications which have been used by different investigators ; chapters vii to xvi are confined to a systematic review of the different families, genera, etc. ; chapter xvii to a survey of the various geologic foraminiferal faunas ; chapter xviii to the geographical distribution ; chapter xix to the collecting, examination and mounting, the work concluding with a useful series of bibliographical lists, comprising the more important works.

Mr. Chapman has given students of this interesting order of protozoa a valuable handbook, which few will omit to avail themselves of.

EDITOR'S NOTES.

We regret to have to record the decease of Alpheus Hyatt, one of the foremost authorities upon the fossil Cephalopoda, which occurred at Cambridge, Mass., U.S.A., on January 15th ; also of Professor A. G. Wetherby, an American conchologist, on February 15th ; and that of J. C. Mansel-Pleydell, on May 3rd.

We again appeal to those subscribers whose subscriptions to volumes vii, viii, and ix are in arrear, to kindly forward the same. A third request will surely not be necessary.

The publication of the Journal involves a considerable expenditure of time and labour, in addition to an annual financial loss ; unless the subscriptions are forthcoming at the commencement of each year, it will be impossible to carry it on.

THE
JOURNAL OF MALACOLOGY.

No. 3.

SEPTEMBER 29th, 1902.

VOL. IX.

ON THE NON-OPERCULATE LAND AND FRESH-
WATER MOLLUSCS

collected by the Members of the "Skeat Expedition" in the Malay
Peninsula, 1899-1900.

BY WALTER E. COLLINGE, B.Sc.,

The University, Birmingham.

(Plates iv-vi.)

INTRODUCTION.

OF the collection of Land and Freshwater Molluscs obtained by the members of the "Skeat Expedition" in the Malay Peninsula, Dr. Harmer has invited me to furnish a report upon the non-operculate species.

The collection is not a large one, comprising representatives of only 29 species, which are contained in 22 genera; of these 11 species and 3 genera are new.

The most interesting species are those belonging to the genus *Atopos*, Simr., which has not hitherto been recorded from the Malay Peninsula; unfortunately the new species are nearly all represented by single examples. *Paraparmarion*, *Apoparmarion*, and *Cryptosemelus* are new and interesting genera, placed at present in the family *Girasiidae*.

A number of specimens of the animals of *Hemiplecta humphreysiana*, Lea, were collected, which has enabled me to give some details of the anatomy. I am also able to make a further contribution to our knowledge of the internal structure of the genus *Amphidromus*, Albers, by a description of various internal parts of *A. perversus*, L.

Of the shells, the most interesting are the two new species of *Streptaris*, and the very small new species of *Hypselostoma*.

Previous collections from these regions have been described by

de Morgan (22, 23), Crosse (9, 10), Godwin-Austen and Nevill (14), Stoliczka (30), and Möllendorff (19, 20, 21).*

My best thanks are here tendered to the Council of the Royal Society for a Grant in aid of this work.

The identification of some of the specimens here recorded, has often proved very difficult, and I must express my indebtedness and thanks to Messrs. Edgar A. Smith and E. R. Sykes for the generous assistance they have at all times so willingly given me.

LIMNAEIDAE.

Limnophysa, Fitzinger.

Limnophysa singaporica, Küster.

Limnaeus singaporinus, Küst. : Conch. Cab., T. i, pt. xvii, p. 35, no. 50, Tab. 6, fig. 17.

Hab.—Biserat, State of Jalor.

STREPTAXIDAE.

Ennea, H. & A. Adams.

Ennea (Microstrophia) perakensis, Godw.-Aust., and G. Nev.

Ennea perakensis, Godw.-Aust., and G. Nev. : P.Z.S., 1879, p. 735, pl. lix, fig. 2 (juv.).

Ennea (Microstrophia) perakensis, Müllff. : P.Z.S., 1891, p. 331, pl. xxx, figs. 1, 1a.

Hab.—Caves near Biserat, State of Jalor.

One specimen.

Streptaxis, Gray.

Streptaxis sykesi, n. sp.

Pl. iv, figs. 1, 2.

Shell dextral, subdiscoidal, depressed, flattened above, concave below, deeply and widely umbilicated, smooth except for faint lines of growth; whorls 5, regularly increasing, aperture somewhat L-shaped, deeply depressed above, armature consisting of one lamelliform projection, ascending inwards, situated on the columella whorl; peristome thickened and reflected.

Diam. maj. 11.5, min. 8.5; alt. 3 millim.

Hab.—Biserat, State of Jalor.

This interesting species seems to be very distinct from any previously described. It is perhaps most closely allied to the *S. plussensis*

* Since this paper was completed, Mr. E. R. Sykes has published two papers in this Journal, and Dr. Möllendorff one in the *Nachrichtsblatt d. D. Malak. Gesell.*, the titles of which have been added to the Bibliography.

of de Morgan (23), which species, however, has a more heliciform shell, and according to the author's figures (*op. cit.*, pl. v, figs. 1a-c), there is a distinct notch or groove in the upper portion of the aperture. *S. sykesi* is much more distantly related to *S. planus*, Fulton (11), with which it partly agrees in the form of the aperture. I have much pleasure in naming the species after Mr. E. R. Sykes.

***Streptaxis striatula*, n.sp.**

Pl. iv, figs. 3, 4.

Shell dextral, flattened above and below, umbilicus deep, striae fairly prominent; whorls 6, irregular, last whorl occupying the greater portion of the shell, deeply depressed above, armature consisting of one long, lamelliform projection, situated on the columella whorl; peristome reflected and slightly thickened.

Diam. maj. 13, min. 8.5; alt, 5 millim.

Hab. Belimbing, State of Ligei.

This species is probably allied to *S. theaeocola*, Heude (16, p. 151, pl. xxxv, fig. 25), and also to *S. borealis*, Heude (16, p. 79, pl. xviii, fig. 26), but distinct, I think, from either.

VITRINIDAE.

***Helicarion*, Fér.**

***Helicarion permolle*, Stol.**

Helicarion permolle, Stol.: J. As. Soc. Bengal, 1873, vol. xlii, p. 18, pl. i, fig. 11, pl. ii, figs. 21-23.

Hab.—Gunong Inas, 3,000 ft., State of Perak.

This is certainly the mollusc described by Stoliczka, for both externally and internally it agrees with his description and figures.

GIRASIIDAE.

***Apoparmarion*, n. gen.**

***Apoparmarion partridgeii*, n. sp.**

Pl. iv, figs. 5-12, Pl. v, figs. 31-33.

Animal yellowish-brown, head bluish, tentacles yellow; mantle blue, coarsely granulated, rising upon the shell on all sides, on the right side posteriorly a large wing-like lobe covers the apex of the shell. Body laterally divided up into somewhat diamond-shaped figures by a series of oblique lines. Rugae small. Peripodial groove distinct. Foot-fringe yellow, no lineoles. Foot-sole yellow, divided into median and lateral planes. Caudal mucous pore not extending to the foot-sole.

Length (in alcohol) 25 millim.

Shell amber coloured, thin, membranaceous, apex distinct, whorls 2.
Maj. diam. 9.5, min. 5 millim.

Body cavity not extending posterior to the visceral mass. Intestinal tract short. Generative organs *Parmarion*-like. Well developed penis with beak-like head, no penis papilla. Dart-gland and dart-sac, latter containing fleshy dart.

Hab.—Gunong Inas, 3,500 ft., State of Perak.

I have pleasure in associating with this interesting species the name of Mr. F. J. Partridge, who has spared no pains to faithfully represent by his skillful brush and pencil, most of the specimens in this collection.

The Alimentary Canal (Pl. iv, fig. 7).—The intestinal tract is both short and simple. Commencing at the fairly large buccal cavity, the oesophagus passes off from the dorsal side, and after a short course enters the wide pyriform crop, which has, at its posterior end, a sharp constriction marking the division between the crop and the ill-defined stomach. The intestine passes off from the posterior end of the stomach, and making a bend forward and to the right side forms the second loop of the intestinal tract, then gradually narrowing, a very short backwardly directed loop follows, which again bends forward to form the rectal portion, and terminates at the anus.

Lying at each side of the forepart of the crop is a conspicuous salivary gland, which gives off a duct opening at the side of the oesophagus, on the dorsal region of the buccal cavity.

The Generative Organs (Pl. iv, figs. 8-11).—The form and general character of these organs at once indicate the *Parmarion* relationship of this genus. The vagina, which opens into the vestibule by an opening common to this organ and the dart-sac, is short and wide; at its posterior end it becomes constricted, and on the right side the duct of the pyriform receptaculum seminis opens into it. Beyond the constriction is the free-oviduct, which at first is a wide, sac-like cavity, suddenly narrowing into a tube, which as it passes backward gradually widens until it joins the oviducal portion of the common duct. Externally the lower portion has its wall thrown into a series of folds which give it a fluted appearance. The penis is a long tube-like organ, with a sharply differentiated beak-like head. At the distal end of the tube-like portion, the retractor muscle is inserted. The two portions of the penis are connected together by a short neck. The head is marked by a series of crescent shaped constrictions, while just below the point where the vas deferens joins the penis, there is a peculiar little outgrowth (Pl. iv, fig. 9, x). Internally the cavity of the penis differs considerably from the external form. Commencing as a

narrow tube the lumen widens until about the middle of the penis, then narrowing somewhat abruptly it gradually becomes less, and passing through the neck as a very fine tube it expands in the first portion of the head into a globular sac, which is connected on its ventral side with the vas deferens (Pl. iv, fig. 10). The remaining portion of the head is solid. The dart-gland and the dart-sac are of about equal length, and similar in shape. The external wall of the sac is marked by a series of ring-like indentations. Internally there is a small fleshy dart, the surface of which is minutely studded with fleshy papillae, (Pl. iv, fig. 11). No trace of a muscle at the distal end of the dart-gland was observed.

The Free Muscles (Pl. iv, fig. 12).—The buccal retractor divides anteriorly into two bands which are inserted into the posterior ventral portion of the buccal cavity. Both superior and inferior tentaculars join to form a common tentacular retractor, and are exactly the same on both sides. The columellar muscle is short and small.

Paraparmarion, n. gen.

Paraparmarion elongatus, n. sp.

Pl. v, figs. 34-36.

Animal dark reddish-brown, head and tentacles bluish, mantle degenerate, rising upon the shell on the right side only, as a dark brown, wing-like lobe, covering the apex of the shell. Rugae scarcely visible, small and flat. Peripodial groove faintly marked. Caudal mucous pore very small, not extending to the foot-sole. Foot-fringe reddish-brown. Foot-sole reddish-brown, divided into narrow median and broad lateral planes.

Length (in alcohol) 12 millim.

Shell yellow, thin, membranaceous; whorls 3, last whorl large and globose.

Hab.—Gunong Inas, 3,500 ft., State of Perak.

This is one of those small, puzzling, *Parmarion*-like molluscs, common to the Indian and Malayan faunas. I have compared this interesting specimen with a large number of small *Parmarion*-like molluscs in my collection, from Java, Borneo and India, which at present are unnamed, and also with immature specimens of *Parmarion*, but can find nothing at all like it. The well-developed shell and the degenerate mantle at once characterise this form, and it seems desirable that it should be named, if for no other reason than that of directing attention to these diminutive species. Until the internal structure is made known it is difficult to say what its true position is, but judging by the external features, this genus may possibly supply a

link between the genus *Damayantia* of Issel and *Parmarion* of Fischer.

Cryptosemelus, n. gen.

Cryptosemelus gracilis, n. sp.

Pl. v, figs. 37-39.

Animal dark blue, body marked by prominent oblique lines running downward and backward, dorsum posteriorly keeled; mantle rises upon the shell anteriorly and laterally, on the right side it is produced into a wing-like extension covering the apex of the shell, while on the left side antero-laterally there is a smaller lappet. Rugae only visible on the head and anterior parts of the body. Caudal mucous pore very small. Peripodial groove distinct. Foot-fringe bright yellow, no lineoles. Foot-sole divided into median and lateral planes.

Length (in alcohol) 19.5 millim.

Shell yellow, thin, membranaceous, whorls, $3\frac{1}{2}$, last whorl very large.

Hab.—Bukit Besar, State of Nawang Chik.

Known to the natives as the "Dancing Slug."

Girasia. Gray (em Godw.-Aust.).

Girasia peguensis, Theob.

Pl. iv, figs. 13-14.

Girasia peguensis, Theob.: J. As. Soc. Bengal, 1864, p. 244.

Girasia? peguensis, Godw.-Aust.: P.Z.S., 1880, p. 294.

Girasia peguensis, Godw.-Aust.: Moll. of India, 1888, vol. i, p. 227, pl. lix, figs. 6-6d.

Hab.—Belimbing, State of Lijeh.

It has been pointed out by Godwin-Austen (12) that so far as the mantle is concerned, this species forms a connecting link between *Girasia* and *Austonia*, Nev (em G.-A.); this author also draws attention to the fact that the right and left tentacular retractor muscles differ from one another, which I am able to confirm: the left one is joined to the buccal retractor and both of these have their origin posterior to the shell, while the right one remains distinct and originates from the posterior border of the visceral mass.

The Generative Organs (Pl. iv, figs. 13-14).—The generative organs of this species have not previously been described. The vagina is a wide cavity, similar in detail to that in *G. hookeri*, Gray. The receptaculum seminis is much longer than in the last mentioned species, and has a distinct duct which gradually widens into the elongated head (Pl. iv, fig. 13, *v.d.* and *v.s.*). In life it lies at the

left-hand side of the free-oviduct beneath the penis. In figure 14 (Pl. iv), the free-oviduct is purposely omitted so as not to complicate the figure. The extreme end of the receptaculum seminis is overlapped by the folds of the oviduct. The penis is long and twisted upon itself (Pl. iv, fig. 14, *p.*). At the point where the penial retractor muscle is attached, its walls are thrown into a series of constrictions and at the distal end of this constricted portion there is a short coiled kalk-sac (Pl. iv, fig. 13, *k.s.*). The vas deferens passes over the proximal portion of the penis and then beneath it before communicating with the oviduct. No flagellum or diverticulum was present in the specimen dissected. The penial retractor muscle is long, and originates just behind the right tentacular retractor muscle on the right posterior border of the visceral mass. The free-oviduct is much longer than in *G. hookeri*, Gray, but not so wide. The common duct is a sinuous tube, but not folded upon itself as in many species of this genus; lying over its postero-dorsal portion is the albumen gland. I was unable to trace the hermaphrodite gland, but a portion of the hermaphrodite duct was dissected out; this is characterised by the absence of any convolutions or foldings so generally associated with this particular organ (Pl. iv, fig. 13, *h.d.*).

ZONITIDAE.

Macrochlamys, Bens.

Macrochlamys resplendens, Philippi.

Helix resplendens, Philippi: Zeitschr. f. Malak., 1846, p. 192.

Macrochlamys? resplendens, Godw.-Aust.: Moll. of India, 1883, p. 109, pl. xxvi, figs. 1-3.

Hab.—Penang.

One specimen.

The habitat of the type was Mergui. Mr. Edgar A. Smith, who has very kindly examined this specimen and compared it with examples in the British Museum, writes me "We have a specimen from King Island, Mergui Archipelago (named by Dr. von Martens as *resplendens*) which is exactly like your example only a trifle smaller, that is to say less fully grown."

Cryptosoma, Theob.

Cryptosoma, sp.

Pl. iv, figs. 14, 15.

Animal yellowish, with deep blue mottling; head and tentacles dark blue. Caudal mucous pore large. Peripodial groove distinct, terminating below caudal mucous pore. Foot-fringe yellow with blotches of

blue. Foot-sole yellow, not divided into medium and lateral planes. Extremity of foot rounded.

Length (in alcohol) 2.4 millim., breadth of foot-sole 7 millim.

Hab.—Summit of Bukit Besar, 3,500 ft., State of Nwang Chik. One specimen, damaged.

Although I think this is a new species of *Cryptosoma*, I hesitate to name it, as it was in a very damaged condition when received, in fact the only internal parts of its anatomy present were the terminal ducts of the generative organs, and of these I give a figure (Pl. iv, fig. 24). The penis is of considerable size, very long, and quite distinct in form from that of any described species. There is a small kalk-sac just before the commencement of the vas deferens. The dart-gland and dart-sac are proportionally small, at the distal end of the gland there is a short muscle; a dart, partially formed was present in the dart-sac.

Rhysota, Albers.

Rhysota cymatium, Bens.

Helic cymatium, Benson, apud Pfr.: Novit. Coch., 1, p. 58, pl. xvii, figs. 1, 2.

Rhysota cymatium, Stol.: J. As. Soc. Bengal, 1873, vol. xlii, p. 11, pl. i, figs. 1-3, pl. ii, figs. 13-15.

Hab.—Penang.

Hemiplecta, Albers.

Hemiplecta humphreysiana, Lea.

Pl. iv, figs. 16-23.

Hemiplecta humphreysiana, Lea.: Trans. Amer. Phil. Soc., 1841, vol. vii, p. 463, pl. xii, fig. 16.

Hab.—Kwala Aring, State of Kelantan.

After a careful examination of the shells and animals of the specimens collected, I have come to the conclusion that there are here three distinct forms. Fortunately I have had two or three examples of each, and quite recently I have been able to confirm my observations made some months back.

Respecting the different forms, which it will be convenient to refer to as A, B, and C respectively, the different characters in the shell were in each case found to be associated with differences in the animal.

THE SHELL.—In the form A the apex is fairly high, and the keel on the whorls slightly produced with only a single band below the keel on the last whorl; generally the whorls are flattened,

In the form B the apex is much higher than in A, and the last whorl exhibits a somewhat prominent keel. In addition to the band below the keel, there is a broad incipient band above; the whorls are more convex than usual and the shell thicker.

In the form C both apex and whorls are flattened, there is very little keel on any of the whorls, and an incipient band above the keel only; the shell is much thinner than either A or B.

INTERNAL STRUCTURE OF THE ANIMAL.—*Alimentary Canal.* No differences of any importance were found in the intestinal tract. In an example of form C the long straight oesophagus is followed by a wide crop, over which a pair of large salivary glands lie, fused in their mid-dorsal line. Posterior to the crop is a short tube-like portion which passes into the large sac-like stomach, which is coiled upon itself, the posterior portion exhibiting a well marked constriction which separates the terminal portion from the main cavity. The remaining part of the intestine is a simple wide tube, which makes a bend backward over the region of the stomach, and then again forward, traversing the side of the pulmonary cavity.

The Generative Organs (Pl. iv, figs, 16-19).—In the form A there is a large vestibule into which the penis opens on the right side. This latter is a long muscular organ for half of its length, then coiling upon itself, it becomes a narrow tube-like body, and making a further sharp turn upon itself it joins the epiphallus, from here a short diverticulum is given off which terminates in a fine hook-like process (Pl. iv, fig. 16). The epiphallus is a short tube expanding at its distal end to form a bulbous, sac-like, terminal portion, the kalk-sac, to which the retractor muscle of the penis is attached. The vas deferens joins the epiphallus just below the insertion of the muscle, and is a long fine tube looped around the vagina. All around the proximal portion of the vagina, a series of short oblique muscles bind this organ to the ventral body wall. The vagina is wide and sac-like in this region, but bending to the right it soon becomes tube-like. The receptaculum seminis is small and its duct short. Inserted in the distal wall of the receptaculum seminis is a short stout muscle, differing in this particular point from the condition described by Godwin-Austen (13, p. 32). The free-oviduct exhibits a constriction about its middle, and then gradually becoming smaller joins the oviducal portion of the common duct. There is a large conspicuous dart-gland, the actual dart-sac being very small and containing no true dart, this latter being represented by a short, broad, muscular papilla, on the summit of which there is a small, pointed, horny-looking body (Pl. iv, fig. 17).

In the forms B and C the generative organs were very similar to

one another. Those in B are here figured and described (Pl. iv, fig. 18). The chief differences from those described in the form A are, the general position of the organs, the form of the male organs, free-oviduct, and the densely convoluted common duct.

Proximally the penis is surrounded by a muscular collar, and is shorter than in the form A. At the inner side of the muscular collar there is inserted a small muscle (Pl. iv, fig. 18, m^1), which is continuous with one inserted in the end of the kalk-sac (Pl. iv, fig. 18, m^2). There is a small diverticulum, the retractor muscle of the penis being inserted at its distal end. The epiphallus is very short, practically a small connecting duct between the penis and vas deferens. The kalk-sac is smaller than in form A. The vagina is comparatively short, the receptaculum seminis sessile, and usually without any muscle. Externally the free-oviduct appears as a large, globose mass for the greater portion of its length, internally, however, the actual cavity is considerably smaller than one would at first suppose (Pl. iv, fig. 28, *f. oc.*). Commencing at the external generative orifice the internal wall of the vagina has quite smooth walls, but passing distally they become plicated, and at the point where the sharp bend occurs at the junction of vagina and free-oviduct, the walls become very richly folded, and again quite smooth in the free-oviduct (Pl. iv, fig. 19).

The Free Muscles (Pl. iv, figs. 20-22).—In the form A the buccal retractor forms a thick broad band, tapering posteriorly at its origin and dividing anteriorly into two narrow bands, which are inserted into the walls of the buccal cavity posteriorly and ventro-laterally. The retractors and inferior tentaculars are on both sides fused together, while more posteriorly the combined pedal and inferior tentacular join the superior tentacular, passing backward as a single band (Pl. iv, fig. 20).

In the form B the buccal retractor is as in A. The pedal retractor arises from the superior tentacular, and then posteriorly the superior and inferior tentaculars unite (Pl. iv, fig. 21).

In the form C the buccal retractor commences as a broad band, which soon bifurcates, the two branches then being similar to those in A and B. The superior and inferior tentaculars fuse much more anteriorly than in either A or B, after the fusion the pedal retractor arises, and some distance behind a further pedal (Pl. iv, fig. 22).

The Pallial Organs (Pl. iv, fig. 23).—The kidney is a little more than half the length of the lung, the latter measuring 102 millim., and the former 62 millim. The ureter passes off from the anterior border, at its commencement it is slightly more than 5 millim in breadth, but posterior to the region of the pericardium it narrows forming a tube of uniform dimensions. The posterior border of the pericardium is

exactly 37.5 millim. from the anterior border of the kidney. The pulmonary vein is large, as also the efferent and afferent vessels.

The specimen figured is one of form B.

HELICIDAE.

Trochomorpha, Albers.

Trochomorpha castra, Bens.

Helix castra, Benson : Ann. Mag. N.H., 1852, vol. x, p. 349.

Trochomorpha castra, Stoliczka : J. As. Soc. Bengal, 1873, vol. xlii, p. 21, pl. i, figs. 14-16, pl. ii, figs. 7-9.

Hab.—Kwala Aring, State of Kelantan.

One specimen.

Sitala, A. Ad.

Sitala carinifera, Stol.

Sitala carinifera, Stoliczka : J. As. Soc. Bengal, 1873, vol. xlii, p. 16, pl. i, figs. 8, *Sa-c*.

Hab.—Gunong Inas, 3,500 ft., State of Perak.

Four specimens.

Chloritis, Beck.

Chloritis malayana, Mlldff.

Helix (Trachia) malayana, Mlldff. : J. As. Soc. Bengal, 1886, vol. lv, p. 303.

Chloritis malayana, Mlldff. : P.Z.S., 1891, p. 335, pl. xxx, figs. 6, 6a.

Hab.—Foot of Gunong Inas, State of Perak.

Amphidromus, Albers.

Amphidromus perversus, L.

Pl. iv, figs. 24, 25, Pl. v, figs. 26-28.

Hab.—Biserat, State of Jalor.

Three examples of the animal of this species, enables me to give some account of the anatomy.

The shells of the two specimens here described were submitted to Mr. Hugh Fulton, who very kindly confirmed my identification.

The Generative Organs (Pl. iv, figs. 24, 25, Pl. v, fig. 26).—In the first specimen the vagina is of great length, and proximally is held in position by a series of short, strong muscles arising from the floor of body cavity. Internally the condition is not unlike that I have described in *A. palaceus*, Mouss. (6). The free oviduct is very short. The receptacular duct is a long, wide, irregular shaped tube, distally it becomes very narrow and forms a short, fine tube, which terminates

in an ovoid-sac, the receptaculum seminis (Pl. iv, fig. 24, *r.s.*). The penis is short, with an epiphallus of great length, variously folded and twisted upon itself, it penetrates the distal wall of the penis and terminates in a short, bluntly ending, fleshy papilla (Pl. v, fig. 26, *p.p.*); beyond the epiphallus is a long flagellum whose distal portion is densely coiled. Internally the wall of the penis is thrown into a series of thick, longitudinal, muscular folds, with short cross connecting folds (Pl. v, fig. 26). The retractor muscle of the penis is short, and inserted on the right side, at the proximal end of the epiphallus. The vas deferens leaves the latter organ as a narrow tube, and passing forward along its walls, it bends back again over the region of the vagina and joins the common duct, which is long, and richly folded. The albumen gland is long and narrow. The hermaphrodite duct short and convoluted.

In the second specimen (Pl. iv, fig. 25) the chief differences are, that the vagina is shorter and S-shaped, the receptacular duct longer and narrower, the epiphallus and flagellum both shorter, and the retractor muscle of the penis longer.

The Free Muscles (Pl. v, fig. 27).—The buccal retractor consists of a series of short muscular bands inserted on the ventral side of the buccal cavity, and two rather longer bands, one being inserted on each lateral wall of the buccal cavity. All these fuse immediately behind the buccal cavity, and pass backward as a single band. The tentacular and pedal retractors are similar on both sides. The superior and inferior tentaculars first join, forming a stout band with which the pedal unites a little more posteriorly. The columellar muscle is short and narrow, and twisted twice.

The Pallial Region (Pl. v, fig. 28).—The kidney is unusually large, measuring 51·5 millim. in length and 5·5 millim. in breadth. The ureter passes off from the anterior border, and in the region just in front of the pericardium it passes across the dorsal side of the kidney, continuing its course backward on the opposite side, to the posterior end of the lung, where it bends forward again and runs along the side of the rectum. In a sinistral example of this species the ureter does not cross over the kidney. The measurements of the different organs in the two specimens were as follows :

	Lung.	Kidney.	Pericardium.
Dextral	65·5	51·5	10 millim. long.
Sinistral	80	58	8 " "

Hapalus, Albers.

Hapalus jousseaumei, de Morgan.

Hapalus jousseaumei, de Morg. : Bull. Soc. Zool. Fr., 1885, vol. x,
p. 24, pl. i, figs. 2a, 2b.

Hab.—Kwala Aring, State of Kelantan.

PUPIDAE.

Hypselostoma, Bens.

Hypselostoma laidlawi, n. sp.

Pl. v, figs. 29, 30.

Shell dextral, conical, with last whorl dorsally grooved, surface smooth, deeply umbilicated, whorls 5, regularly increasing, aperture C-shaped, armature consists of four teeth, a dorsal and ventral one situated on the upper and lower border of the peristome, and two smaller internal teeth, one on the right and one on the left of the peristomial teeth; peristome thin, slightly reflected.

Alt. and diam. 1 millim.

Hab.—Biserat Caves, State of Jalor.

STENOGYRIDAE.

Prosopeas, Mörch.

Prosopeas tehehelense, deMorg.

Stenogyra tehehelensis, de Morg. : Le Natural., 1885, p. 69,
Bull. Soc. Zool. Fr., 1885, vol. x, p. 40, pl. ii, figs. 7a, 7b.

Stenogyra swettenhami, de Morg. : Bull. Soc. Zool. Fr., 1885,
vol. x, p. 41, pl. ii, figs. 6a, 6b.

Stenogyra (Subulina) tehehelensis, Mlldff. : J. As. Soc. Bengal,
1887, vol. lv, p. 304.

Stenogyra (Opaeas)? terebralis, Theob. (? n. sp.): G. Nevill,
Hand-list Moll. Ind. Mus., 1878, p. 166.

Prosopeas tehehelense, Mlldff. : P.Z.S., 1891, p. 337.

Hab.—Gunong Inas, 3,000 ft., State of Perak; Belimbing (from jungle floor, at base of cliff), State of Lige; Biserat, State of Jalor.

Möllendorff (20, p. 337) has expressed the opinion that the *Stenogyra tehehelensis* and *S. swettenhami* of deMorgan are the same, the latter being only a slight variation. After examining a large series of specimens from the above localities, I can fully endorse this opinion.

The eggs of this mollusc are exceedingly large for the size of the animal, and are enclosed in a hard calcareous shell. All the eggs in the region of the free-oviduct had a well developed shell, whilst those in the lower portion of the oviducal canal had not.

Specimens having eight whorls in the shell were found to be sexually mature; the largest shell met with was one with twelve whorls,

CLAUSILIIDAE.**Clausilia**, Drap.**Clausilia kapayanensis**, de Morg.

Pseudonenia kapayanensis, de Morg.: Bull. Soc. Zool. Fr., 1885, vol. x, p. 43, pl. ii, fig. 8.

Hab.—Belimbing, State of Lige.

One specimen.

Clausilia penangensis, Stol.

Clausilia (Phaedusa) penangensis, Stol.: J. As. Soc. Bengal, 1873, vol. xlii, p. 27, pl. ii, figs. 4-6 and 15-17.

Hab.—Belimbing, State of Lige.

I have to thank Mr. E. R. Sykes for very kindly examining these. A large globose form, which at first sight seems very distinct, he thinks is only a variety, as there are intermediate forms gradually leading up to it.

Clausilia penangensis, var.

Hab.—Bukit Besar, 2,000 ft., State of Nawng Chik; Patalung, State of Raman.

VERONICELLIDAE.**Veronicella**, Blainv.**Veronicella**, sp.

Hab.—Hills near Biserat, State of Jalor.

There are two specimens belonging to this genus, but owing to injury the species are undeterminable.

RATHOUIIIDAE.

The genera of slugs which have been grouped under this family are *Rathouisia*, Heude (15), *Atopos*, Simr. (27), *Prisma*, Simr. (27), and the sub-genus *Palangia*, Babor (1).

In the present collection there are examples of *Atopos* only (and possibly Babor's sub-genus), but as the anatomy of this genus has an important bearing upon the family generally, and on other families of molluscs, it seems desirable to very briefly state the history of the various species and genera, and the views of other malacologists upon their position, affinities, etc.

Under the name of *Vaginula tourranensis*,* Souleyet (29) in 1852 described a slug found by Gaudichand near Tourranne in

* It should be pointed out that Férussac's genus *Vaginulus* (1821), has really priority over any of the above mentioned genera, for he distinctly states that in *V. taunaysi*, the type of the genus the pulmonary aperture is on the lower right side of the mantle about two-fifths of the length of the body from the anterior end, the female generative orifice on the same side is said to be about the middle. Blainville's account of the anatomy, however, is partly contradictory to Férussac's account, and his figures very unsatisfactory.

Cochin China. Later Semper (26) found a slug in Central Luzon which he named *Vaginulus trigonus*, and expressed the opinion that it was more like a *Limax* than a *Vaginula*. Stoliczka (30) in 1873 found in Penang a species closely allied to *V. tourrannensis*, Soul., which according to Heynemann (17), is probably identical with the *V. pulverulenta* of Benson from the same island. Heynemann in 1876 † described a further new species from Queensland, which he named *V. australis*. In 1882, Heude (16, p. 10, pl. xiii, figs. 2, 2a) gave a brief description of a slug found in Eastern China, under the name of *Vaginulus sinensis*; finding, however, that the name *sinensis* was preoccupied by Möllendorff's *Vaginula sinensis*, he re-named it *leonina*, an altogether unnecessary change, as he now (16) transferred it to a new genus *Rathouisia*. Tapparone-Canefri (31) in 1883 described a species from New Guinea which he named *V. prismatica*. Heude in 1885 (16, p. 100, pl. xxvi, figs. 1, 1a) gave a description and figures of a further new species of *Rathouisia* (*R. tigrina*), while at the same time Rathouis (24) gave a short, but exceedingly interesting account of the life-history of *R. leonina*, Heude, and figures of many parts of the internal structure. Unfortunately, as the Sarasins (25) have observed, the lithographic impressions of his figures are so faint that much of the detail is lost.

When studying the specimens of slugs in the British Museum collection in 1885, Heynemann examined two slugs, one from an island in the Torres Straits, the other from the Huon Gulf (17).

Heude in 1890 (16, p. 133, pl. xxxvi, figs. 23, 23a), described a further new species of *Rathouisia* (*R. pantherina*) from Eastern China, and gave figures of the animal.

In 1891, Simroth (27) in a paper betokening rare and critical insight, founded the genera *Atopos* and *Prisma*, the former including three new species: *A. semperi* from Mindanao, and *A. lewkearti* and *A. strubelli* from Amboina, and the *Vaginulus trigonus* of Semper and the *V. pulverulenta* of Benson. The new genus *Prisma* included the following species: *P. tourrannense*, Soul., from Cochin China, *P. prismaticum*, Tap.-Can., from New Guinea, *P. australe*, Heyn., from Queensland, and the Huon Gulf specimen in the British Museum collection, to which he gave the name of *P. heynemanni*. A detailed account of the anatomy of the three new species of *Atopos* was given, illustrated by figures.

In the same year Cockerell (2) published the names *Vaginulinae* or *Rathouisiinae*, as a sub-family for the genera *Rathouisia*, *Atopos* and *Prisma*. He further pointed out that a specimen in the British

† J. Mus. Godefr., 1876, xii, p. 159.

Museum collection from Penang marked "*V. sanguinea*, Stol.," was apparently referable to *A. pulverulentus*, Bens., and also gave a description of *Prisma heynemanni*, Simr.

In 1892 von Ihering (18) published a short, critical note on Simroth's paper, and proposed a separate family—*Atopilæ*—for the genus. A reply by Simroth followed (28).

Nothing more was heard of these interesting molluscs until 1899, when the Sarasins (25) in their beautiful work on the Land Mollusca of the Celebes, described four new species of *Atopos*, viz., *A. scutulatus*, *simrothi*, *crystalalli* and *pristis*, and gave some interesting notes on their anatomy and figures of some of the internal organs.

Lastly Babor (1) in 1900 described a new sub-genus—*Palangia*—for a new species, *Atopos (Palangia) schildii*, from Padang, Sumatra.

The opinions held by the different writers quoted above, as to the affinities and systematic position of these various genera are widely diverse. On the one hand Simroth and Babor are both inclined to regard them as allied to the *Veronicellidæ*, while on the other von Ihering and the Sarasins allie them with the *Testacellidæ*.

Simroth (27) in his valuable paper first directed attention to certain resemblances between *Atopos* and the *Athoracophoridæ* (*Jawellidæ*), and he there states that the *Veronicellidæ* may have been directly derived from the Opisthobranchia, the *Athoracophoridæ* diverging from them at some period; the two families he classes together as Mesomatophora, in contradistinction to the true Stylommatophora. Babor (1) also hints at the resemblances between the *Athoracophoridæ* and *Palangia*.

Von Ihering strongly supports the Testacellid relationship, entirely overlooking the fact mentioned by Simroth, that the Testacellid tooth structure, evolved as it is by necessity for adaptation to carnivorous habits, has no anatomical value, as is evidenced by the great variety of molluscs possessing such a tooth structure.

The Sarasins regard *Rathousia* and *Atopos* only as valid genera, *Prisma* in their opinion not having been sufficiently defined. Whilst strongly favouring the Testacellid affinities of these two genera, they admit that such characters may have arisen independently, as in *Ianthina* and *Scalaria*. Further, these authors regard *Apera*, Heyn., as also being closely allied to the *Rathousioidæ*, they write (25, p. 112) "This slug, we can without hesitation look upon as an ancestral form of *Atopos*." Unfortunately the genus *Apera* is known to these authors from Binney's original description and figures only. The spider-glands of Simroth are not present in *Apera*, and the general disposition and form of the digestive and generative organs, pedal gland, etc., is totally

different. As yet our knowledge of the internal structure of this genus is very imperfect. I have given a very brief account of the anatomy of *Apera burnupi*, E. A. Smith (3), and *A. natalensis*, Clge. (5), from two alcoholic specimens, and in a later example of the former species, I have recently figured and described the male organ (7). This figure is repeated here for comparison (Pl. vi, fig. 6).

An examination of the specimens contained in the present collection, and comparison with the results obtained by the above authors, suggests not a few points of interest.

Firstly there seems every probability that the family *Rathouisiidae* comprises a large number of species, and possibly genera, distributed over the Malay-Australian region and Southern China.

From the primitive condition of the digestive organs, and similar indications in the generative organs, I am adverse to grouping any of the genera with the *Testacellidae*, and prefer to regard the *Testacellid* resemblances as a case of parallel evolution rather than one of direct affinity.

Respecting the generic or sub-generic distinctiveness of *Rathouisia*, *Atopos*, *Prisma*, and *Palangia*, our knowledge is yet too inexact and insufficient for any definite expression of opinion. I agree with the Sarasins that *Prisma*, Simr., is as yet insufficiently defined, still, I think there can be no doubt as to the wisdom of separating it from *Atopos* on the one hand and *Veronicella* on the other.

From the above brief résumé it will be seen that we have yet much to learn respecting the internal structure of these most interesting molluscs, before our attempts at classification or tracing affinities can be of any value. I am pleased to learn that my friend Dr. Josef F. Babor has in active preparation a monograph of the genus *Atopos*, to the completion of which, all malacologists will look forward with great interest.

RATHOUISEIDAE, Heude.

Atopidae, von Ihering: Nachr. Deutsch. Malak. Gesell., 1892, p. 143.

Atopos, Simr.

Atopos sarasini, n. sp.

Pl. v, figs. 40-42, 56-59, Pl. vi, figs. 60-65.

Colour of the notum a deep blue, granulated, extending over the head in a hood-like manner; head yellowish; underside (perinotum?) yellowish-brown; foot-sole yellowish-brown; keel only faintly produced. Length of notum (in alcohol) 59.5, breadth 13.5, height 14.5 millim. Breadth of foot-sole 9 millim. Female generative orifice 14 millim. from the male generative orifice.

Hab..—Hills near Biserat, State of Jalor.

Probably this species belongs to Babor's sub-genus *Paulangia*. The granulated appearance of the notum is due to a large number of small wart-like bodies of two different sizes. The notum fits over the head as a hood, covering over the tentacles and mouth. The external male generative orifice is situated on the right side, as indicated in figure 57 (Pl. v); although very carefully examined, I failed to find any opening on the left side which would correspond to the opening of the left gland of Simroth.

The Alimentary Canal (Pl. v, fig. 59).—The digestive tract is exceedingly simple. I have nothing to add to the accounts already given by Simroth and the Sarasins, of the buccal cavity and sheath. The oesophagus passes from the buccal cavity towards the right side, then dipping ventrally it passes beneath the most posterior portion of the buccal mass, and backward to the stomach or mid-gut gland of Simroth, which internally has a sacculated appearance very similar to that figured by Rathouis (24, Pl. xxxii, fig 1), in *Rathouisia leonina*. Leaving this gland the intestine makes a slight sigmoid curve and runs dorsal to the oesophagus as the second loop of the intestinal tract, then making a bend to the right, it terminates at the anal aperture, the whole structure being of a very simple and primitive nature. The contents of the oesophagus and mid-gut gland were microscopically examined, and the results obtained tend to confirm Simroth's observations on the contents in *A. semperi* and *A. leuckarti*, viz. that the food consists of vegetable matter (fungi) and flesh.

The Generative Organs (Pl. v, figs. 58-59, Pl. vi, figs. 60-64).—Having only one specimen for dissection, I have been unable to work out the structure of the generative organs in the detail I should have liked. This specimen internally was not in the best condition either, which is the more to be regretted as both Simroth (27), and the Sarasins (25) give few particulars regarding these organs. The figures given by Simroth (27, T. xxxvii, figs. 27-28) I can scarcely think are correct.

In *A. sarasini* I was able to trace a well developed vagina, a simple tube-like organ, at the distal portion of which, the duct of the receptaculum seminis enters, beyond this point it becomes folded in an U-shaped pouch, continuing again as a tube; this portion lying posterior to the receptaculum seminis I regard as the free-oviduct. It passes into the oviduct, a large and closely coiled body which is sharply folded upon itself, the folding marking the organ off into three portions. At the end of this tube there is a small glandular body lying upon the albumen gland, this, I think may be the ovary (Pl. vi, fig. 60, *o*). I have failed to trace any connection between the male and female organs.

The penis is a large and muscular body enclosed within a muscular sheath. There is a prominent retractor muscle inserted in its distal end. The external orifice is common to the penis and the right Simroth gland. I was unable to find any trace of a gland on the left side. Internally the sheath of the penis has plicated walls, while arising from the distal end of the cavity is a large muscular organ the penis papilla. This is broad at its base, narrowing towards its free end which terminates as a comparatively sharp point. Its external wall appeared longitudinally indented or fluted, but this appearance is probably due to the pressure of the plications of the sheath. On the left side, at the base of the penis there is a small aperture which communicates with a folded duct (Pl. vi, fig. 61), this I succeeded in tracing as far as the inner side of external male generative orifice. As previously pointed out, only a single Simroth gland was found, the one on the right side; I am quite certain as to the absence of any such body on the left side. The structure of the folded distal portion of that on the right side is shown in transverse section in figure 62 (Pl. vi.). On comparing this transverse section with some recently made of the dart-gland of a Cingalese mollusc (8), I have been struck by the extraordinary resemblance they bear to one another, which has led me to inquire whether it is not possible that the Simroth gland is a vestigial dart-gland?

The Pedal Gland (Pl. vi, fig. 65).—This is a small tongue-shaped body measuring 22 millim in length. Serial transverse sections were made of the whole of the gland, and while agreeing in general with Simroth's description, there were some points very different, but better material is necessary before these can be discussed.

***Atopos harmeri*, n. sp.**

Pl. v, fig. 43-45.

Colour of the notum, light blue with darker blue blotches and spots, a dark blue stripe extends along the mid-dorsal line, granulated; head yellow; tentacles dark blue; underside (perinotum?) yellow; foot-sole yellowish-white with a faint median groove and transverse wrinkling; keel only very feebly developed. Length of notum (in alcohol) 65.5, breadth 12, height 14.5 millim. Breadth of foot-sole 7 millim. Female generative orifice 13 millim. from the male generative orifice.

Hab.—Kampong, near the borders of Kelantan and Ligei.

A young example of this species measuring 37.5 millim. in length, exhibits a much more prominent keel than the larger specimen. Judging from the external features this species is probably allied to *A. strubelli*, Simr. I have much pleasure in associating with this species the name of Dr. S. F. Harmer,

Atopos rugosus, n. sp.

Pl. v, figs. 46-48.

Colour of notum, dark green with yellowish-brown spots, granulated, the extreme anterior portion of the notum is almost white, while posteriorly the body is sharply pointed; underside (perinotum?) yellowish; foot-sole dirty yellow; keel fairly well developed, yellowish brown in colour. Length of notum (in alcohol) 43.5, breadth 7, height 8 millim. Breadth of foot-sole 4 millim. Female generative orifice 8.5 millim. from the male generative orifice.

Hab.—Hills near Biserat, State of Jalor.

Atopos punctata, n. sp.

Pl. v, figs. 49-52.

Colour of notum, yellow spotted with dark blue or black, granulated; head and tentacles yellowish; underside (perinotum?) yellow; foot-sole yellow with closely set transverse wrinkles; keel fairly prominent. Length of notum (in alcohol) 35, breadth 4, height 4 millim. Breadth of foot-sole 2 millim. Female generative orifice 7 (?) millim.* from the male generative orifice.

Hab.—Hills near Biserat, State of Jalor.

A figure of a small piece of the notum much enlarged (Pl. vi, fig. 52), shows that the wart-like bodies vary greatly in size, as do also the blackish spots.

Atopos strubelli, Simr.

Atopos strubelli, Simr.: Zeit. f. wiss. Zool., 1893, Bd. lii, p. 600.

The specimen collected agrees practically in all details with the description given by Simroth. The dimensions are as follows: Length of notum (in alcohol) 61.5, breadth 11, height 11.5 millim. Breadth of foot-sole 7 millim. Female generative orifice 13 millim. from the male generative orifice.

Hab.—Hills near Biserat, State of Jalor.

Atopos laidlawi, n. sp.

Pl. v, figs. 53-55.

Colour of the notum, dorsally yellowish-brown with small, dark brown dots, finely granulated, laterally an irregular, broad, dark brown band, below which the notum is drab colour, at the extreme anterior and posterior ends the notum is almost white; head dirty white; tentacles

* It is exceedingly difficult in small species like these, which have become hardened and somewhat brittle by immersion in alcohol, to be certain of the actual orifice.

bluish; underside (perinotum?) dirty white; foot-sole yellowish-white; keel well developed and fairly prominent, white with numerous minute brown dots. Length of notum (in alcohol) 30, breadth 7, height 7 millim. Breadth of foot-sole 4 millim. Female generative orifice about 6 millim. from the male generative orifice. *

Hab.—Ban Kong Rah, District of Gaboing.

This interesting species will probably prove to be at least subgenerically distinct from *Atopos* when the internal structure is known. It is named in honour of Mr F. F. Laidlaw, a member of the Skeat Expedition, and by whom it was collected.

BIBLIOGRAPHY.

1. Babor, J. F.—Mittheilungen über Nacktschnecken in der Sammlung des k. k. naturhist. Hofmuseums. II. Erste vorläufige Mittheilung zu einer Monographie der Gattung *Atopos* Simroth. Ann. d. k. k. Naturhist. Hofmus. Wien, 1900, Bd. xv, pp. 100-102.
2. Cockerell, T. D. A.—A Check-list of the Slugs. *The Conchologist*, 1893, vol. ii, pp. 168-176 and 185-232.
3. Collinge, Walter E.—On the Anatomy of *Apera burnupi*, E. A. Smith. Ann. Mag. N. H., 1897 (s. 6.), vol. xx, pp. 221-225, pl. v.
4. do. Report on the Slugs. A. Willey's Zoological Results, 1899 [1900], pp. 429-438, pls. xl-xli.
5. do. On a collection of Slugs from South Africa, with descriptions of some New Species. Ann. Sth. Afr. Mus., 1900, vol. ii, pp. 1-8, pls. 1, 2.
6. do. Note on the Anatomy of *Amphidromus palaceus*, Mouss. Journ. Malac., 1901, vol. viii, pp. 50-52, pl. iv.
7. do. Note on the Anatomy of *Apera burnupi*, E. A. Smith. Ibid., pp. 71, 72, fig.
8. do. On the Anatomy of the *Vitrina irradians* of Pfeiffer. Ibid., pp. 63-70, pls. v, vi.
9. Crosse, H.—Mollusques nouveaux de Perak. Journ. de Conchyl., 1879, vol. xxvii, pp. 198-208.
10. do. Faune malacologique de Perak. Ibid., pp. 336-340.
11. Fulton, Hugh.—A List of the species of Land Mollusca, collected by Mr. W. Doherty in the Malay Archipelago; with descriptions of some supposed new Species and Varieties. Proc. Malac. Soc. Lond., 1899, vol. iii, pp. 212-219, pl. xi.
12. Godwin-Austen, H. H.—Mollusca of India, 1882-1888, vol. 1.

13. do. On the Anatomy of *Hemiplecta floweri*, E. A. Smith, from Perak, Malay Peninsula. Proc. Malac. Soc. Lond., 1900, vol. iv, pp. 31-36, pl. iv.
14. do. and Nevill, G.—Descriptions of Shells from Perak and the Nicobar Islands. Proc. Zool. Soc., 1879, pp. 734-740, pls. lix, lx.
15. Heude, P. M.—Note sur une Limacien nouveau de Chine. Journ. de Conchyl., 1883, vol. xxxi, pp. 394.
16. do. Notes sui les Mollusques terrestres de la vallée du Fleuve Bleu. Mem. concern. L'Hist. nat. de l'Empire Chinois, 1882-1890, pp. 1-188, pls. xii-xliii.
17. Heynemann, D. F.—Über Vaginula-Arten im British Museum—Natural History—in London. Jahrb. Deutsch. Malak. Gesell., 1885, pp. 1-16.
18. Ihering, H. von.—Ueber *Atopos* Simroth. Nachr. Deutsch. Malak. Gesell., 1892, pp. 140-144.
19. Möllendorff, O. F. von.—The Landshells of Perak. Journ. As. Soc. Bengal, 1887, vol. lv, pp. 299-316.
20. do. On the Land and Freshwater Shells of Perak. Proc. Zool. Soc., 1891, pp. 330-348, pl. xxx.
21. do. On a collection of Land Shells from the Samui Islands, Gulf of Siam. Ibid., 1894, pp. 146-156, pl. xvi.
22. Morgan, J. de.—Note sur quelques espèces nouvelles de Mollusques terrestres recueillis dans la Péninsula Malaise. Le Naturaliste, 1885, vol. vii, pp. 68-70.
23. do. Mollusques terrestres et fluviatiles du royaume de Perak et des pays voisins (Presqu'île Malaise). Bull. Soc. Zool. France, 1885, t. x, pp. 1-80, 5 plts.
24. Rathouis, C.—Quelques remarques sur les moeurs et habitudes du *Rathouisia leonina*. Mem. concern. L'Hist. nat. de l'Empire Chinois, 1884, pp. 131, 132, pl. xxxii.
25. Sarasin, P. und F.—Die land-Mollusken von Celebes. Wiesbaden, 1899.
26. Semper, Carl.—Reisen im Archipel der Philippinen. 1870, Bd. iii. Landmollusken.
27. Simroth, H.—Über das Vaginulidengenus *Atopos* n.g. Zeit. f. wiss. Zool., 1891, Bd. lii, pp. 593-616, T. xxxvii.
28. do. Einige Bemerkungen zu vorstehendem Aufsatz. Nachr. Deutsch. Malak. Gesell., 1892, pp. 144-149. (See reference No. 18.)
29. Souleyet in Eydoux et Souleyet. Voyage sur le Bonite, 1852, T. ii.
30. Stoliczka, F.—On the Land Shells of Penang Island, with des-

- criptions of the animals and anatomical notes. Pt. ii. *Helicacea*. J. As. Soc. Bengal, 1873, vol. xlii, pp. 11-38, pls. i-iii.
31. Tapparone-Canefri, C.—Fauna malacologica della nuova Guinea e delle isole adiacenti. Pt. i. Molluschi Estramarini. Ann. del Mus. Civ. de St. Nat. de Genova, 1883, vol. xix, pt. i, pp. 1-304, Tav. i-xi.
32. Sykes, E. R.—Descriptions of six new Land Shells from the Malay Peninsula. Journ. Malac., 1902, vol. ix, pp. 22, 23.
33. do. On a collection of Land and Freshwater Shells from Kelantan, Malay Peninsula. *Ibid.*, pp. 60-63, pl. iii.
34. Möllendorff, O. v.—Binnenmollusken aus Hinterindien. 1. Landschnecken von Kelantan, Ostküste der Halbinsel Malacca. Nachr. Deutsch. Malak. Gesell., 1902, pp. 135-149.

REFERENCE LETTERS.

<i>alb. gl.</i>	Albumen gland.	<i>ov.</i>	Oviduct.
<i>an.</i>	Anus.	<i>p.</i>	Penis.
<i>b.c.</i>	Buccal cavity	<i>pc.</i>	Pericardium.
<i>b.r.</i>	Buccal retractor.	<i>pr.</i>	Prostate.
<i>c.m.</i>	Columnellar muscle.	<i>pp.</i>	Penis papilla.
<i>c.m.f.</i>	Circular muscle fibres.	<i>pr.</i>	Pedal retractor.
<i>cr.</i>	Crop.	<i>pv.</i>	Pulmonary vein.
<i>d.</i>	Dart.	<i>r.</i>	Rectum.
<i>d. gl.</i>	Dart-gland.	<i>r. ap.</i>	Renal aperture.
<i>d.s.</i>	Dart-sac.	<i>r.d.</i>	Receptacular duct.
<i>di. gl.</i>	Digestive gland.	<i>r.m.</i>	Retractor muscle.
<i>div.</i>	Diverticulum.	<i>r. or.</i>	Respiratory orifice.
<i>ep.</i>	Epiphallus.	<i>r.s.</i>	Receptaculum seminis.
<i>fl.</i>	Flagellum.	<i>s.d.</i>	Salivary duct.
<i>f. ov.</i>	Free-oviduct.	<i>s. gl.</i>	Salivary gland.
<i>f.s.</i>	Foot-sole.	<i>S. gl.</i>	Simroth's gland.
<i>gl. c.</i>	Gland cells	<i>st.</i>	Stomach.
<i>h.d.</i>	Hermaphrodite duct.	<i>T.</i>	Superior tentacular retractor.
<i>h. gl.</i>	Hermaphrodite gland.	<i>t.</i>	Inferior tentacular retractor.
<i>int. 1-4</i>	Loops of intestine.	<i>Tn.</i>	Superior tentacle.
<i>k.</i>	Kidney.	<i>tn.</i>	Inferior tentacle.
<i>k.s.</i>	Kalk-sac.	<i>ur.</i>	Ureter.
<i>l.or.</i>	Left ocular retractor.	<i>v.</i>	Vestibule.
<i>m₁m₂</i>	Muscles.	<i>vg.</i>	Vagina.
<i>m. gl.</i>	Mid-gut gland.	<i>v.d.</i>	Vas deferens.
<i>n.</i>	Notum.	<i>w.d.s.</i>	Wall of dart-sac.
<i>o.</i>	Ovary.	<i>w.p.c.</i>	Wall of pulmonary cavity.
<i>ob. m.</i>	Oblique muscles.	δ	Male generative orifice.
<i>oc.</i>	Oesophagus.	φ	Female generative orifice.

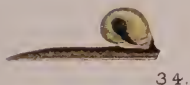
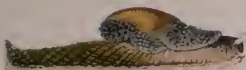
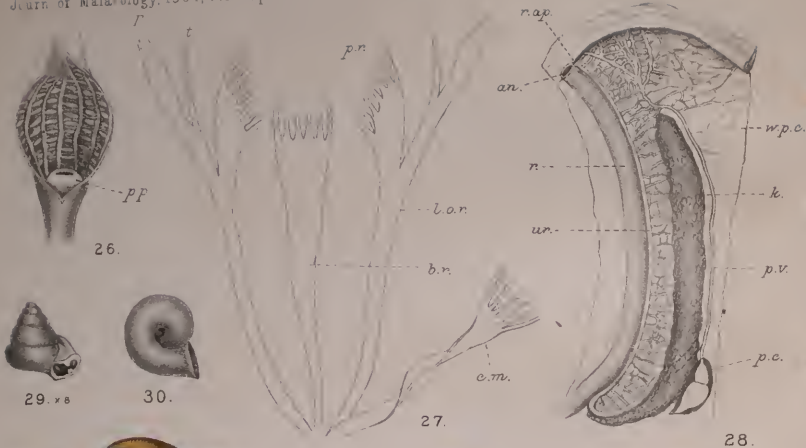
EXPLANATION OF PLATES IV-VI.

PLATE IV.

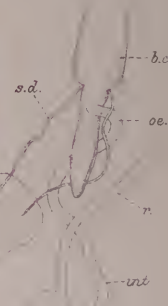
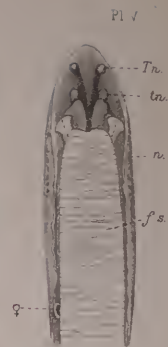
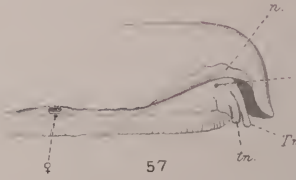
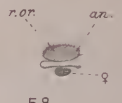
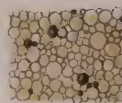
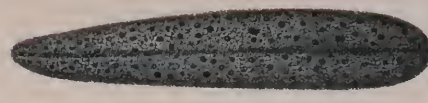
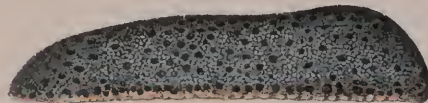
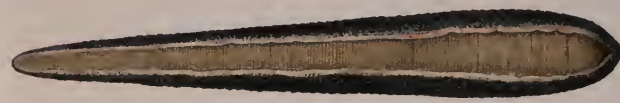
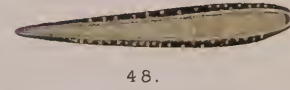
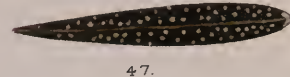
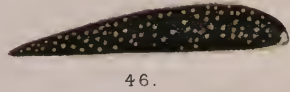
Fig. 1.	<i>Streptaxis sykesi</i> , n. sp.	Dorsal view of the shell.	× 2.
Fig. 2.	" "	Ventral view of the shell.	× 2.
Fig. 3.	<i>Streptaxis striatula</i> , n. sp.	Dorsal view of the shell.	× 1.
Fig. 4.	" "	Ventral view of the shell.	× 1.
Fig. 5.	<i>Apoparmarion partridgei</i> , n. sp.	Dorsal view of the shell.	× 2.
Fig. 6.	" "	Ventral view of the shell.	× 2.
Fig. 7.	" "	Alimentary canal, enlarged.	
Fig. 8.	" "	Generative organs, enlarged.	
Fig. 9.	" "	Penis, much enlarged.	
Fig. 10.	" "	Diagrammatic longitudinal horizontal section of the penis, showing the form and extent of the cavity.	
Fig. 11.	" "	Dart-gland and dart-sac, the latter opened to show the dart, enlarged.	
Fig. 12.	" "	Free muscles, enlarged.	
Fig. 13.	<i>Girasia fegucnsis</i> , Theob.	Generative organs.	× 3.
Fig. 14.	" "	The same showing the penis, etc., in natural position. The dart-gland (<i>d. gl.</i>) has been moved slightly to the left. The receptaculum seminis and free-oviduct are not shown.	
Fig. 15.	<i>Cryptosoma</i> , sp.	Terminal ducts of the generative organs, enlarged.	
Fig. 16.	<i>Hemiplecta humphreysiana</i> , Lea.	Generative organs of the Form A.	
Fig. 17.	" "	Dart-sac opened to show the dart.	
Fig. 18.	" "	Generative organs of the Form B.	
Fig. 19.	" "	Vagina and free-oviduct dissected to show the internal walls.	
Fig. 20.	<i>Hemiplecta humphreysiana</i> , Lea.	Free muscles of the Form A.	
Fig. 21.	" "	Free muscles of the Form B.	
Fig. 22.	" "	Free muscles of the Form C.	
Fig. 23.	" "	The pallial complex.	× 1/2.
Fig. 24.	<i>Amphidromus perversus</i> , L.	Generative organs.	
Fig. 25.	" "	" "	

PLATE V.

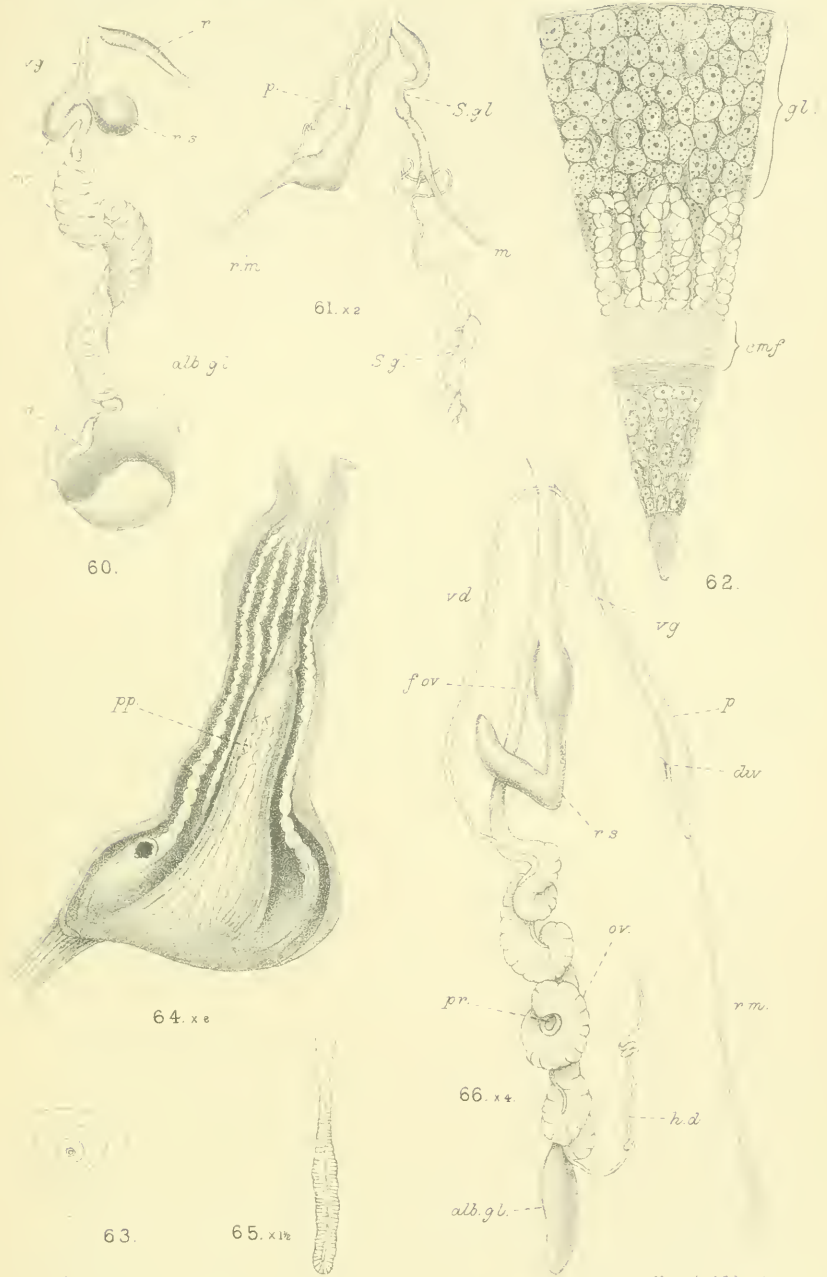
Fig. 26.	<i>Amphidromus perversus</i> , L.	Penis dissected to show the internal walls and penis papilla.	
Fig. 27.	" "	Free muscles, enlarged.	
Fig. 28.	" "	The pallial complex.	× 1.
Fig. 29.	<i>Hypselostoma laidlaxi</i> , n. sp.	Shell.	× 8.
Fig. 30.	" "	Ventral view.	× 8.
Fig. 31.	<i>Apoparmarion partridgei</i> , n. sp.	Right lateral view.	× 1 1/2.
Fig. 32.	" "	Dorsal view.	× 1 1/2.
Fig. 33.	" "	Left lateral view.	× 1 1/2.



de et pinx ad nat



Math. Lith' London



F.C.P. del. ad nat.

Hutn. Lith^r London.

Fig. 34.	<i>Parafarmarion elongatus</i> , n. sp.	Right lateral view. $\times 1\frac{1}{2}$.
Fig. 35.	" "	Dorsal view. $\times 1\frac{1}{2}$.
Fig. 36.	" "	Left lateral view. $\times 1\frac{1}{2}$.
Fig. 37.	<i>Cryptosemclus gracilis</i> , n. sp.	Right lateral view. $\times 1\frac{1}{2}$.
Fig. 38.	" "	Dorsal view. $\times 1\frac{1}{2}$.
Fig. 39.	" "	Left lateral view. $\times 1\frac{1}{2}$.
Fig. 40.	<i>Atopos sarasini</i> , n. sp.	Right lateral view. $\times 1$.
Fig. 41.	" "	Dorsal view. $\times 1$.
Fig. 42.	" "	Ventral view. $\times 1$.
Fig. 43.	<i>Atopos harmeri</i> , n. sp.	Right lateral view. $\times 1$.
Fig. 44.	" "	Dorsal view. $\times 1$.
Fig. 45.	" "	Ventral view. $\times 1$.
Fig. 46.	<i>Atopos rugosus</i> , n. sp.	Right lateral view. $\times 1$.
Fig. 47.	" "	Dorsal view. $\times 1$.
Fig. 48.	" "	Ventral view. $\times 1$.
Fig. 49.	<i>Atopos punctata</i> , n. sp.	Right lateral view. $\times 1$.
Fig. 50.	" "	Dorsal view. $\times 1$.
Fig. 51.	" "	Ventral view. $\times 1$.
Fig. 52.	" "	Portion of the notum, enlarged, to show the varying sizes of the papilla, which give to the body a granulated appearance.
Fig. 53.	<i>Atopos laidlawi</i> , n. sp.	Right lateral view. $\times 2$.
Fig. 54.	" "	Dorsal view. $\times 2$.
Fig. 55.	" "	Ventral view. $\times 2$.
Fig. 56.	<i>Atopos sarasini</i> , n. sp.	View of the ventral side of the body with the notum pulled forward to show the tentacles. $\times 1$.
Fig. 57.	" "	Lateral view showing the position of the male and female generative orifices, pulmonary orifice, and anus.
Fig. 58.	" "	Position of the external orifices.
Fig. 59.	" "	Alimentary canal, enlarged.

PLATE VI.

Fig. 60.	<i>Atopos sarasini</i> , n. sp.	Female generative organs, enlarged.
Fig. 61.	" "	Male generative organs and right Simroth gland. $\times 2$.
Fig. 62.	" "	Portion of a transverse section through the distal portion of the Simroth gland.
Fig. 63.	" "	Diagrammatic section of the gland.
Fig. 64.	" "	The penis dissected to show the internal walls, penis papilla, and orifice from duct. $\times 6$.
Fig. 65.	" "	The pedal gland. $\times 1\frac{1}{2}$.
Fig. 66.	<i>Apera buruupi</i> , E. A. Smith.	Generative organs. $\times 4$.

NOTES ON SOME FURTHER MALFORMED SPECIMENS OF ANODONTA CYGNEA, L.

BY H. H. BLOOMER.

(Plate vii).

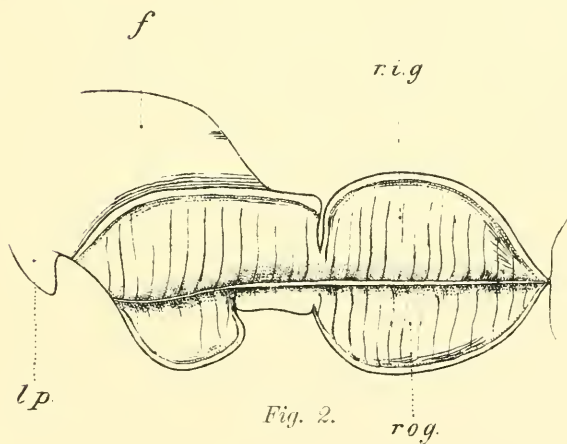
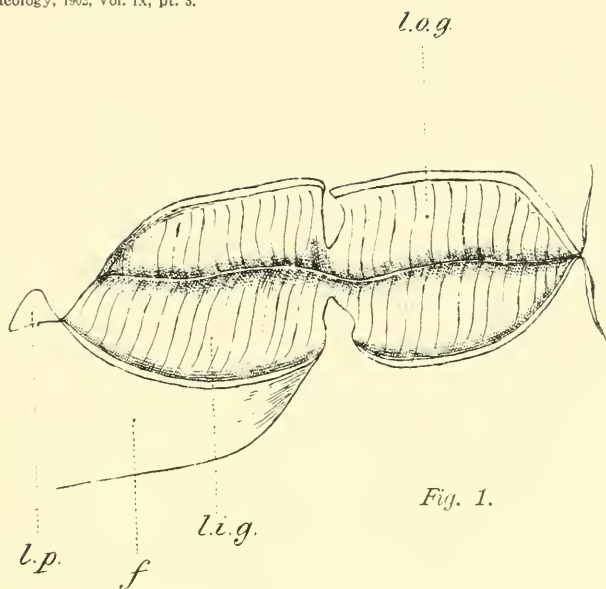
Since my last notes on this subject appeared in the Journal,¹ I have received from Mr. S. P. Bolton several more injured specimens, among which were two showing other interesting points of malformation. One bore indications of an injury to the left valve—the fracture extending in an antero-ventral direction from the umbo to the edge of the shell, which had been repaired, the inner layer now being continuous with that of the other portion of the valve. There is also an indentation on the right valve opposite to the injury on the left one. The free edge of the left mantle lobe appears irregular in its growth, and the portion of the lobe covering the injured part of the valve is much thicker than the other portion. The left labial palps are somewhat aborted, and have a more ventral position than the right ones. The outer one for a little distance is fused with the mantle lobe.

In the other specimen the right valve was apparently stove in a little anterior to the centre of it, and just below the umbo. The injury at the time of occurrence must have been considerable, and penetrated into the body of the animal itself. The injured valve was repaired and the subsequent growth of the shell was nearly normal. The left valve is intact. The gills suffered the greatest injury, while strange to say the mantle lobes appear to be normal. The left gills are severed from their distal edges to close to the outer supra branchial chamber (Pl. vii, fig. 1).

The right inner gill is not injured so much and the laceration does not extend so far dorsally, while, however, the free portion of the right outer gill is for some distance anterior to the injury, entirely missing (Pl. vii, fig. 2, *r.o.g.*), and the portions near the base on both sides of the gap have fused with the mantle lobe.

A transverse section across the injured portion of the animal, shows both the left supra branchial vessels to be somewhat distorted and bent inwards, and the right inner gill exhibits the subsequent fusion of its injured portions.

(1) Journ. of Malac., 1900, vol. vii, p. 177.



H.H.B. del. ad nat.

ANODONTA CYGNEA, L.

Fig. 1. Left side. Fig. 2. Right side.

References: f. Foot; l.p. Labial palpus; l.i.g. Left inner gill; l.o.g. Left outer gill; r.i.g. Right inner gill; r.o.g. Right outer gill.

A CLASSIFIED LIST OF THE HELICOID LAND SHELLS OF ASIA.

(PART III.)*

BY G. K. GUDE, F.Z.S.

ii. ASIATIC RUSSIA.

A. WESTERN TURKISTAN.

The Helicoids of Russian Turkistan exhibit strong affinity with those of Eastern Turkistan, notably in the presence of the genera *Cathaira* and *Macrochlamys*. The occurrence, on the other hand, of two species of *Zonites*, one of *Retinella*, and seven species of the Belogona Siphonadenia proves relationship with the Palaearctic Fauna.

The earliest record of Helicoids is by Prof von Martens, who worked out the collections of Fedtschenko and Semenow. Others were described by Dr. Westerlund from material collected by Dr. S. Korschinsky, Adrianow, Dr. A. Nikolsky, A. Kuschakewitsch, L. Bartschschewsky, Dr. A. Regel, A. Kasnakow, and K. E. Stenroos. The shells collected by the latter went to the Museum of Helsingfors, while all the others described by Dr. Westerlund are in the Imperial Museum of St. Petersburg.

Macrochlamys coeligena, n.sp.

(Figs. 1-3.)

Shell narrowly perforate, lenticular, depressed, fragile, greenish corneous, translucent, polished, finely striated, shortly and slightly



Figs. 1-3.—*Macrochlamys coeligena*, n. sp.

costulate near the sutural margin. Spire obtuse, suture somewhat shallow, margined. Whorls $4\frac{1}{2}$, compressed and a little flattened above and below, slightly sloping towards the suture, increasing slowly at first; last whorl more than twice the size of the penultimate, widened towards the mouth, not descending in front, rounded at the periphery, impressed round the umbilicus. Aperture oblique, much

* See Ante p. 51.

wider than high; peristome thin, acute, the margins convergent: upper and lower margins gently curved, united by a thin callus; outer round; columellar ascending, slightly dilated over the narrow perforation of the umbilicus.

Diam. maj. 12, min. 10.5; alt. 5.5 millim.

Hab.—Tian-Shan Mountains, Russian Turkistan.

From Mr. Preston I received two specimens with the MS. name "*Macrochlamys coeligena*, Mart." Professor von Martens, to whom I submitted a specimen, informs me that the new species is allied to *M. sogdiana*, and that he saw a specimen in Mr. Rolle's collection for which he suggested the name *M. coelicola*, in allusion to the native name Tian-Shan meaning Celestial Mountains. To prevent confusion I have retained the name *coeligena*, as the shells have been distributed under that name.

Macrochlamys coeligena differs from *M. sogdiana*, Mts., by its smaller size, its more depressed shape, and its more flattened whorls; the umbilical region is more excavated and the last whorl is less widened towards the mouth. The shell is also thinner in texture than that of *M. sogdiana* which, moreover, is opaque not translucent.

Family **Zonitidae**.

Subfamily **Macrochlaminae**.

Genus **MACROCHLAMYS**, Bens.
sogdiana, Mart. Sarafschan;
 Ferghana; Taschkent;
 Samarkand.
coeligena, n.sp. Tian-Shan.
turanica, Mart. Sarafschan;
 Kokand; Ferghana; Khiva.
clessini, West. Issik-Kul, Alatau.
 = schmidti, Cless.
schmidti, Brancs. Turcomania.
korschinskyi, West. Kugart
 and Taldyk-ssu Rivers.

Sub-family **Zonitinae**.

Genus **VITRINA**, Drap.
alexandri, West. Iskander-Kul.
rugulosa, Mart. Iskander-Kul.
conoidea, Mart. Sarafschan;
 Ferghana.
raddei, Boettg. Kopet Dagh.
 Genus **ZONITES**, Montf.
corax, Pfr. Samarkand.

latissimus, Dohrn. Samarkand.

Genus **EUCONULUS**, Reinh.

fulvus, Drap. Iskander-Kul.

Sub-family **Ariophantinae**.

Genus **ZONITOIDES**, Lehmann.

nitidus, Müll. Turcomania.

Family **Endodontidae**.

Genus **PUNCTUM**, Morse.

pygmaeum, Drap. Kultuk,
 Transcaspia.

Family **Helicidae**

Group **Belogona**, v. Iher.

BELOGONA EUADENIA, Pils.

Genus **CATHAICA**, Mdff.

Sub-genus **PLIOCATHAICA**, Andr.

phaeozona, Mart. Ferghana;
 Tian-Shan.

rubens, Mart. Sarafschan
 v. *finschiana*, Mart. Alatau
 v. *zeiliana*, Mart. Alatau.
 v. *caryodes*. West. Kugart
 and Baskan Rivers;
 Lepsinsk.

- v. *limitata*, West. Artschaty. Section HELIOMANES, Moq.
 v. *angulata*, West. Artschaty; derbentina, Andr. Taschkent ;
 Samarkand. Saamin ; Khiva.
semenowi, Mart. Tian-Shan ; diaphora, West. Targabak.
 Alatau. Section THEBA, Risso.
duplocincta, Mart. Tian-Shan. seductilis, West. Kashkara,
 Sub-genus XEROCATHAICA, Andr. Ferghana.
fedtschenkoj, Mart. Sarafschan. transcaspia, Boettg.
 Sub-genus PSEUDIBERUS, Anc. Kopet Dagh.
aspasta, West. Taschkent. Genus HYGROMIA, Risso.
plectotropis, Mart. Tian-Shan. Section FRUTICICOLA, Held.
 Sub-genus CAMPYLOCATHAICA, rhysota, West. Alatau.
 Andr. Genus VALLONIA, Risso.
rufispira, Mart. Sarafschan. ladacensis, Nev. Tian-Shan.
retteri, Rosen. Samarkand. mionecton, Boettg.
 v. *serotina*, West. Samarkand; Kopet Dagh.
 Saamin. Genus HELICODONTA, Fér.
dichrozona, Mart. Ferghana. lentina, Mart. Ferghana.
indigena, West. Wandsch Valley. Genus HELIX, L.
 BELOGONA SIPHONADENIA, Pils. Section LEVANTINA, Kob.
 Genus HELICELLA, Fér. kurdistana, Parr. Samarkand.

B. SIBERIA.

The vast territories comprised within the limits of Eastern and Western Siberia, are comparatively poor in molluscan life, and although many large tracts of country have never been searched, it is not very probable that any considerable number of new forms will come to light. Among the earlier naturalists who have brought Siberian mollusca to Europe must be mentioned Gebler, Ehrenberg and Middendorff; the first two in 1829, the latter in 1851. Maack, during a residence of many years, collected in the neighbourhood of Irkutsch, and the same naturalist, in conjunction with Gerstfeldt, travelled and collected in the Amur District in 1855. Other contributions were made by Kindermann and Schrenck (1854-1856), Nordenskjold and Stuxberg (1875), during the Nova-zembla and Jenissei Expedition. These were described by Dr. Westerlund in Kon. Svenska vet. Akad. Handl., Bd. xiv, No. 12 (1877). The latter work was accompanied by a plate, but unfortunately without any explanation of the figures, and as no references to these were given in the text, I have thought it useful to publish here the explanation with which Dr. Westerlund has kindly favoured the writer.

- Fig. 1. *Helix fruticum*, Müll. Fig. 12. *Physa hypnorum* v. *polaris*,
 Fig. 2. „ *nordenskioldi*, West. West.
 Fig. 3. „ *sturbergi*, West. Fig. 13 „ *sibirica*, West.
 Fig. 4. *Pupa theeli*, West. Fig. 14. *Planorbis infraliratus*, West.
 Fig. 5. *Succinea turpida*, West. Fig. 15. *Valvata aliena*, West.
 Fig. 6. „ *putris* v. *acuta*, Pfr.? Fig. 16. „ *sibirica*, Midd.
 Fig. 7. „ *altaica*, Mart. Fig. 17. *Sphaerium lerinodis*, West.
 Fig. 8. *Limnaea attenuata*, Say. Fig. 18. „ *nitidum*, Cless.
 Fig. 9. „ *layotis*, Schr. v. *patula*, West. Fig. 19. *Calyculina lacustris*, var.
 Fig. 10. „ *pereger* v. *producta*, West. Fig. 20. *Pisidium nordenskioldi*,
 West. Fig. 21. „ *sibiricum*, Cless.
 Fig. 11. „ „ v. *torquilla*, West. Fig. 22. „ *mucronatum*, Cless.
 Fig. 23. „ *boreale*, Cless.

Most of the known Helicoids, as might be expected, belong to the Palaearctic Fauna, the *Zonitidae* being represented by nine species, the genus *Eulota*, more characteristic of the Eastern Fauna, producing eight species.

Family **Zonitidae**.

Sub-family **Zonitinae**.

Genus **VITRINA**, Drap.

- pellucida, Müll. Baikal ;
 Tomsk ; Jenissei ; Amur ;
 Kamschatka.
 sibirica, West. Tomsk ; Jenissei.
 = rugulosa, West.
 exilis, Morel. Kamschatka.

Genus **VITREA**, Fitz.

- hammonis, Ström. Tomsk ;
 Jenissei ; Amur.
 petronella, Charp. E. Siberia.
 pura, Ald. Jenissei ; Baikal.

Genus **EUCONULUS**, Reinh.

- fulvus, Drap. Baikal ; Jenissei ;
 Irkutsch ; Kurga ; Amur ;
 Kamschatka.
 pupula, Gould. Kamschatka.

Sub-family **Ariophantinae**,

Genus **ZONITOIDES**, Lehmann.

- nitidus, Müll. Tomsk ; Jenissei.

Family **Endodontidae**.

Group **Polyplacognatha**.

Genus **PUNCTUM**, Morse.

- pygmaeum, Drap. Baikal ;
 Amur.

Group **Haplogona**, Pils.

Genus **PYRAMIDULA**, Fitz.

Section **GONYODISCUS**, Fitz.

- ruderata, Stud. Jenissei ;
 W. and E. Siberia.
 v. angulosa, Mouss. Tomsk ;
 Irkutsch ; Amur ;
 Kamschatka.
 v. opulens, West. Kamschatka.
 pauper, Gould. Kamschatka.
 flocculus, Morel. Kamschatka.

Family **Helicidae**.

Group **Belogona**, v. Iher.

BELOGONA EUADENIA, Pils.

Genus **EULOTA**, Hartm.

Section **EULOTA**, s.s.

- fruticum, Müll. Tomsk ;
 Jenissei ; Altai.
 v. asiatica, Dyb. Amur.
 v. europaea, Dyb. W. Siberia.
 ravida, Bens. Amur.

- serotina, A. Ad. Saghalien. nordenskioldi, West. Altai ;
 maacki, Gerstf. Amur. Jenissei ; Amur.
 selskii, Gerstf. Amur. = rufescens, Schr.
 m'iddendorffi, Gerstf. v. depressa, West.
 Wladiwostock ; Amur. v. planata, West.
 cincto-inflata, Mouss. verna, West. Irkutsch.
 Wladiwostock. = hispida, Schr.
 similaris v. arcasiana, Cr. and dieckmanni, Mouss. Amur.
 Deb. Amur. stuxbergi, West. Altai ; Amur.
 weyrichi, Schrenck. Amur. annexa, West. Irkutsch.
 Saghalien. = rufescens, Schr.
 Genus CATHAICA, Mdff. czekanowskii, West. Irkutsch
 Sub-genus EUCATHAICA, Andr. eutheta, West. Amur.
 graeseri, MOUSS. Wladiwostock. Section DIBOTHRION, Pfr.
 BELOGONA SIPHONADENIA, Pils. bicallosa, Friv. Altai.
 Genus HELICELLA, Fér. sibirica, West. Amur
 Section HELICELLA, s.s. = gerstfeldti, Dyb.
 apollinis, Mart. Altai. Genus ACANTHINULA, Beck.
 Section THEBA, Risso. Section ZOOGENITES, Morse.
 strigella, Drap. Amur harpa, Say. Amur.
 duiensis, West. Saghalien. = amurensis, Gerstf.
 schrencki, Midd. Altai ; Genus VALLONIA, Risso.
 Jenissei ; Irkutsch ; Trans- pulchella, Müll. Jenissei ; Amur
 Baikal ; Amur. costata, Müll. Irkutsch ;
 = sibirica, Friv. Jenissei ; Amur.
 helvola, Friv. ? W. Siberia. v. amurensis, Sterki. Amur.
 carthusiana, Müll. Irkutsch ; tenuilabris, Braun.
 Amur. adela, West. Irkutsch ; Jenissei ;
 Amur.
 Genus HYGROMIA, Risso. Amur.
 Section MONACHA, Fitz. Genus HELICIGONA, Fér.
 frequens, Mouss. ? W. Siberia. Section CHILOSTOMA, Fitz.
 incarnata, Müll. ? W. Siberia. ussuriensi, West. So. Ussuri
 Section FRUTICICOLA, Held. Distr.
 hispida, L. ? Amur. Section ISOGNOMOSTOMA, Fitz.
 sericea, Drap. Irkutsch ; Amur. supersonata, Midd. E. Siberia.
 rufescens, Penn. Irkutsch ; Genus HELIX, L.
 Amur. Section TACHEA, Leach.
 = strigella, Gerstf. atrolabiata v. laeta, West.
 rhysoa v. altaica, West. Altai. Awtrasia.

iii. AFGHANISTAN.

One of the least known regions as regards Mollusca is undoubtedly

Afghanistan. The earliest record is by Capt. Thomas Hutton (Journ. Asiat. Soc. Beng., vol. xviii, part 2, 1849 (1850), p. 649), who procured a few species during the advance of the Army of the Indus into Afghanistan in 1839. Only three Helicoids were recorded. The only subsequent contribution appears to be that by Mr. C. F. Ancey in 1893, (Bull. Soc. Zool. Fr., xviii, p. 40), who *inter alia* refers to the paucity of the Molluscan Fauna of Baluchistan, which he attributes to the geological constitution of the soil, and the vast deserts which cover part of its surface. No Helicoids of Baluchistan are known.

Vitrina baccata, Hutt.

Eulota bactriana, Hutt.

Helicella (*Heliomanes*) *krynickii* v. *candaharica*, Pfr.

iv. KURDISTAN.

The only known Helicoids of this district belong to the genus *Helix*. Bourguignat recorded a few, the remainder were described by Galland. The unsettled state of the country no doubt accounts for our meagre knowledge of its molluscan fauna.

Genus *HELIX*, L.

= v. *baschkira*, Pfr.

Section *LEVANTINA*, Kob.

escheriana, Bourg.

guttata, Oliv.

v. *diarbekirana*, Gall.

kurdistana, Parr.

v. *euthyomphala*, Gall.

v. *ergilensis*, Gall.

ninivita, Gall.

v. *sesteri*, Gall.

Section *HELICOGENA*, Fér.

v. *michoniana*, Bourg.

lucorum, L.

v. MESOPOTAMIA.

We owe our knowledge of the Mollusca of this region almost entirely to the researches of Dr. Schlaefli, the results of which were tabulated by Mousson in 1874.

Family **Zonitidae**.

derbentina, Andr.

Sub-family **Zonitinae**.

mesopotamica, Mouss.

Genus *VITREA*, Fitz.

vestalis, Parr.

aequata, Mouss.

Section *THEBA*, Risso.

nitelina, Bourg.

obstructa, Fér.

Family **Helicidae**.

Genus *HELIX*, L.

Genus *LEUCOCHROA*, Beck.

Section *LEVANTINA*, Kob.

fimbriata, Bourg.

caesariana, Parr.

Genus *HELICELLA*, Fér.

guttata, Oliv.

Section *XEROGRASSA*, Monterosato.

escheriana, Mouss.

seetzeni, Roth.

Section *HELICOGENA*, Fér.

Section *HELIOMANES*, Moq.

figulina, Parr.

commeata, Mouss.

lucorum v. *onixiomica*, Bourg.

vi. ARABIA.

Like many of the preceding regions, Arabia has but a scanty molluscan Fauna. The bulk of the Helicoids show an intimate affinity with the Fauna of Asia minor. One species of *Lejeania* found in the south, however, connects this region with Abyssinia.

Family Zonitidae .	Genus HELICELLA , Fér.
Sub-family Zonitinae .	Section XEROCRASSA , Monterosato.
Genus VITRINA , Drap.	<i>beadlei</i> , Pils. Desert.
<i>gruneri</i> , Pfr.	Section HELIOMANES , Moq.
Genus ZONITES , Montf.	<i>derbentina</i> , Andrz. Oman.
<i>sabaea</i> , Mart. Menaha.	Section LEJEANIA , Anc.
Genus EUCONULUS , Reinh.	<i>leucosticta</i> , Mart. Menaha.
<i>eremias</i> , Melv. and Pons.	Genus HELIX , L.
Hadramaut.	Section EUPARYPHA , Hartm.
Family Helicidae .	<i>tohenica</i> , Bourg. Aden.
Group Belogona , v. Iher.	Makalla.
BEOGONA EUADENIA , Pils.	Section EREMINA , Pfr.
Genus LEUCOCHROA , Beck.	<i>desertorum</i> , Forsk. Arabia
<i>boissieri</i> , Charp. Arabia,	Petraea.
Petraea.	= <i>arabica</i> , Roth.
BEOGONA SIPHONADENIA , Pils.	<i>desertella</i> , Jick. Djeddah.

vii. PERSIA.

The principal contribution to our knowledge of the Persian Helicoids is by Prof. von Martens, who published the malacological results of Prof. Hausknecht's travels in Persia as well as Kurdistan, Mesopotamia and Syria. The entire molluscan fauna is essentially palaeartic, no Eastern Asiatic forms having been found. Dr. Westerlund described the material collected in North Persia by Keyserling and Bienert, and Mousson those collected by Dr. Sievers; Dr. Pohlig published the results of his own travels in North Persia; Prof. Boettger enumerated the shells procured by Dr. Radde's expedition to Transcaspia and Chorassan, and also those collected by Hans Leder and Otto Herz, while Issel catalogued the shells acquired during the Italian mission to Persia. The most recent additions are by Mr. E. A. Smith from the Urmi district, and Pfarrer Naegele who made considerable collections, the shells being described by himself and by Dr. Kobelt.

Family Zonitidae .	<i>annularis</i> v. <i>persica</i> , Boettg.
Sub-family Zonitinae .	<i>Shah-rud</i> .
Genus VITRINA , Drap.	Genus POLITA , Held.
Section OLIGOLIMAX , Fisch.	<i>herzi</i> , Boettg. Taesch.

- patuliformis, Boettg. Shah-rud. talyschana, Mart. Rescht ;
 v. calculiformis, Boettg. Astara.
 Chorassan. Genus HYGROMIA, Risso.
 Section GASTRANODON, Boettg. Section MONACHA, Fitz.
 siaretana, Boettg. aristata, Kryn. Mazenderan.
 Genus VITREA, Fitz Genus ACANTHINULA, Beck.
 lucida, Drap Section ZOOGENITES, Morse.
 cellaria, Müll. v. concinna, West. harpa, Say. Astrabad.
 Siaret, Chorassan. Genus VALLONIA, Risso
 caspia, Boettg. Astrabad. pulchella, Müll. Shamhala.
 Genus RETINELLA, Shutt. costata, Müll. Mazenderan.
 semisculpta, Mart Caspian. mionecton v. shamhalensis,
 persica, Boettg. Siaret, Chorassan. Rosen. Shamhala.
 Genus EUCONULUS, Reinh. Genus HELICIGONA, Fér.
 fulvus, Drap. Mazenderan. Section FRUTICOCAMPYLAEA, Kob.
 Family **Helicidae**. narzanensis, Kryn. Astrabad.
 Group **Belogona**, v. Iher. ravergiensis, v. persica, Boettg.
 BELOGONA SIPHONADENIA, Pils. Astrabad ; Ghilan.
 Genus HELICELLA, Fér. transcaucasica, Bayer. Mt.
 Section HELIOMANES, Moq. Elburs.
 derbentina, Andr. Astrabad ; Genus HELIX, L.
 Ghilan ; Salmas, Buschir. Section EUPARYPHA, Hartm.
 krynickii, Andr. Ispahan ; subdentata, Fér.
 Ashabad. Section LEVANTINA, Kob.
 millepunctata, Boettg. Irak dschulfensis, Dub. Araxes Valley.
 Adschmi ; Shah-rud. = djulfensis, Mouss.
 Section HELICELLA, s.s. mazenderanensis, Nev. Mazeran-
 aberrans, Mouss. deran.
 Section CANDIDULA, Kob. ghilanica, Mouss. Ghilan.
 acutistria, Boettg. Koyun urmiensis, Naeg. Salmas ;
 Daghi. Urmia.
 kotschy, Pfr. Section TACHEA, Leach.
 langloisiana, Bourg. Schiraz. atrolabiata, Kryn. Ghilan.
 parableta, Boettg. Urmia ? v. staupolitana, Schin.
 profuga, Schm. Teheran. Ghilan, Rastemabad.
 Section JACOSTA, Gray. v. elegans, Issel. Ghilan.
 crenimargo v. obtusior, Mouss. v. lenkoreana, Mouss.
 Salmas. Rescht ; Astara.
 Section THEBA, Risso. Section HELICOGENA, Fér.
 arpatschiana, Mouss. Salmas. lucorum, v. taurica, Kryn.
 pisiformis, Pfr. Astrabad ; Siaret ; North Persia.
 Shah-rud. figulina, Parr. Seir, Urmia.
 v. atypa, Boettg. Astrabad. salomonica, Naeg. Urmia.
 syriaca, Ehrb. Ghilan.

CURRENT LITERATURE.

Nierstrasz, H. F.—The Solenogastres of the Siboga-Expedition. Siboga-Expeditie. Monog. xlvii. Leyden: 1902. pp. 46, pls. i-vi.

One of the most important memoirs of recent years, upon the structure and classification of the Solenogastres, is that just published in connection with the "Siboga" Expedition.

Hitherto only two species were known from the East Indian Archipelago viz. those described by Thiele in 1898—*Notomenia clavigera* and *Proneomenia australis*. The 'Siboga' expedition has been extremely fortunate, bringing back no less than 65 specimens, which are contained in 8 genera, of which 4—*Dinomenia*, *Proparamenia*, *Hemimienia*, and *Cyclomenia*—are new. All the species, twelve in number, are also new.

The genus *Dinomenia* is characterised by the presence of a thick cuticle, in which are many layers above each other of hollow, pointed spicula. The papillae are numerous. There is a dorso-terminal sense organ present, three ventral folds; two separate, unramified, tubular salivary glands; and cloacal ducts with vesicular appendages. There are no gills and the radula is distichous. Two species are described, *D. hubrechtii*, and *D. verrucosa*. The genus is regarded as related to *Pronomenia* because of the integument, and to *Paramenia* on account of the distichous radula.

The genus *Proparamenia* has also a thick cuticle with many layers of pointed spicula, and numerous papillae. There is no dorsal sense organ, and no copulation spicula. There are 3 ventral fold; 2 separate, ramified salivary gland; 2 vesicular receptacula seminis; and a cirlet of gills in the cloaca. The radula is monoserial.

Hemimienia while closely related to *Neomenia*, differs from it in the structure of the integument, which has a thin cuticle, with flat imbricated spicula, and no papillae. It is very rightly regarded as a transition form, and as such may be compared with *Paramenia*, Pruvot.

Cyclomenia is another similar genus, exhibiting relationship to *Proparamenia* on the one hand and *Paramenia* on the other.

The author divides the *Neomeniidae* into two groups, viz.: A. Those forms possessing a thick cuticle, with numerous pointed, hollow spicula in different layers, and a large number of hypodermal papillae, and B. Those forms with a thin cuticle, covered with a layer of flat, imbricated spicula, and no hypodermal papillae. He further points out, that taking the radula as a basis of classification, we have the family divided into three groups, viz. *a*. Forms with polystichous radula, *b*. Forms with distichous radula, and *c*. Forms without a radula. It further appears that there is a correspondence between groups A and *a*, and groups B and *b*, with certain exceptions such as *Dondersia* and *Macclomenia*.

If we might suggest a slight improvement upon this, it would be as follows:

Group i.—**Neomeniatina** for group A of Nierstrasz.

ii.—**Parameniatina** for intermediate forms.

iii.—**Metameniatina** for group B of Nierstrasz.

The author then discusses in some detail the relationships of the known genera of *Neomeniidae*, which are summarised in diagrammatic form.

In additions to the conclusions stated above, Dr. Nierstrasz has set forth in great detail, with a wealth of illustration, a host of anatomical facts on the structure of the new genera and species, which in the present state of our

knowledge, cannot fail to be of the greatest importance. While it is very interesting to guess at the position and possible origin of the Aplacophora, it is much more important that more forms should be worked out, in order that there may be some foundation for, what at present, can only be regarded as interesting speculation. The generalisations in this memoir, do not go beyond the point warranted by the result obtained. It is a solid contribution, and marks an important advance in our knowledge of these interesting molluscs.—W.E.C.

Hedley, C.—Studies on Australian Mollusca. Pt. v. Proc. Linn. Soc. N.S.W., 1902, pp. 700-708, pl. xxxiv.

The following new species are described and figured: *Columbella flexa*, *Puncturella galerita*, *Philina trapezia*. Figures of various other species are given, and valuable notes on their nomenclature and classification.

Drummond, Isabella, M.—Notes on the development of *Paludina* [*Vivipara*] *vivipara*, with special reference to the Urinogenital organs and theories of Gasteropod torsion. Quart. Journ. Micro. Sci., 1902, vol. 46, pp. 97-143, pls. 7-9.

Miss Drummond has studied the development of the urinogenital organs of *Vivipara*, and arrives at the following conclusions: the functional kidney of the adult belongs, as von Erlanger has already shown, to the left side of the body and the right is not lost, as described by von Erlanger, but persists as the genital duct. An indication of the original coelomic connection between gonad and kidney, is present in the course of development. The gonad arises as a solid proliferation of the morphologically dorsal wall of the pericardium. It arises from the original left side, and shows no sign of a paired origin.

The authoress then briefly summarises the theories of Bütschli, Plate, Pelseener, Amaudrut and Boutan on Gasteropod torsion, and divides such theories into two classes, viz. i. Those which view the present position of the pallial complex as due to a forward movement along the right side of the body, which resulted from greater growth of the left side than of the right. ii. Those which view the present position of the pallial complex as due to a ventral flexion, followed by a vertical rotation of the whole visceral hump upon the head. The evidence for the second of these views seems greater than that for the first.

Dautzenberg, Ph.—Description de deux Bulimulidés nouveaux provenant du Pérou. Journ. de Conchyl., 1901, vol. xlix, pp. 213, 214, pl. vii, fig. 1-4.

The two species described and figured are *Peronaeus iocosensis* and *P. bacri*.

Dautzenberg, Ph. et Bernier, J.—Description d'un Bulimidé nouveau, provenant de la Nouvelle Calédonie. Ibid., pp. 215, 216, pl. vii, fig. 5, 6. *Leucocharis porphyrochila*.

Dautzenberg, Ph.—Sur deux déformations observées chez des *Placostylus* de la Nouvelle Calédonie. Ibid., pp. 217, 218, pl. vii, fig. 7, 8.

The author describes and figures two interesting monstrosities of *Placostylus porphyrostomus*, Pfr., and *P. fibratus*, Martyn.

Dollfus, G. et Dautzenberg, Ph.—Nouvelle list des Pélécytopodes et des Brachiopodes fossiles du Miocène moyen du Nord-Ouest de la France. Ibid. pp. 229-280.

The authors' catalogue 185 species of molluscs and various varieties, the following species are new: *Corifia boisteli* and *Prasina lecointrae*.

Dautzenberg, Ph.—Descriptions de coquilles nouvelles provenant de la Nouvelle-Calédonie. Ibid., pp. 299-302, pl. viii.

The author figures and describes *Rhytida bernieri*, *Leucocharis porphyrochila*, Dautz. and Bernier var. *rubicunda*, and *Placostylus houailouensis*, all of which are new.

Dautzenberg, Ph.—Descriptions de coquilles nouvelles rapportées du Pérou par M. Baer. Ibid., pp. 306—313, pl. ix.

The new species are *Helix (Labyrinthulus) bacri*, *Drymaeus jousseaumei*, *D. scoliodes*, *Bulimulus (Alaxus) huayabocensis*, and *Amfullaria bacri*.

Dautzenberg, Ph.—Sur une nouvelle variété de *Chlamys opercularis*. Ibid., p. 340.

Wagner, A.—Neue Formen und Fundorte des Genus *Pomalias* Studer. Ann. d. k. k. naturhist. Hofmus., 1901, Bd. xvi, pp. 63-65.

The new forms are *P. (Aurilus) gracilis* v. *gracillima*, nov., and *P. (Pleuropoma) roscoli*, n. sp.

Sturany, R.—Diagnosen neuer Landschnecken aus der Hercegovina. Ibid., pp. 65-67.

The author gives descriptions of the following new species: *Campylaea affelbecki*, *C. pentheri*, *Xerophila rhabdota*, and *Clausilia (Medora) matulici*.

Sturany, R.—Neue Inselformen dalmatinischer Landschnecken. Ibid., pp. 68, 69, figs. 1-4.

Dr. Sturany describes and figures the following interesting species, viz.: *Campylaea insolita*, Zglr. v. *lagostana*, *Buliminus brunnicensis*, and *B. pelagosanus*.

Sturany, R.—Ueber eine neue *Ennea* aus Südafrika. Ibid., pp. 69-71, fig. *Ennea fremnodes*, n. sp.

Sturany, R.—Ueber eine neue Höhlenschnecke. Verhandl. d. k. k. zool-bot. Gesell. Wien, 1901, pp. 761, 762, 3 figs. *Spelaeoconcha paganacltii*, n. sp.

Sturany, R.—Mittheilungen über Gehäuseschnecken aus dem Peloponnes. Ibid., 1902, pp. 402-409, figs 1-4.

Sturany, R.—Ueber die Verbreitung von *Cylindrus obtus*, Drap. Nachr. d. Deutsch. Malak. Gesell., 1902, pp. 9-13.

Sturany, R.—Beitrag zur Kenntniss der kleinasiatischen Mollusken fauna. Sitz. d. k. Akad. d. Wiss. Wien, 1902, Bd. cxi, pp. 123-140, T. i, ii.

In all 53 species and varieties are recorded, of which the following are new: *Helix (Xerophila) dicheshemena*, *H. (Xer.) pyramidata*, Drp. v. *platiensis*, *Buliminus (Chondrula) werneri*, and *Unio desceclus*, Drouët, f. *pusacensis*.

Hoyle, William E.—British Cephalopoda: Their Nomenclature and Identification. Journ. Conch., 1902, vol. 10, pp. 197-206.

An authoritative statement on the nomenclature of the British Cephalopoda has long been desired, and Mr. Hoyle's interesting and useful paper will be heartily welcomed by all malacologists. The most important change perhaps, is the adoption of the names *Polyfus* and *Moschiles* for the well-known genera *Octopus* and *Eledone*. A useful key for the determination of British forms, and a Bibliography complete the paper.

Hoyle, William E.—The Luminous Organs of *Pterygioteuthis margaritifera*, a Mediterranean Cephalopod. Mem. Manchester Lit. and Phil. Soc., 1902, vol. xlvi, pp. 1-14, figs. 1-6.

Mr. Hoyle finds that the luminous organs of *Pterycioteuthis margaritifera* may be divided into four sets : i. Ocular, ii. Siphonal, iii. Branchial, and iv. Abdominal. Of the first set there are nine on each eyeball, their arrangement is irregular and there are marked differences in size ; the second set are two in number, they are situated just below the hinder margin of the siphon ; the third set are also paired, and lie at the root of each gill ; while the fourth set are divided into a group of three lying transversely in the mantle cavity, close to the anterior margin of the nidamental gland, and two lying one in front of the other in the posterior end of the mantle cavity in the median line. As regards structure, the ocular and siphonal are the most complex, the branchial and abdominal being less so. Generally they recall the structure of the luminous organs in other cephalopoda, described by this and other writers.

Frandsen, P.—Studies on the Reactions of *Limax maximus* to Directive Stimuli. Amer. Ac. Arts and Sci., 1901, vol. xxxvii, pp. 185-227, 22 figs.

The behaviour of any organism toward artificial stimulation, the author remarks, is probably always largely dependent on its normal environmental conditions. The long action of these conditions, assisted, perhaps, by the animal's own efforts, conscious or unconscious, to adapt itself to them, finally results in certain habits and instincts. The process of adaptation being extremely slow, organisms are strongly averse to great or sudden changes in their environment and incapable of adjusting themselves to them. As a rule, then, we should expect animals to seek those conditions of light, heat, moisture, and other physical and chemical influences, which are most in accordance with those to which they are normally subjected.

In the present paper the author very carefully details his study of the locomotor responses of *Limax maximus* to three kinds of stimuli ; those of touch, gravity and light ; the chief results are as follows : Under ordinary circumstances, the slug is negatively thigmotactic. On an inclined *glass plate*, all slugs give a geotactic response, in some it is a decided positive, in others a markedly negative response ; a few are somewhat indifferent. The quality and quantity of the slime secreted, and the relative proportions of the length of the anterior and posterior regions of the animal's body, are the two main factors in accounting for the different responses. The animals are markedly phototactic, and as in geotaxis, there are individual differences. To strong light, slugs, on the average give a strong negative response ; the degree of response gradually diminishing with the reduction in the strength of the stimulus. They are responsive to light stimuli covering a wide range of intensities. In the dark, other directive stimuli being eliminated, the slug tends to travel in a spiral of gradually increasing radius, almost invariably producing one or more loops. These responses to touch, gravity, and light-stimuli emphasise the fact, that it is an animal's normal environmental conditions which chiefly determines its general response to artificial stimuli. The variations in precision and character of this general response are mainly dependent on certain internal factors, such as the food conditions of the animal, its fear of an enemy, and desire to escape captivity.

EDITOR'S NOTES.

Owing to the want of space, obituary notices of the late Alexander Kowalevsky, Oliver Collett, and J. G. Cooper are held over until the December issue.

THE
JOURNAL OF MALACOLOGY.

No. 4.

DECEMBER 24th, 1902.

VOL. IX.

DESCRIPTION OF A NEW SPECIES OF GOMPHINA
FROM NEW ZEALAND.

BY EDGAR A. SMITH, F.Z.S.

Mr. William H. Webster of Auckland, New Zealand, has very kindly presented to the British Museum specimens of the Bivalve about to be described, also an oyster attached to part of a *Haliotis*, and a specimen of the rare *Unio (Diplodon) websteri* of Simpson, from Waiuku, New Zealand. The oyster is only about 16 millim. in diameter, and may very possibly be merely the young state of a fairly large species. As it possesses no striking features, and considering the variability of oysters generally, it seems to me unadvisable, at all events until more material is available, to attempt to name or describe it.

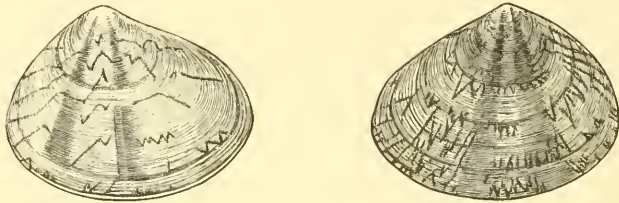
Gomphina maorum, n. sp.

Testa aequivalis, inaequilateralis, solidiuscula, ovato-trigonalis, medio-criter convexa, alba, fusco biradiata, lineisque zigzag-formibus fuscis irregulariter picta, ad umbones plus minus rufescens; latus anticum acute rotundatum, posticum brevius; margo dorsi posterior valde descendens, parum arcuatus, anterior longior, minus obliquus, vix

curvatus, ventralis late arcuatus; umbones mediocriter prominentes, fere contigui, postmediani; valvae concentrice fortiter striatae, haud lunulatae intus albae, in medio rufo plus minus saturatae, ad marginem laeves; cicatrix antica ovalis, posterior brevior, magis rotundata; sinus pallii parvus, minime profundus.

Longit. 16 millim., alt. 13, diam 8.

Both of the examples of this species which I have examined, exhibit two brown rays, one down the middle of the valves and the other posterior to it, the rest of the surface being marked with irregular wavy or zigzag lines, and they are slightly reddish towards the umbones.

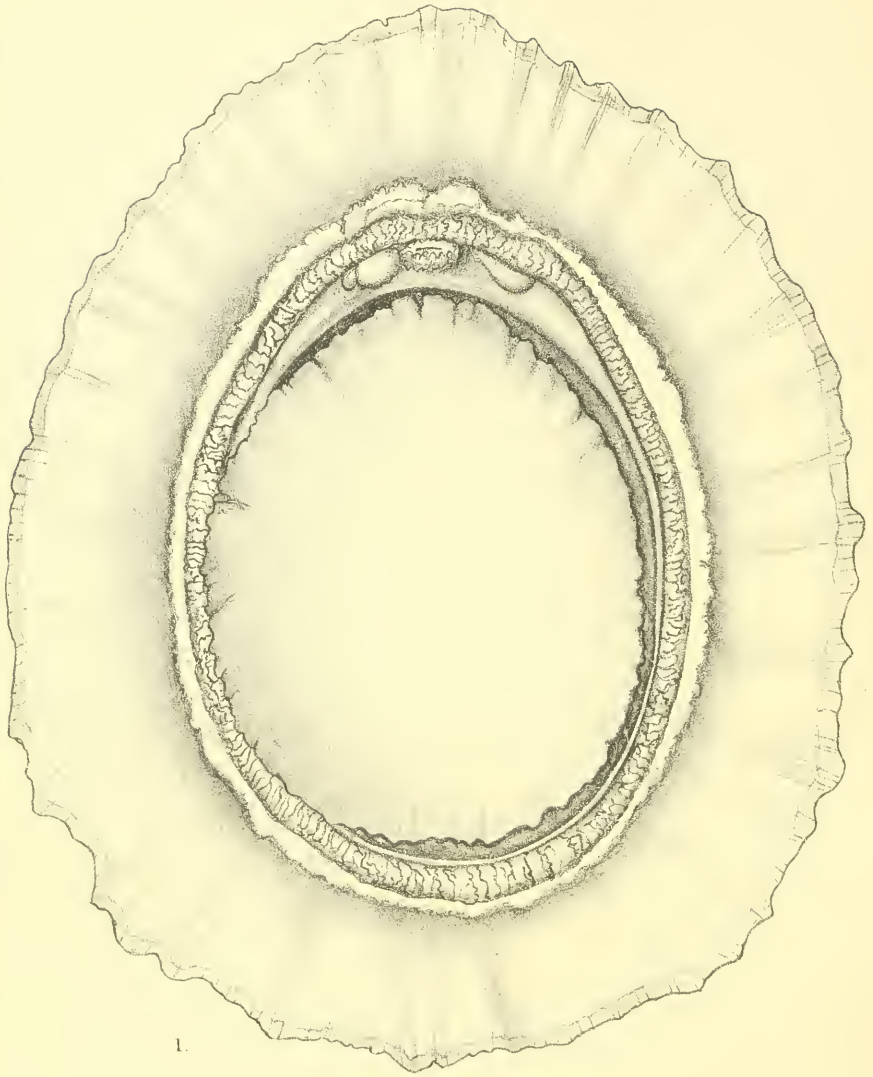


The species is at once separable from *Gomphina undulosa*, Lamarck*, by the difference of form and the different position of the beaks and the relative difference in the extent of the anterior and posterior ends. In *G. undulosa* the beaks are slightly antemedian, whereas in the present species they are decidedly postmedian. The extent of the valves in front of and behind the umbones, is consequently reversed in the two forms. The style of colouration, the dentition of the hinge and the character of the scars and pallial line are alike in both. *G. moerchi* of Angas† is a more convex and triangular shell and subrostrate posteriorly. This subrostration, however, is only noticeable in the adult form, for young examples are quite obtuse behind. The locality of *G. moerchi* was unknown at the time it was described, but examples, received from the late M. Robillard, show that it occurs at the Mauritius. *G. undulosa* has been recorded from the same locality.††

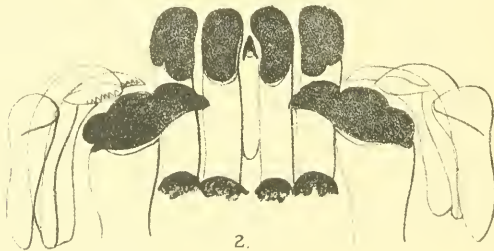
* See Pfeiffer, Conch. Cab., ed. 2, *Veneracea*, p. 186, pl. xxiii, fig 3; Reeve, Conch. Icon., vol. xiv, *Venus*, pl. xxv, figs. 126a—b.

† Proc. Zool. Soc. London, 1872, p. 611, pl. xlii, fig. 7.

†† Martens in Moebius's Beiträge zur Meeresfauna der Insel Mauritius und des Seychellen-Mollusken, p. 326.



1.



2.

H Suter del.

Huth, lith^r London.

PATELLA KERMADECENSIS, PILSBRY.

ON THE SYSTEMATIC POSITION OF *PATELLA* *KERMADECENSIS*, PILSBRY.

By HENRY SUTER.

(Plate viii.)

Described and figured in 1894, ⁽¹⁾ the soft parts of this mollusc have remained unknown. Some two years ago Mr. Shakespear, of Little Barrier Island, on a trip to the Kermadecs, kindly procured for me some specimens with the animal, and it was my intention of giving an account of the anatomy of this large and beautiful species; but having only a very limited time for scientific research at my disposal, I had to abandon the idea, and am now publishing only a few notes which may help to settle the systematic position of this mollusc.

The accompanying figure (Pl. viii, fig. 1.) of the underside of *P. kermadecensis*, drawn in natural size from a spirit specimen, shows that the branchial cordon is complete, and not interrupted in front.

The radula is rather short, and the formula is $3 \left(\begin{smallmatrix} 2 & 1 & 2 \\ 1 & & 1 \end{smallmatrix} \right) 3$. Figure 11 represents a row of teeth, and hardly needs an explanation. It may, however, be mentioned that the short rhachidian tooth bears two small sharp side-cusps on its reflected portion. The radula contains about 85 rows of teeth.

These few facts would, it seems to me, suggest that the species may be best classed under sect. *Ancistromesus*, Dall, of the sub-genus *Patella*, L. (s.str.)

New Zealand, Auckland, 10, Oct. 1902.

EXPLANATION OF PLATE VIII.

Fig. 1. Under side of *Patella kermadecensis*, Pilsbry, from spirit specimen. Natural size.

Fig. 2. Teeth of radula, magnified.

1. Proc. Acad. Nat. Sci. Philadelphia, 1894, pp.208-212, Pls. vii-viii.

A CLASSIFIED LIST OF THE HELICOID LAND SHELLS OF ASIA.

(PART IV*)

BY G. K. GUDE, F.Z.S.

viii. ARMENIA.

The Helicoids of Armenia all belong to the Palaearctic Fauna. The *Helicidae* are represented only by *Belogona Siphonadenia*, viz.: *Helicella*, *Helicigona*, and *Helix*. The *Zonitidae* produce *Vitrina*, *Retinella* and *Vitrea*.

The earliest record of Armenian shells is by Hohenacker (1837), collected by himself. Subsequent collections were made by: Sievers, described by Mousson; Filippi, enumerated by Issel; Schneider; Leder, catalogued by Boettger; Huet du Pavillon, published by Mortillet (1854); and Brandt, recorded by von Martens (1880).

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Family Zonitidae.</p> <p>Sub-family Zonitinae, Pils.</p> <p>Genus VITRINA, Drap.
 <i>sieversi</i>, Mouss.</p> <p> = <i>komarowi</i>, Boettg. Glen-
 owka, N.W. of Goktscha
 Lake.</p> <p>Genus VITREA, Fitz.
 <i>transiucida</i>, Mort.</p> <p>Genus RETINELLA, Shutt.
 <i>cyprea</i>, Pfr. Baibout.</p> <p>Family Helicidae.</p> <p>BELOGONA SIPHONADENIA, Pils.</p> <p>Genus HELICELLA, Fér.</p> <p>Section HELIOMANES, Moq.
 <i>variabilis</i>, Drap. Ispir.
 <i>derbentina</i>, Andr. Borschom;
 Abas Tieman.</p> <p>Section CANDIDULA, Kobelt.
 <i>striata</i>, Müll. Baibout, between
 Erzeroum & Trebizond.</p> <p>Section THEBA, Risso.</p> | <p> <i>arpatschaiana</i>, Mouss. var. <i>sew-</i>
 <i>anica</i>, Mart.</p> <p> Is. Sewanga, Goktscha
 Lake.</p> <p> <i>carthusiana</i>, Müll. Baibout.
 <i>globula</i>, Kryn. v. <i>nana</i>, Boettg
 Elenowka.</p> <p>Genus HELICIGONA, Fér.</p> <p>Section FRUTICOCAMPYLAEA,
 Kobelt.
 <i>joannis</i>, Mort. Erzeroum.
 = <i>dumonti</i>, Mort.
 v. <i>major</i>, Mort.
 <i>pratensis</i>, Pfr. v. <i>depressa</i>,
 Kobelt. Azchur, Upper
 Kur.
 v. <i>delabris</i>, Mouss.</p> <p>Genus VALLONIA, Risso.
 <i>costata</i>, Müll. Michailowo.
 <i>pulchella</i>, Müll. Michailowo.</p> <p>Genus HELIX, Linné.</p> <p>Section HELICOGENA, Fér.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

* See ante p. 97.

aspersa, Müll.	Trebizond.	and Goktscha.
pomatia, L.	Trebizond.	= obtusata, Zglr.
ligata, Müll.	v. gussoneana,	= obtusalis, Zglr.
	Shutt. Tortoum.	nordmanni, Parr. Achalzych
melanostoma, Drap	v. candida,	Tortoum.
	Rossm.	Section TACHEA, Leach.
vulgaris, Parr.	Between Tiflis	atrolabiata, Kryn. Borschom.

ix. TRANSCAUCASIA.

Repeated explorations of this district, principally by German travellers, have enabled us to form a fairly comprehensive survey of its molluscan fauna

The earliest extensive collection is that made by Dr. Alexandre Schläfli, recorded by Mousson in two contributions (Coquilles terrestres et fluviatiles recueillies dans l'orient par le Dr. Alexandre Schläfli, 1859, and 1863). Professor Boettger, however, is the chief contributor, having published no less than twelve treatises in : Jahrbüchern der Deutschen Malakozoologischen Gesellschaft for 1879, 1880, 1881, 1883, and 1886 ; Bericht der Senckenbergischen Naturforschenden Gesellschaft for 1884 and 1889 : and Radde's Fauna und Flora der Südwestlichen Kaspigebietes (1886), based on the results of Hans Leder's and O. Retowski's explorations. Oscar Schneider published the results of his travels in Naturwissenschaftliche Beiträge zur Kenntniss der Kaukasus Länder (1878), and Klika in Sitzungs Berichte der Kön Bohemischen Gesellschaft der Wissenschaften, 1893, no. xlv.

As might be expected the relations of the Transcaucasian molluscan fauna are with South Russia, Armenia, and Persia on the one hand, and on the other with Asia Minor.

Family Zonitidae.	Sub-genus OLIGOLIMAX, Fisch.
Sub-family Zonitinae, Pils.	annularis, Stud. Tiflis ; Elisa-
Genus DAUDEBARDIA, Hartm.	betpol.
siewersi, Boettg.	= subglobosa, Mich.
lederi, Boettg. Kutais.	siewersi, Mouss. Kutais ; Tiflis ;
jetschini, Wagn. Psirsk.	Araxis Region.
Genus VITRINA, Drap.	= komarowi, Boettg.
Sub-genus PHENACOLIMAX, Stab.	Sub-genus TROCHOVITRINA,
pellucida, Müll. Manglis ;	Schacko.
Mamoutli ; Kutais ;	subconica, Boettg. Kasbeck.
Elisabetpol.	lederi, Boettg.
globosa, Boettg. Ibatani.	subcarinata, Boettg. Lenkoran.

- Genus *RETINELLA*, Shutt.
duboisii, Charp. Sukhum ;
 Psirsk ; Kutais ; Gilat ;
 Elisabetpol.
 = *approximans*, Parr.
suanetica, Boettg. Suanetia.
sucinacea, Boettg. Abkhasia.
elegans, Boettg. Lenkoran.
mingrelica, Mouss. Kutais ;
 Sukhum ; Psirsk ; Poti.
 v. *intermissa*, Kob.
selecta, Mouss. Kutais ; Suk-
 hum ; Lenkoran.
reticulata, Boettg.
 = *mingrelica*, Boettg. non
 Mouss.
filicum, Kryn. Lenkoran.
koutaisiana, Mouss. Kutais ;
 Borschom ; Batoum.
 = *cyprius*, var. Mouss.
 v. *transitans*, Boettg.
difficilis, Boettg. Batoum.
 v. *discrepans*, Retowski.
horsti, Boettg. Maikop ; Dach-
 owskaja ; Chumischky.
- Genus *AEGOPSINA*, Kob.
pontica, Boettg. Between
 Sukhum and Poti.
- Genus *VITREA*, Fitz.
cellaria, Müll. Akstafa ; Kutais.
angyrostropha, Boettg. Kutais ;
 Poti ; Elisabetpol.
contortula, Kryn. Batoum ;
 Borschom ; Oschten
 Fischt ; Lenkoran ;
 Kutais ; Poti.
subeffusa, Boettg. Borschom ;
 Manglis ; Mamoutli ;
 Lenkoran ; Oschten
 Fischt ; Mount Guk.
 = *effusa*, Boettg.
 v. *daghestana*, Boettg. Kaba.
- v. *depressa*, Boettg. Helenen-
 dorff.
pygmaea, Boettg. Manglis.
sorella, Mouss. Rion.
- Genus *POLITA*, Held.
pura, Alder. Manglis ; Elisa-
 betpol.
 v. *lenticularis*, Held. Bor-
 schom ; Lenkoran.
hammonis, Strom. Borschom.
petronella, Charp. Oschten
 Fischt.
 v. *subnitidosa*, Mouss.
 Mamoutli.
 = *jaccetanica*, Boettg.
suturalis, Boettg. Batum ;
 Suram Mountains.
caspia, Boettg. Talysh District.
translucida, Mort.
deciapiens, Boettg. Shagh Dagh
komarowi, Boettg. Between
 Sukhum and Poti.
derbentina, Boettg. Derbent ;
 Helenendorff.
- Genus *EUCONULUS*, Reinh.
fulvus, Drap. Borschom ; Kutais ;
 Manglis ; Kasbek.
 Batum ; Elisabetpol ;
 Oschten Fischt.
- Sub-genus *CONULOPOLITA*, Boettg.
raddei, Boettg. Between
 Sukhum and Poti.
- Sub-family **Ariophantinae**.
- Genus *ZONITOIDES*, Lehm.
nitida, Müll, Elisabetpol ;
 Sukhum ; Borschom ;
 Michailowo.
- Family **Endodontidae**.
- Group **Polyplacognatha**.
- Genus *PUNCTUM*, Morse.
pygmaeum, Drap. Borschom ;
 Manglis ; Elisabetpol.

- Group **Haplogona**.
 Genus PYRAMIDULA, Fitz.
 Sub-genus PYRAMIDULA, s.s.
 rupestris, Drap. Germab ;
 Borschom ; Kutais ;
 Elisabetpol.
 v. saxatilis, Hartm. Borschom.
 Section PATULASTRA, Pfr.
 lederi, Boettg. Lenkoran.
 Section GONYODISCUS, Fitz.
 ruderata, Stud Borschom ;
 Elisabetpol.
 v. gorktschaana, Mouss.
 Borschom ; Gorktschak.
 Family **Helicidae**.
 BELOGONA EUADENIA, Pils.
 Genus EULOTA, Hartm.
 Section EULOTA, s.s.
 fruticum, Müll. Elisabetpol.
 BELOGONA SIPHONADENIA, Pils.
 Genus HELICELLA, Fér.
 Section HELIOMANES, Moq.
 variabilis, Drap. Poti ; Novo
 Rossizk.
 vestalis, Parr. Borschom.
 krynickyi, Andr. Wladikawkas ;
 Baku ; Lenkoran.
 = *babondubi*, Parr.
 = *theodosiae*, Cless.
 v. minor. Sukhum ; Novo
 Rossizk.
 derbentina, Andr. Derbent ;
 Akstafa ; Batoum ; Mang-
 lis ; Kers ; Baku ; Kutais ;
 Tiflis ; Borschom ; Poti.
 v. caucasica, Parr.
 v. isomera, Boettg. Lenkoran.
 v. suprazonata, Mouss.
 Delizan.
 v. anprazonata, Mouss.
 Dagomys.
 Section CANDIDULA, Kob.
 acutistria, Boettg. Tiflis.
 = *crenimargo*.
 v. obtusior, Mouss.
 parableta, Boettg. Araxis.
 profuga, Schm. Gudaur.
 Section JACOSTA, Gray.
 crenimargo, Kryn. Sardarabad.
 = *piatigorskiensis*, Bayer.
 Section THEBA, Risso.
 arpatschaiana, Mouss. Arpats-
 chai ; Daralaghez.
 flaveola, Kryn. Between Suk-
 hum and Poti ; Psirsk.
 flavolimbata, Boettg. Suanetia.
 holotricha, Boettg. Psirsk.
 pachnodes, Boettg. Uetsch
 Deré.
 pisiformis, Pfr. Lenkoran ;
 Batoum ; Elisabetpol.
 pseudoglobula, Mouss. Kapud-
 schiz.
 selecta, Klika. Borschom ;
 Kutais ; Manglis ; Gilat ;
 Delizan ; Elisabetpol ;
 Araxis Region.
 = *globula*, Kryn.
 septemgyrata, Mouss. Kutais ;
 Kers.
 strigella, Drap. Wladikawkas.
 transcaspia, Boettg. Kopet
 Dagh.
 Section PLATYTHEBA, Pils.
 prometheus, Boettg. Rion
 District.
 jasonis, Dub. Nikolakevi.
 Genus HYGROMIA, Risso.
 Section MONACHA, Fitz.
 aristata, Kryn. Kutais ; Bor-
 schom ; Poti.
 carascaloides, Bourg. Dag-
 omys ; Psirsk ; Mount
 Guk.

- circassica*, Charp. Borschom ;
 Batum ; Sukhum ;
 Psirsk, Elisabetpol.
 = *colchica*, Bayer.
euages, Boettg. Sukhum ;
 Psirsk ; Oshchen Fischt.
frequens, Mouss. Kutais ;
 Sukhum ; Batoum.
fruticola, Kryn.
schuberti, Roth.
 Section FRUTICICOLA, Held.
granulata v. *epirotica*, Mouss.
 Kasikoparan.
hispidata v. *hispidosa*, Mouss.
 Akstafa.
revelata v. *occidentalis*, Recl.
 Somketh.
sericea v. *caucasica*, Mouss.
 Genus ACANTHINULA, Beck.
aculeata, Müll. Borschom ;
 Elisabetpol ; Lenkoran ;
 Helenendorf.
 Genus VALLONIA, Risso.
pulchella, Müll. Borschom ;
 Batum ; Sukhum,
 Elisabetpol ; Poti.
costata, Müll. Borschom ;
 Elisabetpol.
mionecton, Boettg. Agh Dagh.
 Genus HELICIGONA, Fér.
 Section FRUTICOCAMPYLAEA, Kob.
appeliana, Mouss. Kislovodsk.
 v. *mediata*, West. Novorossik.
narzanensis, Kryn. Elisabetpol ;
 Delizan ; Mamoutli ;
 Kasbeck.
 v. *suanetica*, Boettg. Caucasus
 v. *macromphala*, Boettg.
 v. *cyclothyra*, Boettg.
 v. *solidior*, Mouss.
pratensis, Pfr. Borschom ;
 Kutais ; Elisabetpol.
 = *bayerii*, Parr.
 v. *depressa*, Kob. Borschom.
 v. *solidior*, Kob.
joannis, Mort. Batoum.
 = *dumonti*, Mart.
pontica, Boettg. Sukhum.
nymphaea, Dub. Nikolakevi.
ravergiensis, Fér. Borschom ;
 Manglis ; Lenkoran ;
 Elisabetpol ; Murut.
 = *limbata*, Kryn.
 = *caucasica*, Pfr.
 = *ravergii*, Kryn.
 = *ravergieri*, Kryn.
 v. *transcaucasica*, Mouss.
 Helenendorf ; Delizan.
phaeolaema, Boettg. Shagh
 Dagh.
eichwaldi, Pfr. Borschom ;
 Kasbeck.
 v. *daghestana*, Parr.
armeniaca, Pfr. Kasbeck ;
 Elisabetpol.
 = *ziegleri* v. *airumia*, Siem-
 ashko.
 Genus HELIX, L.
 Sub-genus LEVANTINA, Kob.
djulfensis, Dub. Djulfa ;
 Ordubad.
 = *dschulfensis*.
ceratomma, Pfr.
 Sub-genus OTALA, Schm.
vermiculata, Müll.
 Sub-genus TACHEA, Leach.
atrolabiata, Kryn. Borschom ;
 Kutais ; Poti ; Sukhum ;
 Elisabetpol.
 = *calligera*, Dub.
 v. *stauropolitana*, Schum.
 Sukhum ; Mount Guk.
 v. *nemoraloides*, Mart.
 Kutais.

- | | |
|-----------------------------------------------------|------------------------------------------------------------|
| v. lenkorana, Mouss. Lenkoran. | hum ; Elisabetpol. |
| v. unicolor. Lenkoran. | v. taurica, Kryn. Elisabetpol ; Lenkoran. |
| v. pallasii, Dub Imeretia. | philibinensis, Friv. Georgia. |
| vindobonensis, Fér. | vulgaris, Parr. Kutais ; Mount Guk ; Kur District. |
| = austriaca, Mühl. | = obtusalis, Zglr. |
| Sub-genus HELICOGENA, Fér. | nordmanni, Parr. Borschom ; Kutais ; Agkar ; Kur District. |
| buchi, Dub. Tiflis ; Marienfeld ; Chula ; Imeretia. | christophi, Boettg. Adschania. |
| v. martensi, Boettg. | raddei, Boettg. Lenkoran. |
| lucorum, L. | |
| v. euphratica, Mart. Suk- | |

x. ASIA MINOR.

A. MAINLAND.

Our knowledge of the Mollusca of Asia Minor dates as far back as 1839, when a collection of these creatures was made by Dr. Erdl and Dr. Roth, which was described by the latter in "Molluscorum species, Dissertatio Inauguralis." Other contributions were made by Mousson (Coquilles terrestres et fluviatiles recueillies par le Prof. Bellardi, 1854); Pfeiffer, in Malak. Blätter, 1857 ; Issel, in Ann. Mus. Civ. Genova, 1877 ; Naegeli, in Nachrbl. Deutsch. Malak. Gesellsch., 1894 ; and quite recently by Sturany, in Sitz. Ber. K. Akad. Wiss., 1902, cxi.

One of the most striking features of the Molluscan fauna of this region is the number of species of *Zonites*, which further south are replaced by the genus *Leucochroa*.

The occurrence of *Vitrina conoidea*, Mart., on Mount Olympus in Asia Minor, as recorded by Bourguignat, ⁽¹⁾ and confirmed by Sturany ⁽²⁾ is certainly remarkable. The shell was originally discovered in Turkestan, and if the Olympus specimens are correctly identified, the species may be assumed to exist in other places in the intervening countries ; for the absence of intercourse would discountenance the theory of introduction to the one place or the other.

Family **Zonitidae**.

? conoidea, Mart. Olympus.

Sub-family **Zonitinae**. Pils.

Genus **VITREA**, Fitz.

Genus **VITRINA**, Drap.

cellaria, Müll. Trebizond.

sieversi, Mouss. Tokat.

diaphana, Stud. Trebizond ;

= komarowi, Boettg.

Reduktaleh.

1. Descr. nouv. Genre Gallandia, 1880, p. 8.

2. Sitz. Ber. Kais. Akad. Wiss., 1902, Bd. cx1, p. 2.

- crystallina, Müll. Reduktaleh. Is. Meis.
 lucida, Drap. Reduktaleh. Family **Endodontidae**.
 hydatina, Rossm. Smyrna ; Sub-family **Endodontinae**.
 Samsun ; Troas. Genus **PYRAMIDULA**, Fitz.
 samsunensis, Retowski. Sub-genus **GONYODISCUS**, Fitz.
 Samsun. erdelli, Roth. Is. Prinkipo.
 Beikos.
 Genus **POLITA**, Held. Family **Helicidae**.
 crenimargo, Retowski. Risā. **BELOGONA EUADENIA**, Pils.
 nitidissima, Mouss. Samsun ; Genus **LEUCOCHROA**, Beck.
 Sinope. adanensis, Naeg. Adana, Cilicia.
 suturalis, Boettg. Risa ; Trebi- **BELOGONA SIPHONADENIA**, Pils.
 zond. Genus **HELICELLA**, Fér.
 Genus **RETINELLA**, Shutt. Section **HELIOMANES**, Moq.
 natolica, Alb. Scutari. variabilis, Drap. Hieronda ;
 duboisii, Charp. Reduktaleh, Caria ; Troas ; Smyrna ;
 Elisabetpol ; Kutais. Brussa ; Aidin ; Magnesia.
 malinowskii, Pfr. Isnik. variegata, Friv. v. infans, West.
 cypria, Pfr. Tokat ; Bujukdere ; Smyrna.
 Samsun ; Reduktalch ; ungeri, Zelebor, Samsun.
 Trebizond ; Caria ; Aidin ; vestalis, Parr. Mersina ;
 v. borealis, Kob. N. Coast Alexandrette.
 secemenda, Retowski. Trebi- krynickii, Andr. Sinope ;
 zond ; Samsun. Samsun.
 = filicum, Mouss. non Kryn. luteata, Parr. Is. Prinkipo.
 frondosula, Mouss. Olympus. derbentina, Andr. Trebizond ;
 Genus **EUCONULUS**, Reinh. Samsun. Samsun.
 fulvus, Müll. Reduktaleh. joppensis, Roth v. subkrynicky-
 Reduktaleh. iana, Mouss. Mersina.
 boettgeri, Retowski. Trebizond. cretica, Fér. Beikos.
 Genus **ZONITES**, Montf. dichesthemena, Stur. Eski-
 smyrnensis, Roth. Smyrna ; Chetur.
 Burnabat. Section **HELICELLA**, s.s.
 chloroticus, Pfr. Smyrna ; aberrans, Mouss. Mersina ;
 Aidin. Abullonia.
 corax, Pfr. Taurus. neglecta, Drap. Chysir Kaleh.
 caricus, Roth. Cacamo ; Caria. obvia, Mke. Zenibazar ;
 megistus, Rolle. Is. Meis Schumla.
 (Megiste). = candicans, Auct.
 cilicicus, Kob. Giosna, Cilicia. v. dejecta, Zglr. Taurus.
 lycicus, Kob. and Rolle. Makri, ? nivea, Zglr. Mersina.
 Lycia. Section **CANDIDULA**, Kobelt.
 rollei, Kob. Kastelloryzo,

- conspurcata*, Drap. Smyrna. Section MONACHA, Fitz.
profuga, Schm. Smyrna. bifaria, West. Brussa.
 v. drachorichi, Zel. Sinope; carascaloides, Bourg. Tokat.
 Samsun. consona, Zglr. Beikos.
 v. comnena, Ret. Trebizond. dasilepida, Bourg. Lasistan.
protea, Zglr. Besika. frequens, Mouss, Alexandrette;
striata, Müll. Sinope; Trebi- Sinope; Samsun;
 zond. Trebizond; Risa; Is.
 Prinkipo.
 Secton JACOSTA, Gray. lepidolena, Bourg. Mersina.
 rozeti, Mich. Lampsaki; malleolata, West. Nr. Smyrna.
 Anatolia. muscicola, Bourg. Risa; Trebi-
 Section TROCHULA, Schlüter. zond.
 pyramidata, Drap. Is. Prinkipo; = crenophila, Pfr.
 Smyrna. Abullonia; ovularis, Bourg. Isnik.
 Brussa. proclivis, Mart. Smyrna;
 ? *vernica*, West. Smyrna. Magnesia; Burnabat.
 Section COCHLICELLA, Risso. redtenbacheri, Zel. Smyrna.
 barbara, L. Sinope. rissoana, Pfr. Trebizond;
 = *acuta*, Müll. Reduktaleh.
 Section THEBA, Risso. schuberti, Roth. Caria.
 berytensis, Fér. *v. rachiodia*, Section FRUTICICOLA, Held.
 Bourg. Cacamo; Caria. chryso-tricha, Boettg. Samsun.
 = *granulata*, Roth. lanuginosa, Boiss. Beikos.
 cantiana, Mont. Troas. Genus VALLONIA, Risso.
 carthusiana, Müll. Caria; pulchella, Müll. Samsun.
 Brussa; Abullonia. Genus HELICODONTA, Fér.
 v. carthusianella, Drap. Section CARACOLLINA, Beck.
 Caria. gyria, Roth. Caria; Lycia.
 flaveola, Kryn. Trebizond. lens, Fér. Caria.
 obstructa, Fér. Genus HELICIGONA, Fér.
 = *obstrusa*, Fér. Section CHILOSTOMA, Fitz.
 v. adpressula, Friv. Mersina. matrella, West. Smyrna.
 v. depressula, Kob. Adana, Section FRUTICOCAMPYLAE,
 Cilicia. Kobelt.
 rothi, Pfr. Beikos. pratensis, Pfr. Chysir Kaleh.
 v. obsita, Mouss. Beikos; Genus HELIX, L.
 Smyrna. Sub-genus EUPARYPHA, Hartm.
 subobstructa, Bourg. Beikos. pisana, Müll. Mersina; Alex-
 syriaca, Ehrb. Hieronda; andrette.
 Mersina; Alexandrette; *v. byzantina*, Roth. Byzan-
 Caria. tium.
 Genus HYGROMIA, Risso.

Section LEVANTINA, Kobelt.

spiriplana, Oliv. Caria.
 werneri, Rolle. Adana.
 cilicia, Kob. Julet Kabas,
 Cilicia.
 mardinensis, Kob. Mardin.
 naegelei, Kob. Sis, Cilicia.

Section OTALA, Schumacher.

vermiculata, Müll. Is. Prinkipo;
 Sinope; Burnabat;
 Smyrna; Troas.
 callirhoe, Kob. Lycia.
 lycica (Mart.), Kob. Lycia.
 = codringtoni v. lycica,
 Mart. Kasteloryzo
 (Megiste).

Section TACHEA, Leach.

atrolabrita, Kryn. Risa;
 Sephanos; Trebizond;
 Reduktaleh.
 vindobonensis, Fér. Schumla.
 aimophila, Bourg. v. tchichat-
 cheffi, Kob. Biredschik.

Section HELICOGENA, Fér.

aspersa, Müll. Hieronda;
 Sinope; Caria; Byzan-
 tum; Aidin.
 adanensis, Kob. Adana, Cilicia.
 v. sarica, Kob.
 buchii, Dub. Colchis.
 lucorum, L. Orfa; Chalcedonia;
 Magnesia; Smyrna;
 Trebizond.
 v. castanea, Oliv. Mersina;
 Alexandrette.
 = mahometana, Bourg.

v. euphratica, Mart. Trebi-
 zond; Samsun.

v. taurica, Kryn. Taurus;
 Tokat; Sinope.

ligata, Müll. Magnesia.
 anctostoma (Mart.), Kob.

Cilicia

= cincta v. anctostoma,
 Mart.

= beilanica, West. Beilan
 near Alexandrette.

cincta, Müll. var. Hieronda.

v. anatolica, Kob. Aidin.
 asemnis, Bourg. v. venusta,
 Mart. Knidos Penin-
 sula.

figulina, Parr. Smyrna; Troas.

melanostoma, Drap. v. micula,
 Parr. Smyrna.

v. mersinae, Kob. Mersina.
 pathetica, Parr. Tokat; Amasia.
 maltzani, Kob. Magnesi near
 Smyrna.

bituminis, Kob. and Rolle.
 Tchangankio; Alex-
 andrette.

issica, Kob. and Rolle. Alex-
 andrette.

pericalla, Bourg. Giosnia,
 Cilicia.

antiochiensis, Kob. and Rolle.
 Antioch.

epidaphne, Kob. Antioch.
 infidelium, Kob. Alexandrette.
 escherichi, Boettg. Ak-shehir.

B. ISLANDS OF ASIA MINOR.

The only comprehensive survey of the Mollusca of these Islands I have been able to trace is that by Professor von Martens, ⁽¹⁾ based

1. Arch. für Naturgesch., 1889, p. 189.

on a collection made in 1887 in the Grecian Islands, extending to the southwest corner of Asia Minor, by von Örtzen. Previous records are by J. Roth, ⁽²⁾ and Mousson, ⁽³⁾ the latter from collections made by Professor Bellardi. In the case of Rhodes, Bourgnignat enumerated the collection made during Saulcy's voyage.⁽⁴⁾

CHIOS.

Genus VITREA, Fitz. nitidissima, Mouss. v. samia, Mart.	Section MONACHA, Fitz. schuberti, Roth. = rissoana, Pfr.
Genus RETINELLA, Shutt. aequata, Mouss. clessini, Hesse.	Genus HELICODONTA, Fér. Section CARACOLLINA, Beck. lens, Fér.
Genus ZONITES, Montf. polycrates, Mart.	Genus HELIX, L. Section OTALA, Schum.
Genus HELICELLA, Fér. Section HELIOMANES, Moq, variabilis, Drap.	vermiculata, Müll. Kastro. Section HELICOGENA, Fér. aspersa, Müll, Kastro.
Section TROCHULA, Schl. pyramidata.	aperta, Born.
Genus HYGROMIA, Risso.	asemnos, Bourg. v. homerica, Mart.

SAMOS.

Genus VITRINA, Drap. annularis, Stud. Kerki.	cauta, West. Genus HYGROMIA, Risso.
Genus VITREA, Fitz. nitidissima, Mouss. v. samia, Mart. Kerki.	Section MONACHA, Fitz. schuberti, Roth. Marathokampos. = rissoana, Pfr.
Genus RETINELLA, Shutt. samia, Kob. cypria, Pfr. v. major, Mart. Kerki.	proclivis, Mart. Genus HELICODONTA, Fér. Section CARACOLLINA, Beck.
Genus ZONITES, Montf. polycrates, Mart. Marathokampos.	lens, Fér. Genus HELIX, L. Section OTALA, Schum.
Genus PYRAMIDULA, Fitz. rupestris, Drap. Kerki.	vermiculata, Müll.
Genus HELICELLA, Fér. Section HELIOMANES, Moq.	Section HELICOGENA, Fér. aspersa, Müll. aperta, Born. Marathokampos.

2. Molluscorum Species, 1830.

3. Mitth. Naturf. Ges. Zurich, 1854, Bd. iii, p. 59.

4. Cat. Rais. Moll. Saulcy, 1853.

NIKARIA.

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Genus VITREA, Fitz.
nitidissima, Mouss. v. samia,
Mart. | Genus PYRAMIDULA, Fitz.
rupestris. Drap. Agio-Kiriko. |
| Genus RETINELLA, Shutt.
cypria, Pfr. v. major, Mart.
aequata, Mouss.
hydatina, Rossm. Agio-Kiriko.
sorella, Mouss. Petropulis.
eudaedalea, Bourg. | Genus HELICELLA, Fér.
Section THEBA, Risso.
carthusiana, Müll.
Genus HELICIGONA, Fér.
Section CHILOSTOMA, Fitz.
cyclolabris, Desh. v. (subfossil). |
| Genus ZONITES, Montf.
smyrnensis. Petropulis.
polycrates, Mart. Eodilos. | Genus HELIX, L.
Section HELICOGENA, Fér.
aperta, Born.
cincta, Müll. v. minor, Mart. |

KALYMNOS.

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Genus RETINELLA, Shutt.
cyprea, Pfr. v. major, Mart.
aequata, Mous. | Genus HYGROMIA, Risso.
Section MONACHA, Fitz.
proclivis, Mart. |
| Genus PYRAMIDULA, Fitz.
Section GONYODISCUS, Fitz.
erdellii. Roth. | Genus HELICODONTA, Fér.
Section CARACOLLINA, Beck.
lens, Fér. |
| Genus HELICELLA, Fér.
Section HELIOMANES, Moq.
variabilis, Drap.
Section CANDIDULA, Kobelt.
calymnia, Mart.
Section TROCHULA, Schl.
pyramidata, Drap. | Genus HELIX, L.
Section LEVANTINA, Kobelt.
spiriplana, Oliv. var.
Section OTALA, Schum.
vermiculata, Müll.
Section HELICOGENA, Fér.
valentini, Kob. |

KAPPARI.

- | | |
|----------------------------------------------------------------------------|----------------------------------------------------------------|
| Genus PYRAMIDULA, Fitz.
Section GONYODISCUS, Fitz.
erdellii, Roth. † | Genus HELIX, L.
Section OTALA, Schum.
vermiculata, Müll. |
| Genus HYGROMIA, Risso.
Section MONACHA, Fitz.
proclivis, Mart. | Section HELICOGENA, Fér.
figulina, Rossm. |

KOS.

- | | |
|------------------------------------------------------------------------|---------------------------------------------------------------|
| Genus HELICELLA, Fér.
Section, TROCHULA, Schl.
pyramidata, Drap. | Genus HELIX, L.
Section EUPARYPHA, Hartm.
pisana, Müll. |
| Genus HYGROMIA, Risso.
Section MONACHA, Fitz.
proclivis, Mart. | Section OTALA, Schum.
vermiculata, Müll. |

NISYROS.

- | | |
|-------------------------------------------------------------------------|----------------------------------------------------------------|
| Genus RETINELLA, Shutt.
aequata, Mouss. | Section MONACHA, Fitz.
proclivis, Mart. |
| Genus PYRAMIDULA, Fitz.
Section GONYODISCUS, Fitz.
erdelii, Roth. | Genis HELIX, L.
Section OTALA, Schum.
vermiculata, Müll. |
| Genus HYGROMIA, Risso. | |

SYMI.

- | | |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Genus ZONITES, Montf.
symmensis, Roth.
rhodius, Mart. | Section OTALA, Schum.
vermiculata, Müll.
Section HELICOGENA, Fér.
aperta, Born.
asemnis, Bourg. v. homerica,
Mart.
figulina, Rossm. |
| Genus HELIX, L.
Section LEVANTINA, Kob.
spiriplana, Oliv. var. | |

RHODES.

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Genus VITREA, Fitz.
nitelina, Bourg.
protensa, Fér. | mesostena, West. Trianda.
Section TROCHULA, Schl.
verticillata, Parr.
pyramidata, Drap. Kastelo.
trochoides, Poir. |
| Genus RETINELLA, Shutt.
aequata, Mouss. | Section THEBA, Risso.
syriaca, Ehrb. Kastelo ;
Trianda ; Rhodos.
rothi, Pfr. |
| Genus ZONITES, Montf.
verticillus, Fér.
rhodius, Mart. | Genus HYGROMIA, Risso.
Section METAFRUTICICOLA, Iher.
pellita, Fér. Rhodos. |
| Genus PYRAMIDULA, Fitz.
Section GONYODISCUS, Fitz.
erdelii, Roth. | Genus HELICODONTA, Fér.
Section CARACOLLINA, Beck.
lens, Fér.
lenticula, Fér. |
| Genus HELICELLA, Fér.
Section HELIOMANES, Fér.
variabilis, Drap. Kastelo ;
Trianda.
cretica, Pfr. Kastelo ; Trianda.
simulata, Fér.
submaritima, Desm.
= lauta, Lowe.
maritima, Drap. | Genus HELIX, L.
Section EUPARYPHA, Hartm.
pisana, Müll.
Section LEVANTINA, Kob.
spiriplana, Oliv. Kastelo.
= gallandi, Bourg.
v. maltziana (Parr), Rossm.
= maltziana (Parr), Pfr. |
| Section HELICELLA, s.s.
itala, Linné
= ericetorum, Müll. | |
| Section CANDIDULA, Kob. | |

Section OTALA, Schum.	cincta, Mull.
vermiculata, Müll.	figulina, Rossm. Kastelo.
lactea, Müll.	pomacella, Parr v. concolor,
Section HELICOGENA, Fér	Bourg.
aspersa, Müll.	equitum (Bourg.), Kob.
aperta, Born.	

KHARKI. (CHALKI).

Genus RETINELLA, Shutt.	Section METAFRUTICICOLA, Iher.
aequata, Mouss,	pellita, Fér.
Genus HELICELLA, Fér.	Genus HELIX, L.
Section HELIOMANES, Moq.	Section LEVANTINA, Kob.
cretica, Pfr.	spiriplana, Oliv.
Genus HYGROMIA, Risso.	Section HELICOGENA, Fér.
	aperta, Born.

KARPATOS.

Genus RETINELLA, Shutt.	candiota, Pfr.
aequata, Mouss.	Genus HYGROMIA, Risso.
Genus ZONITES, Montf.	Section METAFRUTICICOLA, Iher.
caricus, Roth.	pellita, Fér.
Genus HELICELLA, Fér.	Genus HELIX, L.
Section HELIOMANES, Moq.	Section LEVANTINA, Kob.
cretica, Pfr.	spiriplana, Oliv. var.

SOKASTRO. (WEST OF KARPATOS).

Genus HELICELLA, Fér.	Section HELIOMANES, Moq.
	cretica, Pfr.

KAXO. (KASOS).

Genus RETINELLA, Shutt.	candiota, Pfr.
aequata, Mouss.	Section TROCHULA, Schl.
Genus ZONITES, Montf.	pyramidata, Drap.
pergranulatus, Kob.	Genus HYGROMIA, Risso.
casius, Mart.	Section METAFRUTICICOLA, Iher.
Genus HELICELLA, Fér.	pellita, Fér.
Section HELIOMANES, Moq.	testacea, Mart.
cretica, Pfr.	

ARMATHIA.

Genus HELICELLA, Fér.	Section CANDIDULA, Kob.
Section HELIOMANES, Moq.	mesostena, West.
candiota, Pfr.	Genus HYGROMIA, Risso.

Section METAFRUTICICOLA, Iher.	Section OTALA, Schum.
pellita, Fér.	vermiculata, Müll.
Genus HELIX, L.	

C. CYPRUS.

We owe our knowledge of Cyprus Helicoids chiefly to Bourguignat,⁽¹⁾ Mousson,⁽²⁾ and Zelebor.⁽³⁾ More recently Rolle,⁽⁴⁾ Kobelt,⁽⁵⁾ and Westerlund⁽⁶⁾ have added some new species.

Genus VITREA, Fitz.	rothi, Pfr.
cyprina, West. Atrankan.	larnacensis, Kob. Larnaka.
Genus ZONITES, Montf.	Genus HYGROMIA, Risso.
cypricus, Pfr.	Section MONACHA, Fitz.
Genus PYRAMIDULA, Fitz.	redtenbacheri, Zel.
Section GONYDISCUS, Fitz.	nicosiana, Mouss.
sudensis, Pfr. v. cypria, Kob.	v. pallida, Mouss.
Genus HELICELLA, Fér.	lusignani, Kob.
Section HELIOMANES, Moq.	Section METAFRUTICICOLA, Iher.
cretica, Pfr. v. littoralis, Mouss.	pellita, Fér.
ungeri, Zel.	Genus HELICODONTA, Fér.
Section CANDIDULA, Kob.	Section CARACOLLINA, Beck.
profuga, Schm.	lens, Fér.
contempta, Parr.	lenticula, Fér.
cyparissias, Parr.	Genus HELIX, L.
Section JACOSTA, Gray.	Section EUPARYPHA, Hartm.
syrensis, Pfr.	pisana, Müll.
= tarulosa, Parr.	Section LEVANTINA, Kob.
ledereri, Pfr.	bellardii, Mouss.
andrewi, Rolle. Usticensis,	v. oclusa, Mouss.
Calc.	guttata, Oliv.
Section TROCHULA, Schl.	lapithoensis, Rolle.
idaliae, Bourg.	gertrudis, Rolle.
liebetruti, Alb.	chrysostomi, Rolle.
Section COCHLICELLA, Risso.	Section OTALA, Schum.
barbara, L.	vermiculata, Müll.
= acuta, Müll.	Section HELICOGENA, Fér.
Section THEBA, Risso,	aspersa, Müll.
syriaca, Ehrb.	aperta, Born. var. Kob.

1. Cat. Rais. Moll. Saulcy, 1853.
 2. Coq. terr. fluv. Bellardi, 1854, p. 28.
 3. In Unger and Kotschy, Die Insel Cypern, 1865, p. 591.
 4. Nachr. Deutsch. Malak. Gesell., 1898, p. 165.
 5. Rossm. Icon. Suppl., B.l. I, 1895, Lief. 5 and 6.
 6. Nachr. Deutsch. Malak. Gesell., 1902, p. 22.

= kalimatia, Bourg.	trixenostoma (Bourg.), Kob
Mus. Geneva.	cornarae (Bourg.), Kob.
ligata, Müll.	pediaea (Bourg.), Kob.
cincta, Müll.	chassyana (Mab.), Kob.
v. cypria, Kob.	xeraethia (Bourg.), Kob.
stenarochila (Bourg.), Kob.	

DOUBTFUL SPECIES RECORDED BY BOURGUIGNAT AND ZELEBOR.

Helix cirtae, Rossm.—Perhaps a form of *Otala vermiculata*.

Helix soluta, Mich.—It is extremely improbable that this Algerian shell occurs in Cyprus.

Helix supplementaria, Parr.—A nude name recorded by Zelebor.

XI. SYRIA (INCLUDING PALESTINE).

Like those of Asia Minor the Mollusca of Syria have first been brought to our knowledge by Roth and Mousson. Bourguignat recorded the collection made by Saulcy (1853), while the latest comprehensive list is by Dautzenberg.¹ Most of the mollusca of this region. are of the desert type of snails, chief among which are the Leucochroas.

Family **Zonitidae**.Genus **RETINELLA**, Shutt.Sub-family **Zonitinae**, Pils.

simoni, Boettg. Baalbec.

Genus **DAUDEBARDIA**, Hartm.

libanica, Boettg. Beyrouth.

gaillardoti, Bourg. Sidon.

aequata, Mouss. North Palestine.

saulcyi, Bourg. Beyrouth ;

jebusitica, Roth. Jerusalem ;

Sidon.

Sarepta ; Hakeldama ;

= syriaca, Roth.

protensa, Fér. Naplouse.

Genus **VITREA**, Fitz.Family **Endodontidae**,

cellaria v. sancta, Roth.

Sub-family **Endodontinae**, Pils.

Hieros ; Antioch ;

Genus **PYRAMIDULA**, Fitz.

Jerusalem.

hierosolymitana, Bourg.

nitelina, Bourg. Jerusalem ;

Hieros ; Jerusalem.

Naplouse ; Nazareth.

Section **GONYDISCUS**, Fitz.

camelina, Bourg. Jerusalem ;

erdelli, Roth. Jerusalem ;

Nazareth ; Jericho ;

Beyrouth.

Naplouse ; Baalbec.

?= flavida, Rossm.

draparnaudi v. syriaca, Rossm.

Family **Helicidae**.

Syria.

BELOGONA EUADENIA, Pils.

carmeliensis, Pfr. Mount

Genus **LEUCOCHROA**, Beck.

Carmel.

candidissima, Drap. Common.

berytensis, Naeg. Beyrouth.

v. hierochuntina, Boiss.

1. Revue Biol. Nord de France, 1894 p. 329.

- Jaffa.
 prophetarum, Bourg. Jerusalem;
 Sebbeh. North and
 West of Dead Sea.
 fimbriata, Bourg. Alexandrette.
 v. myops, West.
 v. illicita, Mouss.
 v. varicosula, West. Farina.
 cariota, Oliv. Nazareth ; West
 Palestine ; Syria.
 v. amphicyrta, Bourg.
 v. nazarensis, Mouss.
 v. crassocarina, Mouss.
 rollei, Kob. Alexandrette.
- Section SPHINCTEROCHILA, Anc.
 boissieri, Charp. Judaeen
 Desert.
 filia, Mouss. Near Dead Sea.
- BELEGONA SIPHONADENIA, Pils.
 Genus HELICELLA, Fér.
- Section XEROCRASSA, Monterosato.
 setzeni, Koch. Southern
 Deserts ; Jericho.
 = sabaea, Boiss.
 eremophila, Boiss. Desert of
 Sinai.
 = cremnophila, Boiss.
- Section HELIOMANES, Moq.
 turbinata, Jan. Coast.
 variabilis, Drap. Mount
 Carmel.
 vestalis, Parr. Antioch ;
 Dead Sea.
 ? = mesopotamica, Mouss.
 v. alepina, West. Aleppo.
 v. radiolata, Mart. Aleppo.
 hamyi, Bourg. v. foveolata,
 West. Jericho.
 = vestalis, v. foveolata, West.
 maritima, Drap.
 simulata, Fér. Jerusalem.
 derbentina, Andr.
- joppensis, Roth. Damascus.
 = bargesiana, Bourg.
 v. multinotata, Mouss. Jordan.
 patriarcharum, West. Hebron.
 cespitum, Drap. North Palestine
 davidiana, Bourg. Jerusalem.
- Section HELICELLA, s.s.
 aberrans, Mouss. Damascus.
 itala, L. Baalbec.
 = ericetorum, Müll.
 neglecta, Drap. Tiberias.
 obvia, Mke. v. arenosa, Zglr.
- Section CANDIDULA, Kob.
 apicina, Lam. North Coast.
 arrouxi, Bourg. Beyrouth.
 caperata, Mont. Jerusalem ;
 Nazareth.
 hierocontina, West. Jericho.
 conspurcata, Drap. Sidon.
 improbata, Mouss. Jerusalem.
 langloisiana, Bourg. Jerusalem ;
 Mar Saba ; Beni
 Hammad.
 = caperata v. hierochuntina,
 Roth.
 protea, Zglr. Judaea ; Galilea ;
 Moab. ; E. Gilead ; Syria.
 = campestris, Zglr.
- Section JACOSTA, Gray.
 amanda, Rossm. Jerusalem.
 ledereri, Pfr. Beyrouth.
 = syrensis, Bourg. non Pfr.
- Section OBELUS, Hartm.
 tuberculosa, Conr. Jerusalem ;
 Mar Saba.
 = despreauxi, Bourg. S. Syria.
 philammia, Bourg.
 = serrulata, Pfr.
- Section COCHICELLA, Risso.
 barbara, L. Between Beyrouth
 and Sidon.
 = acuta, Müll.

- Section **THEBA**, Risso.
berytensis, Fér. Jerusalem ;
 Beyrouth ; Mount
 Carmel ; Sidon.
v. fourousi, Bourg. Beyrouth.
v. granulata, Roth. Liban.
obstructa, Fér. Jerusalem ;
 Kemleh. Damascus ;
 Tyre ; Sidon.
v. adpressula, Friv. Beyrouth.
olivieri, Fér. Beyrouth ; Jeru-
 salem ; Kemleh.
schotti, Pfr.
syriaca, Ehrb. Jerusalem ;
 Syria ; Tyre ; Antioch.
 = *onchynina*, Rossm.
 = *gregaria*, Zglr.
carmelita, Tristr. Mount
 Carmel.
 = *tristrami*, Mart.
- Section **PLATYTHEBA**, Pils.
nummus, Ehrb. Beyrouth.
 = *hedenborgi*, Pfr.
 = *oxygyra*, Boiss.
spiroxia, Bourg. Alexandrette.
v. hamosa, West.
genezarethana, Mouss. Lake
 Genezareth ; Jordan
 Valley ; Tiberias.
 = *tiberiana*, Mouss.
- Genus **HYGROMIA**, Risso.
- Section **MONACHA**, Fitz.
crenophila, Pfr. Beyrouth.
 = *muscicola*, Bourg.
solitudinis, Bourg. Baalbec.
- Section **FRUTICICOLA**, Held.
crispulata, Mouss. Jerusalem.
- Genus **VALLONIA**, Risso.
pulchella, Müll. Plain of Acre.
- Genus **HELICODONTA**, Fér.
- Section **CARACOLLINA**, Beck,
lenticula, Fér. Naplouse.
- Genus **HELIX**, L.
- Sub-genus **EUPARYPHA**, Hartm.
pisana, Müll. Sea of Judaea ;
 Beyrouth.
- Sub-genus **EREMINA**, Pfr.
desertorum, Forsk.
 = *arabica*, Roth.,
 = *maculosa*, Born.
 = *irregularis*, Fér.
 = *forskalii*, Ehrb.
 = *psamitus*, Bourg.
 = *gemellarii*, Ben.
 = *rhodia*, Chemn.
 = *depressa*, Mart.
 = *pachytoichea*, West.
 = *kobelti*, West.
 = *dillwyniana*, Pfr.
- Section **LEVANTINA**, Kob.
spiriplana, Oliv. South Palestine.
 = *guttata*, Bourg., non Oliv.
v. transjordanica, Kob.
hierosolyma, Boiss. Jerusalem.
v. masadae, Trlstr. Sebbeh.
v. lithophaga, Conr. Mar
 Saba ; Deir.
caesareana, Parr. Jerusalem ;
 Plain of Sharon ; Mar
 Saba ; Jericho ; Jordan ;
 Salima Valley ; Sidon.
 = *caesarea*, Boiss.
arnoldi, Kob. Between Jaffa
 and Jerusalem.
gerstenbrandti, Kob. Between
 Jaffa and Jerusalem.
ramlensis, Kob. Between Jaffa
 and Jerusalem.
guttata, Oliv.
eliae, Kob. South of Mount
 Carmel.
praecellens, Kob. Payas.
- Section **OTALA**, Schum.
vermiculata, Müll. Beyrouth ;

Pieria.	= ciliciana, Bourg.
Section HELICOGENA, Fér.	moabitica, Goldf. Moab.
aspersa, Müll. Tyre ; Sidon ;	figulina, Parr. Dead Sea.
Beyrouth ; Jaffa, Jerusa-	v. albidula, Bourg.
lem.	pachya, Bourg. Lake Geneza-
= grisea, Gm.	reth ; Beyrouth ; Tiberias.
lucorum, L. v. taurica, Kryn.	prasinata, Roth. Tiberias.
Lebanon.	= jordanica, Bourg.
schlaeflii, Mouss.	cavata, Mouss. Jerusalem.
fathallae, Naeg. La Trappe	= figulina v. B, Bourg.
near Abkes.	engaddensis, Bourg. Judaea ;
ligata, Müll. Jerusalem ;	Dead Sea.
Lebanon.	v. concolor, Bourg. Nazareth ;
anctostoma, ¹ Mart. Pompejopolis.	Jerusalem.
beilanica, West. Beilan near	pyncia, Bourg. Nazareth.
Alexandrette,	baristata, Bourg. Between
asemnis, Bourg. Naplouse ;	Alexandrette and Orfa.
Lebanon.	racopsis, Bourg. Beyrouth.
= solida, Zglr.	achidaea, Bourg. Tarablus.

SOME NOTES ON THE GENUS PRISMA, SIMROTH.

By WALTER E. COLLINGE, B.Sc.,

The University, Birmingham.

(Plate ix.)

The genus *Prisma* was constituted by Simroth ⁽¹⁾ in 1891 for the reception of the following molluscs: the *Vaginula tourannensis* of Souleyet, the *V. prismatica* of Tapperone-Canefri, the *V. trigonus* of Semper, the *V. pulrerulenta* of Benson, and a new species *Prisma heynemanni*. Of these, the two first and the last mentioned are probably true *Prismas*; and only *P. tourannense* and *P. prismatica* have been figured.

Simroth does not give any detailed description of the genus, and nothing whatever is known of the anatomy. The most characteristic external feature is the triangular shape of the body, when seen in cross section. Simroth in 1891 wrote (op. cit., p. 596) "it is open to question whether *Prisma* is a sub-genus of *Vaginula* or of *Atopos* or whether it constitutes a genus of its own, which is most probable."

Through the kindness of Mr. Edgar A. Smith, I have been able to examine the examples of this genus in the collection of the British Museum, and also to figure them. There are three specimens all labelled *P. prismatica*, Tap.-Can., the localities of these are as follows:

- i. Huon Gulf, New Guinea (Dr. Comrie). Length (in alcohol) 39 millim.
- ii. An island in the Torres Straits, or New Guinea. Length (in alcohol) 36.5 millim.
- iii. New Guinea. Length (in alcohol) 56.5 millim.

I am entirely in accord with Simroth, who regards the Huon Gulf specimen (i) as a distinct species, *viz.* the *P. heynemanni* of Simroth. The second specimen (ii) is undoubtedly *Prisma prismatica*, Tap.-Can.,⁽²⁾ while the third (iii) is quite distinct from either i or ii, and I am here describing it as a new species under the name of *Prisma smithi*, after Mr. Edgar A. Smith, as a mark of appreciation, for the facilities he has so kindly extended to me when examining these and other specimens in the British Museum collection, and for his permission to figure the three examples.

Heynemann⁽³⁾ was undoubtedly wrong in fancying that the drawings of *P. tourannense*, Soul., and those of *P. prismatica*, Tap.-Can., were of one and the same species.

***Prisma smithi*, n. sp.**

Pl. ix, figs. 1-3.

Colour of the notum greyish-brown, with small black spots arranged in a stellate manner; underside (perinotum?) yellowish-brown with a few very minute black spots; foot-sole yellowish-brown; keel prominent, slightly lighter in colour than the rest of the notum. Length of notum (in alcohol) 56.5, breadth 10, height 9 millim. Breadth of foot-sole 5 millim.

Hab.—New Guinea.

Type in the collection of the British Museum.

***Prisma prismatica*, Tap.-Can.**

Pl. ix, figs. 4-6.

Veronicella prismatica, Tap.-Can.: Ann. d. Mus. Civ. de St. Nat.

Genova, 1883, vol. xix, p. 207, Tav. xi, figs. 6-8.

Tapperone-Canefri has given three uncoloured figures of this species,

1. Zeit. f. wiss. Zool., 1891, Bd. lii.

2. Ann. d. Mus. Civ. di St. Nat. Genova, 1883, vol. xix, p. 207.

3. Jahrb. d. D-utsch. Malak. Gesell., 1885.

but they are not very satisfactory. As the type of the genus *P. tourannense*, Soul.,⁽⁴⁾ is so beautifully represented, I have had two coloured figures made of *P. prismatica*.

The dimensions of the specimens in the collection of the British Museum are: length of notum (in alcohol) 36.5, breadth 7, height 6 millim., breadth of foot-sole 2 millim.

Hab.—An island in the Torres Straits, or New Guinea.

The type, from the Island of Sorong, measured 38 millim. in length.

The foot-sole in this species is less than half the breadth of that in *P. smithi* or *P. heynemanni*.

***Prisma heynemanni*, Simr.**

Pl. ix, figs. 7-9.

Prisma heynemanni, Simr.: Zeit. f. wiss. Zool., 1891, Bd. lii, p. 596.

Colour of the notum greyish-yellow, spotted with black, closely and finely granulated: underside (perinotum?) ochreous, foot-sole same colour; keel prominent. Length of notum (in alcohol) 39, breadth 8, height 6 millim. Breadth of foot-sole 4.8 millim. Female generative orifice $4\frac{1}{3}$ millim. from the head.

Hab.—Huon Gulf, New Guinea (Dr. Comrie).

Type in the collection of the British Museum.

Simroth⁽⁵⁾ quoting Heynemann,⁽⁶⁾ rightly gives the length of this specimen as 39 millim., but Cockerell⁽⁷⁾ states 36.

Although our knowledge of this genus is as yet very imperfect, I think there can be no doubt as to its distinctiveness from *Veronicella* on the one hand, and *Atopos*, Simr., and *Rathousia*, Heude, on the other. The examination of further material will alone indicate its true position, and in connection with the members of this genus, as also those of *Atopos* and *Rathousia*, the Testacella-like teeth may possibly be concomitant with habits similar to the *Testacellidae*, which future collectors would do well to bear in mind.

My best thanks are due, and are here tendered to Mr. C. Butterworth, for the care he has bestowed upon the figures, and to the Council of the Royal Society, out of a Grant from which, the cost has been defrayed.

4. Voyage sur le Bonite, 1852, T. ii.

5. Op. cit.

6. Op. cit.

7. Conchologist, 1893, vol. ii, p. 223.

EXPLANATION OF PLATE IX.

Fig. 1.	<i>Prisma smithi</i> , n. sp.	Right lateral view. $\times 1\frac{1}{2}$.
Fig. 2.	" " "	Ventral view. $\times 1\frac{1}{2}$
Fig. 3.	" " "	Diagrammatic transverse section.
Fig. 4.	<i>Prisma prismatica</i> , Tap.-Can.	Right lateral view. $\times 1\frac{1}{2}$
Fig. 5.	" " "	Ventral view. $\times 1\frac{1}{2}$.
Fig. 6.	" " "	Diagrammatic transverse section.
Fig. 7.	<i>Prisma heynemanni</i> , Simr.	Right lateral view. $\times 1\frac{1}{2}$
Fig. 8.	" " "	Ventral view. $\times 1\frac{1}{2}$
Fig. 9.	" " "	Portion of the notum, much enlarged.

FURTHER NOTES ON AMALIA CARINATA, RISSO.

BY WALTER E. COLLINGE, B Sc.

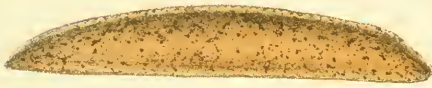
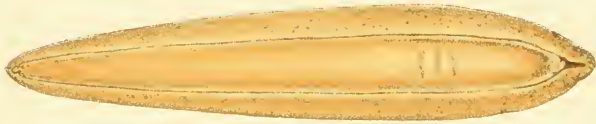
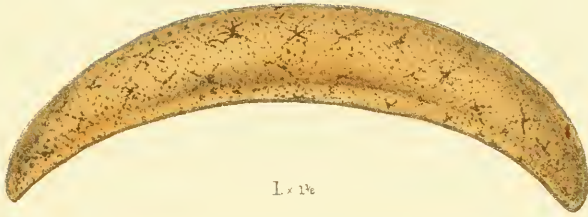
In response to my appeal in the June issue of this Journal,⁽¹⁾ I have received numerous examples of *Amalia sowerbyi*, Fér., from all parts of the British Isles, particularly interesting amongst which are some from Ireland.

When I wrote my previous note, I had for the moment overlooked the fact that Dr. Scharff⁽²⁾ had recorded *A. carinata*, Risso, from Ireland, the specimens being verified by Dr. Simroth. I have not seen Dr. Scharff's specimens, but I cannot agree with him in regarding Risso's species as synonymous with the *A. sowerbyi* of Férussac. An example of this last mentioned species referable to the variety *nigrescens*, Ckll., from Woodenbridge, Co. Wicklow, and two examples of the ordinary form from Piperstown, Co. Louth, received from Dr. Scharff, are certainly quite unlike examples of *A. carinata*, Risso, which I have in my collection from Nizza, Northern Italy, and from Algiers, as also are many other specimens which I have in recent years examined from various Irish localities. Further they are very distinct from the two *Amalias* which I recorded in my previous note, which latter agree very closely with the Italian examples of *A. carinata*, but much less so with the Algerian specimens.

I have now to record two *Amalias* from Kingstown, Co. Dublin, which leave no doubt in my mind that *A. carinata*, Risso, certainly occurs in Ireland, in addition to *A. sowerbyi*, Fér. These two specimens are intermediate, in colouring and markings, between the Italian and Algerian specimens mentioned above, and cannot in my opinion, be referred to Férussac's species.

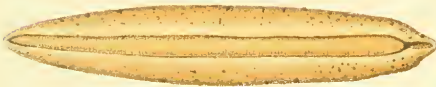
1. See ante p. 63.

2. Trans. Roy. Dublin Soc., 1891, vol. iv. (ser ii), p. 531.



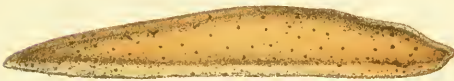
4. x 1 1/2

3.

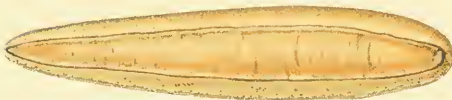


5. x 1 1/2

6.



7. x 1 1/2



8. x 1 1/2



9. x 1 1/2

Butterworth del. et pinx. ad nat.

Huth, Lithf. London.

THE GENUS PRISMA, SIMROTH.

I think, there can be little doubt but that Risso's species has been confused with *A. sowerbyi* in this country, and that on more careful examination it will be found to be fairly well distributed. I hope at a later date to give coloured figures of the British examples, and also figures of the internal anatomy.

In the meantime, I shall still be pleased to receive further examples from any parts of the British Isles.

Distribution in British Isles.

Devon.—Barnstaple (F. J. Partridge).

Warwick.—Near Birmingham (Bromley Peebles).

Dublin—Kingstown. Dr. Scharff⁽³⁾ does not distinguish between *A. carinata*, Risso, and *A. sowerbyi*, Fér., in his list.

THE ANATOMY OF THE BRITISH SPECIES OF THE GENUS SOLEN.

Part IV. *

BY H. H. BLOOMER.

Plate x.

Solen pellucidus, Penn.

EXTERNAL CHARACTERS.

When compared with *S. ensis*, L., this species presents the following points of difference : The measurement from the dorsal to the ventral surface is proportionately greater. The hinge of the shell is situated some distance from the anterior end, and the anterior part of the anterior adductor muscle, together with the dorsal integument, terminate there (Pl. x, fig. 1, H.). What represents the fourth aperture is present at the postero-ventral part of the pedal aperture. As in *S. ensis* it carries a tentacular fringe. From specimens examined, I have not been able to find any trace of concrescence of the mantle lobes between the two apertures, but as this portion of the animal is easily ruptured, the question still remains a matter of uncertainty. The pedal aperture is larger, extending more posteriorly both dorsally and ventrally. The dorsal and anterior edges of the mantle lobes bordering it, carry a closely and finely crenulated fringe, while in the dorsal portion, the mantle lobes are joined together a little below their margins, thus forming a chamber, which apparently does not communicate with the pallial chamber. The foot (Pl. x, fig 1, F.)

3. Irish Naturalist, 1892. vol. 1, p. 89.

* See ante p. 18.

is large, particularly as it approaches its distal end, where it is axe-shaped and of considerable depth. The bases of the inner gills are connected with each other as in *S. marginatus*, Pult. and Don.

MUSCULATURE.

The musculature of *S. pellucidus* differs from that of *S. ensis* in the following particulars.

i. *The Pallial Muscles.*—The muscles along the edges of the mantle lobes are deeper than in *S. ensis*, and anteriorly describe a semi circular curve to the anterior end of the anterior adductor muscle (Pl. x, fig. 1, *H.*), while posteriorly, where forming the proximal portion of the siphon, they are much more developed (Pl. x, fig. 1, E.S.C. and I.S.C.).

The posterior portion of the anterior adductor is deeper but the depth gradually diminishes towards the anterior end, which curves dorsally to the teeth of the shell (Pl. x, fig. 1, *A.A.*).

The posterior adductor is correspondingly smaller (Pl. x, fig. 1, *P.A.*).

ii. *The Pedal Muscles.*—The foot increases in size towards its distal end. In this part the muscles are frayed out, and form a large fibrous network. The retractor pedis posterior muscles are longer, their terminal parts being situated more posteriorly than in *S. ensis* (Pl. x, fig. 1, *P.R.A.*)

In the retractor pedis anterior muscles, the posterior bifurcation (Fig. 1, *P.R.A.*) is short and thick, while the anterior one (Fig. 1, *P.R.A.*') is long and narrow extending over the greater portion of the anterior adductor muscle. The fibres of the muscle cross the foot, as in *S. marginatus*, and pass underneath instead of over the longitudinal muscles, eventually becoming buried in the muscular integument.

THE ALIMENTARY CANAL.

The oesophagus (Pl. x, figs. 2 and 3. *Oe.*) is long and narrow, passing in a posterior direction to the stomach, in consequence of which, the latter is situated more posteriorly than in *S. ensis*. The divisions of the stomach are very pronounced. The cardiac portion (Fig. 2, *C. St.*) is a narrow, deep, pocket-shaped sac. The pyloric portion (Fig. 2, *P. St.*) and the proximal portion of the caecum of the crystalline style (*C.C.*) are very large, while the latter is of considerable length and extends along the greater portion of the pedal cavity. The intestine (*In.*) proceeds from the pyloric portion, close to the caecum of the crystalline style, to within a short distance of its distal end, where it bends and returns along the opposite side, traverses round the posterior dorsal end of the stomach and folding upon itself, passes into the rectum (*R.*). If contrasted with the description of *S. ensis* and *S. marginatus*, it will

be seen that in many respects the alimentary canal more closely resembles that of the latter than that of the former, the more important differences being the relatively larger size of the pyloric portion of the stomach and of the distal part of the caecum of the crystalline style, and the absence of folds in the intestine shortly after leaving the stomach.

The position of the liver (Fig. 1, *L.*) is similar to that of *S. ensis*.

NERVOUS SYSTEM.

The nervous system of *S. pellucidus* resembles that of *S. ensis*, differing from it, however, in the number and distribution of the pallial nerves.

The anterior pallial nerve only gives rise to two branches. The first branch leaves the nerve after it has passed a little distance under the ventral surface of the anterior adductor muscle, and the second a short distance before reaching the anterior edge of the muscle; both branches cross the mantle lobe and join the circumpallial nerve. The posterior pallial nerve does not give rise to any branch which crosses the mantle lobe as in *S. ensis*.

There is only one circumpallial nerve, which anteriorly passes along the dorsal portion of the muscular part of the mantle lobe, and gradually attains a ventral position as it proceeds posteriorly. It is to be observed that the two anterior pallial nerves fuse together close to where the teeth of the shell are connected with the dorsal integument, forming a small ganglionic mass, and then separating, pass along the mantle lobes.

CIRCULATORY SYSTEM.

The general features resemble those of *S. ensis*, but owing to the smallness of the specimens examined it has not been possible to follow it out in all its detail.

From the foregoing morphological account of the different species, and from further work shortly to be published, I purpose at no distant date to review the present classification of the genus *Solen*.

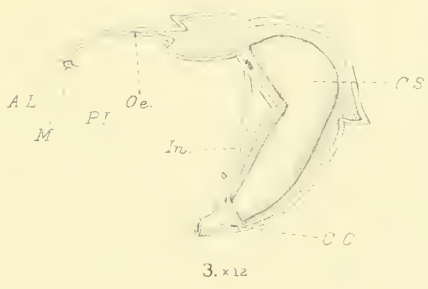
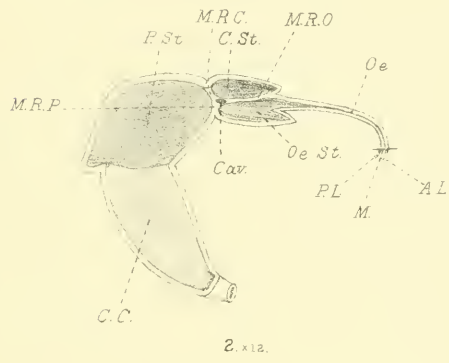
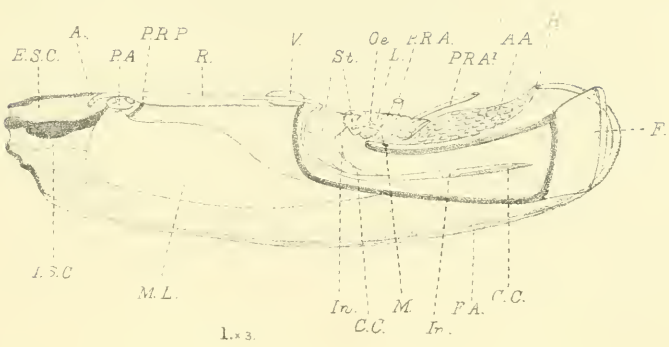
EXPLANATION OF PLATE X.

Solen pellucidus, Penn.

- Fig. 1. View from the right side, alimentary canal, &c. $\times 3$.
 Fig. 2. Longitudinal section of the stomach, showing the internal structure of the left side. $\times 12$.
 Fig. 3. Longitudinal section of the stomach, showing the internal structure of the right side. $\times 12$.

REFERENCE LETTERS.

- | | | | |
|---------------|--------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| <i>A.</i> | Anus. | <i>M.R.O.</i> | Muscular ridge separating the oesophagael from the cardiac portion of the stomach. |
| <i>A.A.</i> | Anterior adductor muscle. | <i>M.R.P.</i> | Muscular ridge separating the small cavity receiving small bile duct from pyloric portion. |
| <i>A.L.</i> | Anterior lip. | <i>Oe.</i> | Oesophagus. |
| <i>Ca.v.</i> | Small cavity receiving the small bile duct. | <i>Oe. St.</i> | Oesophagael portion of stomach. |
| <i>C.C.</i> | Caecum of crystalline style. | <i>P.A.</i> | Posterior adductor muscle. |
| <i>C.S.</i> | Crystalline style. | <i>P.L.</i> | Posterior lip. |
| <i>C.St.</i> | Cardiac portion of stomach. | <i>P.R.A., P.R.A.</i> | Bifurcated parts of retractor pedis anterior. |
| <i>E.S.C.</i> | Exhalent siphonal chamber. | <i>P.R.P.</i> | Bifurcation of retractor pedis posterior. |
| <i>F.</i> | Foot. | <i>P. St.</i> | Pyloric portion of stomach. |
| <i>F.A.</i> | Fourth aperture. | <i>R.</i> | Rectum. |
| <i>H.</i> | Point where the dorsal integument is connected with the teeth of the shell. | <i>St.</i> | Stomach. |
| <i>In.</i> | Intestine. | <i>V.</i> | Ventricle. |
| <i>I.S.C.</i> | Inhalent siphonal chamber. | | |
| <i>L.</i> | Liver. | | |
| <i>M.</i> | Mouth. | | |
| <i>M.L.</i> | Mantle lobe. | | |
| <i>M.R.C.</i> | Muscular ridge separating the cardiac from the pyloric portion of the stomach. | | |



H. H. del ad nat

Huth, Lithr London

ANATOMY OF SOLEN.

OBITUARY.

Alexander Onufrievitch Kowalevsky.

Born November 20th, 1840. Died November 22nd, 1901.

The death of Professor Kowalevsky removes a zoologist of renown, and one whose studies ranged over a wide field. In the Mollusca he investigated the development of *Chiton* and *Dentale*, the structure of *Pseudovermis* and the *Hedyllidae*, and in conjunction with Professor A. F. Marion, the Solenogastres, and with Ovsyannikov, the central nervous system and auditory organ of the Cephalopoda.

Oliver Collett.

Born 1867. Died June 13th, 1902.

By the untimely death of Mr. Oliver Collett, Malacology has lost a devoted and single hearted student of the Cingalese mollusca

When, in 1898, I resumed the Editorship of this Journal, Mr. Collett wrote me inquiring if, in connection with my work on Asiatic molluscs, I cared to examine any of those from Ceylon; this was the commencement of a regular correspondence, which, alas! has all too soon ceased. As I write, there lies before me the latest consignment from him (one of very many which he has sent me, and which, as yet, have been little more than examined in opening), containing examples of *Nilyira*, *Ariophanta*, *Euplecta*, *Veronicella*, etc., all beautifully preserved.

Mr. Collett while engaged in his vocation as a tea planter, found time for much zoological work. As a member of the Ceylon branch of the Royal Asiatic Society, he contributed various papers to their Journal.

He died on June 13th, somewhat suddenly at Columbo, from an attack of dysentery.

Much of the material collected by Mr. Collett has been described by Dr. Blanford, Mr. E. R. Sykes, Lt. Col. Godwin-Austen, myself and others. Some, however, he described himself in the following papers:

1. "Description of *Stroptaris gracilis*, n. sp., from Ceylon." Proc. Malac. Soc. London, 1894.
2. "The Terrestrial Mollusca of Ambagamuwa." Journ. Ceylon Asiat. Soc., 1897, vol. xv, pp. 12—21.
3. "On two new varieties of *Cataulus nietneri*, G. and H. Nev., from Ceylon." Journ. of Malac., 1899, vol. vii, pp. 85, 86, 3 figs.
4. "Description of a new Helicoid land shell from the Southern

- Province." Journ. Ceylon Asiat. Soc., 1899, vol. xv, pp. 153, 154, 1 pl.
5. "Pearl Oysters and Pearl Fisheries." Ceylon Observer, 1900, pp. 1—12.
6. "The Terrestrial Mollusca of Ambagamuwa." Journ. Ceylon Asiat. Soc., 1901, vol. xvi, pp. 1—8.

James G. Cooper.

Born June 19th, 1830. Died July 19th, 1902.

By the death of Dr. Cooper, Western America loses another of its pioneer zoologists. Born in New York in 1830, he received his degree in 1851, and two years later he was appointed physician on a government survey between St. Paul and Puget Sound. Here part of his duty was to make zoological and botanical collections, and after the abandonment of the survey in 1855, he continued his field work on the Pacific coast until 1865. In that year he was appointed Zoologist of the California State Geological Survey. Later he served as a surgeon in the Civil War, after which his life was spent in the practice of his profession.

Although interested in many branches of zoology, he published upwards of forty papers on the mollusca, many of great value and interest.

NOTES.

Physa virgata mut. alba, nov.—Shell pure white. Salt River at Tempe, Arizona, 1902, with the ordinary form.—T. D. A. COCKERELL.

Limax maximus, L., in the Hawaiian Islands.—I have recently received from Professor H. W. Henshaw a small collection of slugs from the neighbourhood of Hilo, amongst which is an example of *Limax maximus, L.* Externally the body is a deep yellow (in alcohol) with about nine irregular and broken black bands, the mantle is spotted with numerous black spots, mostly smaller than those composing the bands. The generative organs differ slightly from those of British or Continental specimens. This species has not hitherto been recorded from the Hawaiian Islands.—WALTER E. COLLINGE.

**PROCEEDINGS OF THE
MIDLAND MALACOLOGICAL SOCIETY.**

37TH MEETING, JUNE 13TH, 1902.

The President in the chair.

EXHIBITS.

By Mr. F. J. Partridge: *Succinea oblonga* from Braunton Marshes, North Devon, and examples of *Hydrobia jenkinsi*.

By Mr. Overton : *Planorbis umbilicalis* and monstrosities, *P. cornuus*, *Limnæa stagnalis*, *L. pereger*, and *Bythinia tentaculata*, from the Derby canal ; also *Limnæa stagnalis* from Sutton Coldfield.

By Mr. Collinge : *Limax nyclelius*, Bgt., from Washington, D.C., *Oloconcha dimidiata*, Pfr., from North Island, New Zealand, and a small collection of slugs from North America.

38TH MEETING, NOVEMBER 15TH, 1902.

The Meeting was held at the President's house.

The President in the chair.

It was unanimously decided (i) to undertake the preparation of a Record of the Molluscan Fauna of Warwickshire, and that Mr. H. Overton be the Recorder. Also (ii) the collection of statistics on the Early Colour Changes, Protective and Mimetic Colouring of Molluscs, and that Mr. Walter E. Collinge be the Recorder.

EXHIBITS.

The President exhibited part of his collection of Slugs, and Land and Freshwater Molluscs and Nudibranchs (in alcohol); the eggs of many species of molluscs, and a series of monographs and memoirs upon the anatomy of the Mollusca.

CURRENT LITERATURE.

Pilsbry, Henry A.—Tryon's Manual of Conchology, ser. ii, Index volume, pp. i—xcix ; vol. xv (pt. 57), pp. 1—48, pls. 1—15. Philadelphia : Academy of Natural Sciences.

The very useful Index volume contains a classification of the Bulimoid molluscs described in volumes x—xiv of the "Manual." Dr. Pilsbry explains that owing in part to the absence of anatomical data, and in part to the want of sufficient knowledge to interpret the facts in his possession, a number of groups belonging to the *Helicidae* were formerly referred to the *Bulimulidae* or "*Bulimidae*," by reason of the lengthened and Bulimoid contour of their shells. Investigations however, made during the progress of the volumes on the Bulimi, have shown the true relationships of several of these genera. We can scarcely over-estimate the value of this epitome.

Among a few of the changes we may cite the genus of *Gonyostomus*, Beck, formerly considered a sub-genus of *Bulimulidae* subordinate to *Auris*. Anatomical research, however, shows that it has no relation to *Auris* or other Bulimuline genera, but is a member of the *Strophochilinae*, and closely related to *Strophochilus*. *Thaumastus*, Albers, formerly considered a sub-genus of *Strophochilus*, is shown to be more nearly related to *Bulimulus*, *Auris* and *Plekocheilus*. Anatomical details are given of numerous other genera, and their bearing upon the classification considered.

In commencing volume xv we note a great improvement in the type, which has been changed from Long Primer to Small Pica, and the quality of the paper. White paper for the plates is still a desideratum. The volume opens with a consideration of the genera *Eucalodium*, Cr. and Fisch., *Anisospira*, Strebel, and *Coelocentrum*, Cr. and Fisch. In the last mentioned genus a

new variety, *estefaniae*, of *C. arctispira*, Pfr., is described and figured, and a new species *C. dispar*, from Guatemala.

Kowalevsky, A.—Études anatomiques sur le genre *Pseudovermis*. Mém. de l'Acad. Imp. d. Sci. St. Pétersb., 1901, T. xii., pp. 1—28, pl. i—iv.

The author returns to a further study of *Pseudovermis*, and confirms the opinion expressed in 1899 that it is a mollusc. It is classed among the Nudibranchia, and is most nearly related to *Eolis*. A new species, *P. papillifera*, is described from Mytilene, and the anatomy of that species and *P. paradoxus* are described, and illustrated by four very beautiful plates.

Thiele, Johannes.—*Pronoemia amboinensis*, n. sp. Jen. Denkschriften, 1902, Bd. viii, pp. 735—737, T. lxvi, figs. 5—9.

Dr. Thiele gives a description of this new species from Amboina, and a short account of the anatomy.

Kesteven, H. L.—The Protoconchs of certain Port Jackson Gasteropoda. Proc. Linn. Soc. N.S.W., 1901, pp. 709—716, pls. xxxv—xxxvi.

The author describes and figures the protoconchs of eleven species of Gasteropoda found in various bays in and around Port Jackson. The suggestion is made that where no varix has been thrown up, it may be that the mollusc has left no conchological record of the nepionic period.

Keller, W.—Die Anatomie von *Vaginula gayi* Fischer. Zool. Jahrb., Suppl. v, 1902, pp. 607—642, T. 18.

The author has investigated the anatomy of *V. gayi*, Fisch., on material brought home by Prof. Plate from Chili. After a description of the external features, and the structure of the integument, the pallial complex is described. The kidney is somewhat triangular in shape; the ureter is folded showing three limbs, the third opening into the base of the lung. The author also gives a corrected account of the kidney in *V. willeyi*, Cllge. The alimentary canal shows a well marked division into oesophagus, stomach, with cardiac and pyloric portions, and a strong, muscular, true stomach. The "liver" is divided into a fore-and hind-liver, the former consisting of eight lobes, and the latter of two. The generative organs are of the usual type.

The central nervous system is characterised by the extraordinary way in which the cerebral, pedal and visceral ganglia approximate to one another, and also with the small buccal ganglion. The nervous apparatus of the foot consists of a thick network of anastomosing fibres in connection with the pedal nerves.

Thiele, Joh.—Die systematische Stellung der Solenogastren und die Phylogenie der Mollusken. Zeit. f. wiss. Zool., 1902, Bd. lxxii, pp. 249—466, Tafn. xviii—xxvii u. 21 fign.

The author, after an exhaustive survey of the anatomy and phylogeny of the Amphineura, concludes that the Solenogastres are really a group of worms allied to the thread-worms (*Gordiidae*) and annelids, but, in the relation of the heart to the uterus, and in the possession of a rudimentary radula they approximate to the Mollusca, more especially to the *Chitonidae*.

Fleure, H. J.—Notes on the Relations of the Kidneys in *Haliotis tuberculata*, etc. Quart. Journ. Micro. Sci., 1902, vol. 46, pp. 77—96, pl. 6.

In connection with studies upon the Gastropod kidney, the author here gives an account of the relations of the kidneys in *Haliolis*, together with certain suggestions concerning the kidney and reproductive organs of the Monotocardia,

He is of opinion that in *H. tuberculata* there are two separate kidneys right and left of the pericardium, which open externally by separate apertures. The right kidney is the functional excretory organ. It communicates with the pericardium, and opening into it is the gonaduct. The left kidney, which does not communicate with the pericardium, is partly degenerating into lymphatic tissue, and is becoming connected with the efferent branchial vein by direct blood-channels. Practically the large anterior lobe of the right kidney, is an accessory genital organ *in posse*, and the external opening of the right kidney is evidently becoming a genital pore. This being so, the functional kidney must find an exit for its excretory products, and it seems probable that this is provided for by the external opening of the left kidney, which would thus be the homologue of the Monotocardian excretory aperture.

Mr. Fleure then discusses the views of various workers upon the derivation of the accessory reproductive organs of the Taenioglossa, and of their descendants the Opisthobranchs and Pulmonates, and the bearing of his investigations upon the same.

Hensgen, C.—Biometrische Untersuchungen über die Spielarten von *Helix nemoralis*. Biometrika, 1902, vol. 1, pp. 468—492, with 3 maps and 10 figs.

The author has made an elaborate study on the distribution of the markings on the shell of *Helix nemoralis* found in the ditches and ramparts of the old Strasburg fortifications, which illustrates the influence of segregation and environment. Statistics of the markings prove that many mathematically possible combinations are not necessarily represented in nature. The basis is laid for further biometric work on other local races of this species, and for observing on captive individuals the laws of inheritance in the shell markings thus classified.

Hedley, Charles.—Scientific Results of the Trawling Expedition of H.M.C.S. "Thetis."—Mollusca, pt. i. Mem. Aust. Mus., 1902, vol. iv, pp. 287—324, figs. 39—60.

In the present report the author treats of the Brachiopoda and Pelecypoda obtained on this expedition, four species are recorded of the former phylum and sixty-four of the latter. Among the Pelecypoda two new genera are described, viz., *Pronucula*, which differs from *Nucula* in the character of the hinge and in the possession of a more prominent radial sculpture (type *P. decorosa*, n. sp.), and *Cuna*, a genus of the *Crassatellitidae*, embracing *C. concentrica*, n. sp., the type, *Kellia atkinsoni*, T. Woods, *Carditella delta*, Tate and May, etc. *Cyrella dalli*, n. sp., and *Condylocardia projecta*, n. sp., add two new genera to the Australian fauna. There are thirteen other new species described and figured.

Hedley, Charles.—A new Australian Volute. Rec. Aust. Mus., 1902, vol. iv, p. 309, fig. 23.

Voluta perflicata, n. sp., allied to *V. thatcheri*, McCoy.

Hedley, C.—Studies on Australian Mollusca. Pt. vi. Proc. Linn. Soc., N.S.W., 1902, pp. 1—29, pls. i—iii.

Continuing this important series of papers Mr. Hedley describes as new *Bornia filosa*, *Congerina lunata*, a genus new to the Australian fauna, *Maetra parkesiana*, *Pyrgulina perspectiva*, *P. senex*, *P. zea*, *P. umeralis*, *Crossea biconica*, *C. galliffi*, *Teniosstoma involuta*, *Liotia corona*, *L. incidata*, and *Mecol-*

folia spinosa. There are notes on numerous other species, on the genera *Clitoceras* and *Lippistes*, and on Perry's Australian Shells. All the new species are figured, in addition to many others, and figures of the operculum, jaw, and radula of *Permetus caferatus*, Tate and May, are also given.

Kesteven, H. L.—The Systematic Position of the genus *Fossarina*, A. Adams and Angus, and of *Fossarina varia*, Hutton. Rec. Aust. Mus., 1902, vol. iv, pp. 317—322, figs. 28—35.

From an examination of the radula and operculum of *F. patula*, the author is of opinion that *Minos*, Hutton, is only a synonym of *Fossarina*, which latter genus should be placed in the *Trochidae*, between *Gibbula* and *Margarita*.

Discussing next the *F. varia* of Hutton, the author shows that in addition to anatomical differences, which he proposes to describe later, it has a subspiral operculum, and a dentition showing relations to *Littorina*, it therefore becomes necessary to propose a new genus for its reception, to which the name *Risclopsis* is given. The teeth, operculum and shell are figured and described, and a new variety—*carinata*, described and figured.

Willey, Arthur.—Contribution to the Natural History of the Pearly Nautilus.

A. Willey's Zool. Results, 1902, pt. vi, pp. 691-830, pls. lxxv-lxxxiii, a map, and 33 figs. in text.

Although Dr. Willey failed to obtain material for the study of the embryonic development of the pearly Nautilus, he has given a most interesting account of his search for the same, and a valuable resumé of previous work upon Nautilus. Some of the new observations contained in the present memoir have been already published in a preliminary form, they are now published in detail, and relate principally to the following aspects of the subject:—binomics (habits, range, oviposition), branchial sense organs (osphradia), mechanism of respiration, injection of the vascular system, connections of the siphuncle, innervation of the ophthalmic tentacles, development of the accessory sexual organs, enumeration of the digital tentacles, orientation, and specific divergence.

When compared with its former world-wide distribution, the present restricted range of the genus has a special interest. It is wholly confined to the seas adjoining the islands of the Eastern Archipelago, which includes the East Indies, Philippines, New Guinea and its dependencies, Solomon Islands, New Caledonia, New Hebrides, and Fiji. The distribution of the species is still more interesting. *N. pompilius* is never taken in the New Caledonian Group of Islands, while *N. macromphalus* is never taken anywhere else. Of the three species *pompilius*, *macromphalus*, and *umbilicatus*, the first has the widest known range, occurring in the Philippines, Moluccas, Bismarck Archipelago, Torres Straits, New Hebrides, and Fiji; the second is confined to the New Caledonian Archipelago; while the third overlaps that of the first.

The paper is well illustrated by nine excellent plates, a map, and numerous figures in the text.

Bergh, R.—The Danish Expedition to Siam 1899-1900. Results of the Zoological Collections made by Dr. Th. Mortensen. I. Gasteropoda opisthobranchiata. Mém. d. l'Acad. Roy. de Danemark, 1902 (6th ser. Sect. d. Sci.), T. xii, pp. 161-218, T. i-iii and map.

The list of the Opisthobranchia obtained by Dr. Mortenson includes seven Tectibranchia, one Ascoglossa, and fourteen Nudibranchia. There are eight new species and one new genus, viz., *Aplysia immunda*, *Aplysiella incerta*, *Adesia ocelligera*, *Idaltia flebeia*, *Doriopsisilla pallida*, *Marionia chloanthes*, *Melibe*

bucephala, and *Nossis* (gen. nov.) *indica*. This last genus is closely related to *Samla*. A welcome contribution to the anatomy of the little known genus *Aclesia* is supplied in the account of the structure of the new species, which is described in some detail.

Ridewood, W. G.—On the Structure of the Gills of Lamellibranchia. Proc. Roy. Soc., 1902, vol. lxx, pp. 499, 500.

Dr. Ridewood has examined the structure of the gills in 215 species of Lamellibranchia, belonging to 118 genera. He is of opinion that the minute structure of the gill, like the gross, cannot, except in a very broad way, be regarded as an indication of genetic affinity. Three main types can be recognised. The first, found in the *Nuculidae* and *Solenomyidae*, is characterised by the mutual freedom of the gill lamellae. For these the author proposes to retain the term Protobranchia (Pelseneer). In the remaining two types the filaments are held in juxtaposition by interlocking cilia, which occur in circular patches on their anterior and posterior faces, or by regularly arranged horizontal bars of cellular tissue. For the former type the author proposes the term eleutherorhabdic, and for the latter synaptorhabdic.

We hope to give a further and longer review when the complete paper is published.

Gude, G. K.—A synopsis of the genus *Streplaxis* and its allies. Proc. Malac. Soc. Lond., 1902, vol. v, pp. 201-244, pl. iv.

Mr. Gude here gives a very valuable synopsis of the genera *Streplaxis*, Gray (with 165 species), *Happia*, Bourg. (with 13 species), and *Scolodonta*, Döring (with 17 species). *S. leonensis*, Pfr., *S. burneus*, Pfr., *S. gibbosus*, Pfr., *S. sinuosus*, Pfr., *S. anceyi*, Mab., *S. subbulbulus*, Mlldff., and *S. dipledon*, Mlldff., are figured.

Sykes, E. R.—The Zoological Record, 1901, vol. xxxviii. Record vii. Mollusca. pp. 102, London, 1902.

We heartily welcome another year's Record, which still remains the most complete and thorough work of its kind.

Owing to ill-health, Mr. G. C. Crick has not been able to assist this year, and Mr. S. Pace has taken over a share of the work. A few alterations have been made which will still further facilitate reference. The Anatomical and Biological headings have been re-classified, and under the heading "Geological," the Tertiary entries have been arranged geographically, finally a paragraph has been inserted giving details respecting Biographies, Obituary Notices, etc.

Sykes, E. R.—The Zoological Record, 1901, vol. xxxviii. Record viii. Brachiopoda. pp. 12, London, 1902.

No less than 98 titles of papers, etc., are given, which is by far the largest number for many years past.

Ihering, H. von.—As Melanias do Brazil. Rev. Museu Paulista, 1901 [1902], vol. v, pp. 653-681, figs. 1-3.

The author describes and figures the following new species: *Doryssa schuffi*, *D. rixosa*, and a new variety—*araguayana*—of *Hemisinus tenuilabris*, Rve. The distribution in space and time is discussed, and a key to the genera *Doryssa* and *Hemisinus* is given. In all 33 species are recorded.

Suter, H.—On the Land Mollusca of Little Barrier Island. Trans. N. Z. Inst., 1901, vol. xxxiv, pp. 204-206.

Mr. Suter records twelve species from this island.

- Suter, H.**—List of the species described in F. W. Hutton's Manual of the New Zealand Mollusca, with the corresponding names used at the present time. *Ibid.*, pp. 207—224.
- Suter, H.**—Observations concernant les "Considérations sur les faunes malacologiques des parties Australes du globe par M. C. F. Ancey." *Journ. de Conchyl.*, 1902, vol. xlix, pp. 316—324.
- Babor, J. F.**—Zur Histogenese der Binde-substanzen bei Weichtieren. I. Entstehung der elastischen Fasern. II. Die Entwicklung des knorpeligen Schädels bei *Eledone moschata*. *Verhandl. d. V. Int. Zool. Con.* Berlin, 1902. pp. 1—8.
- H[armer], S. F.**—Henri de Lacaze-Duthiers. 1821—1901. *Year-Book of the Roy. Soc.* no. 6. 1902, pp. 1—5.
- Hoyle, William E.**—Two points in Nomenclature. *Journ. Conch.*, 1902, vol. 10, p. 214.
Replying to a note by Mr. R. B. Newton, the author defends the use of the name *Cyprina*, and points out that the generic term *Antiocha* is preoccupied by Meigen, 1800, for a genus of Diptera.
- Kennard, A. S. and Woodward, B. B.**—On the non-marine Mollusca from the Holocene deposits at London Wall and Westminster. *Proc. Malac. Soc. Lond.*, 1902, vol. v, pp. 180-182.
The authors' record from the London Wall excavations 6 species of marine and 34 non-marine, of the latter the most noteworthy are *Planorbis glaber*, *P. foulans*, and *Sphaerium lacustre*. Those from Westminster, which are 22 in number, are all common forms in Holocene beds.
- Wright, B. H. and Walker, Bryant.**—Check List of North American Naiades. Detroit: 1902, pp. 19.
This useful check list is based upon Mr. C. T. Simpson's Synopsis, with certain corrections, and the addition of species described since the publication of that valuable work. The List is divided into two parts; the first giving a systematic arrangement and the second a catalogue of the species. The two might with great advantage have been put together.
- Carter, C. S.**—*Pisidium subtruncatum* near Louth, *Linc. N. Nat.*, 1902, p. 292.
- Smith, Edgar A.**—On the supposed Similarity between the Mollusca of the Arctic and Antarctic Regions. *Proc. Malac. Soc. Lond.*, 1902, vol. v, pp. 162-166.

EDITOR'S NOTES.

On completing another volume the Editor tenders his grateful thanks to all who have in any way furthered the interests of the Journal, during 1902.

During the year the number of subscribers has slightly increased, which has enabled me to continue the illustrations as heretofore, and will, I hope, permit of a further increase during 1903.

In maintaining and furthering the value and usefulness of the Journal, the Editor trusts to the co-operation of all subscribers.

INDEX TO VOLUME IX.

A.	PAGE
Afghanistan. List of the Helicoid Land Shells of ...	101
<i>Alcacus kelantanense</i> , n. sp. (fig.)	62
<i>Amalia carinata</i> . Risso? Is ... a British Slug. ...	63
<i>Amalia carinata</i> . Further notes on <i>Amphidromus percersus</i> , L.	
Anatomy of ...	81
Anatomy of <i>Amphidromus percersus</i> , L. (figs.) ...	81
Anatomy of <i>Apofarmarion partridgeii</i> , n. sp. (figs.) ...	74
Anatomy of <i>Atopos sarasini</i> , n. sp. (figs.) ...	88
Anatomy of <i>Girasia peguensis</i> , Theob. (figs.) ...	76
Anatomy of <i>Hemiplecta humphreysiana</i> , Lea. (figs.) ...	79
Anatomy of <i>Myolesta fruhstorferi</i> , Cllege. (figs.) ...	12
Anatomy of <i>Myolesta punctata</i> , Cllege. (figs.) ...	13
Anatomy of <i>Solen ensis</i> , L. (figs.)	18
Anatomy of <i>Solen marginatus</i> , Pult. and Don. ...	20
Anatomy of <i>Solen pellucidus</i> , Penn. (figs.) ...	20
Anatomy of <i>Solen siliqua</i> , L. ...	20
<i>Ancistromesus</i> , Dall. ...	111
<i>Anodonta cygnea</i> , L. Notes on some further malformed specimens of ...	96
<i>Apera</i> , Heyn. ...	86
<i>Apera burnupi</i> , E. A. Smith. [Generative organs]. (fig.) ...	86
<i>Apofarmarion</i> , n. gen. ...	73
<i>Apofarmarion partridgeii</i> , n. sp. (figs.) ...	73
<i>Apofarmarion partridgeii</i> . Anatomy of ...	74
Arabia. List of the Helicoid Land Shells of ...	103
Armenia. List of the Helicoid Land Shells of ...	112
Asia Minor (Mainland). List of the Helicoid Land Shells of ...	117
Asia Minor (Islands of). List of the Helicoid Land Shells of ...	120
Asiatic Russia. List of the Helicoid Land Shells of ...	97
<i>Atopos</i> , Simr. ...	87
<i>Atopos harmeri</i> , n. sp. (figs.) ...	89
<i>Atopos laidlawi</i> , n. sp. (figs.) ...	90
<i>Atopos punctata</i> , n. sp. (figs.) ...	90
<i>Atopos rugosus</i> , n. sp. (figs.) ...	90
<i>Atopos sarasini</i> , n. sp. (figs.) ...	87
<i>Atopos sarasini</i> . Anatomy of ...	88
B.	
Bloomer, H. H.—“The Anatomy of the British species of the genus <i>Solen</i> . Pt. iii.” ...	18
—“Notes on some further malformed specimens of <i>Anodonta cygnea</i> , L.” ...	96
—“The Anatomy of the British species of the genus <i>Solen</i> . Pt. iv.” ...	133
<i>Boysidia kelantanense</i> , n.sp. (figs.)	61
<i>Buccinum</i> , <i>Fusus</i> , etc. Notes on the British species of ...	35
C.	
<i>Chloritis (Sulcobasis) prestoni</i> , n. sp. (figs.) ...	59
Chusan. List of the Helicoid Land Shells of ...	54
<i>Clausilia (Pseudonenia) kelantanense</i> , n. sp. ...	22
<i>Clausilia kelantanense</i> , Sykes. (figs.)	61
<i>Clausilia penangensis</i> , Stol. var.	84
Cockerell, T. D. A.—“ <i>Physa virgata</i> mut. <i>alba</i> , nov.” ...	138
Collett, Oliver. Obituary. ...	137
Collinge, Walter E.—“On the Anatomy of the genus <i>Myolesta</i> , Cllege.” ...	11
—“Description of a new species of <i>Onchidium</i> from South Africa.” ...	17
—“Is <i>Amalia carinata</i> , Risso, a British Slug?” ...	63

- “On the non-operculate Land and Freshwater Molluscs collected by the Members of the “Skeat Expedition” in the Malay Peninsula, 1899-1900.” ... 71
- “Some notes on the genus *Prisma*, Sinroth.” ...
- “Further notes on *Amal-ia carinata*, Risso.” ... 129
- “*Limax maximus*, L., in the Hawaiian Islands.” ... 138
- Cooper, James G. Obituary. ... 138
- Corea. List of the Helicoid Land Shells of ... 54
- Cryfloscnelus*, n. gen. ... 76
- Cryfloscnelus gracilis*, n. sp. (figs.) ... 76
- Cryflosoma*, sp. ... 77
- Current Literature. ... 26, 67, 105, 139
- Cyprus. List of the Helicoid Land Shells of ... 125
- D.
- Description of a new species of *Gomphina* from New Zealand. ... 109
- Description of six new Land Shells from the Malay Peninsula. ... 22
- Description of a new species of *Onchidium* from South Africa. ... 17
- Description of a new species of *Separatista* from New Zealand. ... 65
- E.
- Editor's Notes ... 34, 70, 108, 144
- F.
- Formosa. List of the Helicoid Land Shells of ... 55
- Fusus consimilis*, n. sp. ... 49
- Fusus gracilis*, Da Costa, var. *glaber*, Verk., new to Britain. ... 44
- Fusus profinguis*, Ald. var. *laevis*, n. var. ... 46
- G.
- Girasia peguensis*, Theob. Anatomy of the generative organs. ... 76
- Gomphina maorum*, n. sp. (figs.) ... 109
- Gude, G. K.—“A Classified List of the Helicoid Land Shells of Asia.” ... 1
- “A Classified List of the Helicoid Land Shells of Asia. Part ii.” ... 51
- “Description of a new species of *Chloritis* from New Guinea.” ... 59
- “A Classified List of the Helicoid Land Shells of Asia. Part iii.” ... 79
- “A Classified List of the Helicoid Land Shells of Asia. Part iv.” ... 112
- H.
- Hainan. List of the Helicoid Land Shells of ... 57
- Hawaiian Islands. *Limax maximus*, L., in the ... 138
- Helicoid Land Shells of Asia. A Classified List of the ... 1, 51, 112
- Hemiplecta humphreysiana*, Lea. Internal structure of ... 78
- Hong Kong. List of the Helicoid Land Shells of ... 56
- Hypsclostoma laidlawi*, n. sp. (figs.) ... 83
- K.
- Kowalevsky. Obituary. ... 137
- Kurdistan. List of the Helicoid Land Shells of ... 102
- L.
- Limax maximus*, L., in the Hawaiian Islands. ... 138
- Linnaca pereger*, Müll. A mal-formed variety of (figs.) ... 64
- M.
- Macrochlamys coeligena*, n. sp. (figs.) ... 22
- Malay Peninsula. New Land Shells from the ... 97
- Malay Peninsula. On a collection of Land and Freshwater Shells from Kelantan. ... 60
- Malay Peninsula. On the non-operculate Land and Freshwater Molluscs collected by the Members of the “Skeat Expedition” in the ... 71
- Marshall, J. T.—“Notes on the British species of *Buccinum*, *Fusus*, etc.” ... 35
- Mesopotamia. List of the Helicoid Land Shells of ... 102
- Metamentalina*, n. group. ... 105
- Möllendorff, O. F.—Obituary. C. A. F. Wiegmann. ... 24
- Mongolia. List of the Helicoid Land Shells of ... 53
- Myolestidae*, n. fam. ... 11

Myosteta, Cllge. 11
Myosteta fruhstorferi, Cllge. (figs.) 12
Myosteta punctata, Cllge. (figs.) 13

N.

Ncomeniatina, n. group. ... 105
 New Guinea. Description of a new species of *Chloritis* from ... 52
 New Zealand. Description of a new species of *Gomphina* from 109

O.

Obituary. 24, 137
Onchidium burnupi, n. sp. (figs.) 17
Opisthoporus dautzenbergi, n. sp. 23
Opisthoporus dautzenbergi, Sykes. (figs.) 61
Opisthosoma laidlawi, n. sp. 22
Opisthosoma laidlawi, Sykes. (figs.) 62
Ostracolethe fruhstorferi, Simr. ... 14
 Overton, H.—“On a malformed variety of *Limnaca pereger*, Müll.” 64

P.

Padangia, Babor. 86
Paracomeniatina, n. group. ... 105
Paraparmarion, n. gen. 75
Paraparmarion elongatus, n. sp. (figs.) 75
Patella kermadecensis, Pilsbry. (figs.) 111
 Persia. List of the Helicoid Land Shells of 103
Physa virgata, mt. *alba*, nov. ... 138
Platyrhapha chrysalis, n. sp. ... 23
Platyrhapha chrysalis, Sykes. (figs.) 61
Prisma, Simr. 85
Prisma, Simroth. Some notes on the genus 129
Prisma heynemanni, Simr. (figs.) 131
Prisma prismatica, Tap.-Can. (figs.) 130
Prisma smithi, n. sp. (figs.) ... 130

R.

Rathonsiidae. 84, 87
Rhodina (?) *mirabilis*, n. sp. ... 22
Rhodina (?) *mirabilis*, Sykes. (figs.) 61

S.

Separatista benhami, n. sp. (fig.) 65
 Siberia. List of the Helicoid Land Shells of 99
 “Skeat Expedition.” Land and

Freshwater Mollusca collected by 71
 Smith, Edgar A.—“Description of a new species of *Gomphina* from New Zealand.” ... 109
Solen. Anatomy of the British species of the genus 18, 133
Solen ensis, L. Nervous system. 18
Solen marginatus, Pult. and Don. Nervous system. 20
Solen pellucidus, Penn. Alimentary canal. 134
Solen pellucidus, Penn. Circulatory system. 135
Solen pellucidus, Penn. Eternal characters. 133
Solen pellucidus, Penn. Musculature. 134
Solen pellucidus, Penn. Nervous system. 135
Solen siliqua, L. Nervous system. 20
 South Africa. New species of *Onchidium* from 17
Streptaxis collingei, n. sp. ... 22
Streptaxis collingei, Sykes. (figs.) 60
Streptaxis striatula, n. sp. (figs.) 73
Streptaxis sykesi, n. sp. (figs.) ... 72
 Suter, Henry.—“Description of a new species of *Separatista* from New Zealand.” ... 65
 —“On the Systematic Position of *Patella kermadecensis*, Pilsbry.” 111
 Sykes, E. R.—“Description of six new Land Shells from the Malay Peninsula.” 22
 ———“On a collection of Land and Freshwater Shells from Kelantan, Malay Peninsula.” 60
 Syria (including Palestine). List of the Helicoid Land Shells of 126

T.

Tibet. List of the Helicoid Land Shells of 51
 Transcaucasia. List of the Helicoid Land Shells of 113
 Turkistan, Western. List of the Helicoid Land Shells of ... 52
 Turkistan, Western. List of the Helicoid Land Shells of ... 97

V.

Vernicella, sp. 84

W.

Wiegmann, C. A. F.—Obituary. 24

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "The Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

LECTURER ON ZOOLOGY AND COMPARATIVE ANATOMY IN THE
 UNIVERSITY OF BIRMINGHAM.

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR. CHARLES HEDLEY, F.L.S.
 THE REV. A. H. COOKE, M.A., F.Z.S. E. R. SYKES, B.A., F.Z.S., F.L.S.
 B. B. WOODWARD, F.G.S., F.L.S.

Contents.

	PAGE
Notes on the references for authorship of species, as given in Jeffreys, British Conchology, Volume II—V. By the Rev. A. H. Cooke, M.A., F.Z.S.	1
Description of two new species of Helicoid Land Shells. By G. K. Gude, F.Z.S.	14
Description of two new species of <i>Microparmarion</i> from the Andaman Islands. By Walter E. Collinge.	16
Note on <i>Myrina simpsoni</i> , Marsh. By J. T. Marshall.	19
Malacological Notes. By E. R. Sykes, B.A., F.L.S.	20
NOTES— <i>Helix lapicida m. sinistrorsum</i> By Prof. T. D. A. Cockerell.	21
<i>Trichomya</i> , von Ihering. By Prof. T. D. A. Cockerell.	21
Dates of publication of Forbes and Hanley's Hist. Brit. Moll. By B. B. Woodward.	21
Investigations on the Variation and Life-history of British L. and F. Molluscs.	22
Proceedings of the Midland Malacological Society.	22
Current Literature.	23
General Reviews.	30
Editor's Notes.	32

"The Journal of Malacology" is issued to Subscribers only. The Prepaid
 Subscription is 12s. per volume.

LONDON MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

Bacteriological, Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.

SPECIALITY: BALANCES & WEIGHTS.

PURE CHEMICALS.

CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, AND SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS,

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

Large Selection of Glass Globes, etc.

CONTRACTORS TO MASON UNIVERSITY COLLEGE.

MICROSCOPICAL & LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6s. per dozen.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1. 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1. 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of my very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

ABRAHAM FLATTERS,

16 & 18, CHURCH ROAD, LONGSIGHT, MANCHESTER.

Preparer of Textile Fibres and Demonstrator in Microscopy to the Manchester Municipal Technical School.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements.

JOHN J. HEATH,

ESTABLISHED 1828,

General Engraver, Stationer, &c., &c.

BRASS DOOR PLATES,

Suitable for Professional Men and others, executed in the best manner, at reasonable prices.

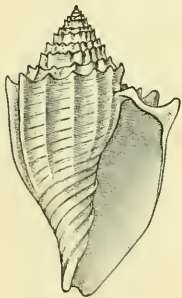
SKETCHES AND ESTIMATES

FREE ON APPLICATION.

MEDICAL ACCOUNT FORMS ENGRAVED AND IN FACSIMILE, &c.

REMOVED FROM 11, GREAT CHARLES STREET,
TO

FLEET STREET, SUMMER ROW,
BIRMINGHAM.



MR. F. J. PARTRIDGE,

ARTIST AND SCIENTIFIC DRAUGHTSMAN,

is prepared to execute Drawings to illustrate Authors' Papers in all branches of Zoology.

A Speciality made of Malacological Work.

Reference is kindly permitted to the Editor of this Journal, and others.

For Estimates and Specimens of Plain and Coloured Work,

Apply—F. J. PARTRIDGE,

25, NOEL ROAD, EDGBASTON, BIRMINGHAM.

E. F. SPICER, F.Z.S.,

Taxidermist,

61, SUFFOLK STREET,



NEXT TO THE TECHNICAL
SCHOOL.

BIRMINGHAM.

PATRONISED BY THE ROYAL FAMILY.

SEVERAL GOLD AND SILVER MEDALS AWARDED.

Birds, Animals, Fish, etc., mounted in the best manner.

Please mention this Journal in replying to Advertisements.

Just published. Price six shillings net; to subscribers to the series five shillings net.

DIGESTA MALACOLOGICA

No. 1.

A SUMMARY OF
THE
AMERICAN JOURNAL OF CONCHOLOGY
1865—1872.

BY
E. R. SYKES.

LONDON:
WILLIAM WESLEY & SON,
28, ESSEX STREET, STRAND.

1901.

Extract from Preface.

IT has been a constant source of difficulty for many years past to ascertain what work has been done by our predecessors relating either to a special genus or to some faunal district; with the idea of rendering some assistance to students, the present work has been undertaken. With a view to furnishing an index to the periodical now dealt with, the few species described in its pages which do not belong to the Mollusca have been included; in future work, however,—and it is hoped, if sufficient support be forthcoming, to deal with other periodicals such as the 'Zeitschrift für Malakozoologie,' 'Annals and Magazine of Natural History,' &c.—no forms will be included which are not, in the strictest sense, Molluscs.

The general arrangement is that of the 'Zoological Record.'

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Conchologist, a Journal of Malacology."

No. 1.

MARCH, 1900.

VOL. VIII.

Contents:

	PAGE
Notes on the references for authorship of species, as given in Jeffreys, British Conchology, volumes II—V.	
By the Rev. A. H. Cooke, M.A., F.Z.S.	1
Description of two new species of Helicoid Land Shells.	
By G. K. Gude, F.Z.S.	14
Description of two new Species of <i>Microparmarion</i> from the Andaman Islands. - - -	
By Walter E. Collinge.	16
Note on <i>Myrina simpsoni</i> , Marsh. - - -	
By J. T. Marshall.	19
Malacological Notes. - - -	
By E. R. Sykes, B.A., F.L.S.	20
NOTES: <i>Helix lapicida</i> m. <i>sinistrorsum</i> .	
By Prof. T. D. A. Cockerell.	21
<i>Trichomya</i> , von Ihering. By Prof. T. D. A. Cockerell.	21
Dates of publication of Forbes and Hanley's Hist. Brit. Moll. - - -	
By B. B. Woodward.	21
Investigations on the Variation and Life-history of British L. and F. Molluscs. - - -	
- - - - -	22
Proceedings of the Midland Malacological Society - - -	22
Current Literature - - - - -	23
General Reviews - - - - -	30
Editor's Notes - - - - -	32

SALT & SON,

Surgical Instrument & Appliance
Manufacturers

TO THE

BIRMINGHAM & MIDLAND HOSPITALS.

SURGICAL, SCIENTIFIC, & OPTICAL INSTRUMENTS

OF EVERY DESCRIPTION.

5, Cherry Street, Birmingham.

Please mention this Journal in replying to Advertisements.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL. MUSEUMS SUPPLIED.

Address—**H. B. PRESTON, F.Z.S.,**

3, Sydney Terrace, Fulham Road, London, S.W.

Two minutes walk from South Kensington Station.

Celenterata, Annelida, Echinodermata, Crustacea, Insecta, Arachnoidea,
Myriopoda, Amphibia, Reptilia, Fishes, &c., dry and in spirits.

A LARGE STOCK OF RECENT SHELLS.

British and Foreign Fossils, Minerals, Rocks, &c. Coloured Casts of rare
and figured Fossils. Sets of Fossils, Minerals, &c., for Students.

Address—**R. F. DAMON, Weymouth, England.**

BUTTERWORTHS,

ENGRAVERS, ARTISTS, ETC.,

SAVOY HOUSE, 115, STRAND, LONDON, W.C.

ADAM J. BROWN & SON,

Tailors and Breeches Makers,

111, COLMORE ROW,

BIRMINGHAM.

Established 1874.

Please mention this Journal in replying to Advertisements.

THE MANUAL OF CONCHOLOGY.

Founded by the late Geo. W. Tryon, Jun., continued under the care of the Conchological Section. Academy of Natural Sciences of Philadelphia, by Henry A. Pilsbry, Conservator.

The **Manual of Conchology** is a *fully illustrated* monography of recent molluscs. Issued in octavo form, in quarterly parts. Each part comprises 64 (or more) pages of letterpress, and 15 to 20 plates.

The Second **SERIES** is now in progress: the **FIRST**, Marine Univalves, of which sixteen volumes have appeared finished that series as planned by its illustrious founder. A supplemental volume to this series will be issued this year, to contain the Dentaliidae. Of the present **SERIES**, Terrestrial Molluscs, ten volumes have been published, completing **HELI**X with Index. A few copies of Vol. IX, "GUIDE TO THE STUDY OF HELICES," will be sold separately at the regular subscription price. Separate copies of the Index, suitable for the purposes of a Catalogue or Check list, can also be had at \$1.00 each.

The Monography of the *Bulimi* was commenced in the tenth volume.

The illustrations of the Manual have received high commendation, and are fully equal to the best figures of shells published.

Prices:—Plain (uncoloured) edition, \$3.00 per part. Coloured edition, \$5.00 per part. Fine edition (both coloured and India-tinted plates) \$8.00 per part.

Structural and Systematic Conchology, by GEO. W. TRYON, JUN.

A COMPLETE CONCHOLOGICAL TEXT BOOK of 1,200 pages, 140 plates and over 3,500 figures of Genera, Anatomy, &c. Three volumes bound in one. Cloth. Price \$6.00.

For further information or descriptive circular, with sample plates of Manual, address:—

S. RAYMOND ROBERTS, Treasurer.

P. O. Address GLEN RIDGE, NEW JERSEY, U.S.A.

Important Reduction of Price.

2 volumes (7 parts with 2 Supplements) 2061 pages,
Royal Octavo, 1886-1890.

DR. C. A. WESTERLUND'S

FAUNA OF THE PALAEARCTIC LAND AND FRESH-WATER MOLLUSCA,

(IN GERMAN LANGUAGE).

Reduced in Price from £3. 9s. od. to £2. 1s. od. post free.

After the sale of a limited number of copies the original price will again be charged.

R. FRIEDLÄNDER & SOHN, BERLIN, N.W.

THE JOURNAL OF CONCHOLOGY,

THE ORGAN OF THE CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.

HON. SECRETARY, W. E. HOYLE, M.A.,

THE OWENS COLLEGE, MANCHESTER.

Annual Subscription, 5s.

The number for January, 1901, commences a new volume and contains a list of British Marine Mollusca, revised and brought up to date by a Committee of the Society.

Please mention this Journal in replying to Advertisements.

IMPORTANT NOTICE.

The price of Volume vii of the 'JOURNAL OF MALACOLOGY' has been advanced to 15s. 6d. NEW SUBSCRIBERS may obtain copies at the original price, 12s., if ordered when subscribing to Volume viii. As only a few complete sets of Volume vii remain, early application should be made.

The Editor desires to purchase clean copies of Volumes iii, iv, v, and vi, in their original paper covers.

WANTED well preserved Specimens (in alcohol) of the following genera of Molluscs:—

Africarium, G.-A.	Gibbulina, Beck.	Parmacella, Cuv.
Anadenus, Heyn.	Glandina, Shm.	Parmella, H. Ad.
Apera, Heyn.	Helicarium, Fér.	Paryphanta, Albers.
Ariolimax, Mörch.	Hyalimax, H. & A. Ad.	Peltella, Webb. & Van B.
Aspidelus, Morel.	Hesperarion, Simr.	Plutonia, Stab.
Austenia, G.-A.	Hemphillia, Bld. & B.	Prophysaon, Bld. & B.
Aerope, Albers.	Ibycus, Heyn.	Pseudomilax, Btgr.
Ariunculus, Less.	Janella, Gray.	Rhytida, Albers.
Binneya, J. G. Coop.	Letourneuxia, Bgt.	Schizoglossa, Hedley.
Cystopelta, Tate.	Lithotis, Blanf.	Selenochlamys, Btgr.
Collingea, Simr.	Lytopelte, Btgr.	Tebennophorus, Binn.
Cryptostracon, W.G.B.	Microparmarion, Simr.	Trichotoxon, Simr.
Damayantia, Issel.	Mariaella, Gray.	Trigonochlamys, Btgr.
Daudebardia, Htm.	Neojanella, Ckll.	Testacella, Cuv.
Ennea, H. & A. Ad.	Omalonyx, d'Orb.	Urocyclus, Gray.
Estria, Poirier.	Oopelta, Mörch.	Velifera, W. G. Binn.
Eumilax, Btgr.	Otoconcha, Hutt. n.	Veronicella, Blain.
Girasia, Gray.	Parmacochlea, E. A. Sm.	Vitrinopsis, Semp.
Geomalacus, Allm.	Parmarion, Fisch.	Zonites, Montf.

Full particulars stating names of species, number of specimens, price or desiderata, should be addressed to W. E. COLLINGE,

The University,
Birmingham.

A Monograph of the Slugs of the British Isles (In preparation).

It is intended in this work to give a full and exhaustive account of the Natural History of the Slugs of the British Isles, together with figures and full descriptions of all the known species and varieties. Special attention will be given to the anatomy and variation.

Specimens of any British species or varieties will be gratefully acknowledged.

All communications should be addressed to—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM.

Please mention this Journal in replying to Advertisements.

"Any one study, of whatever kind, exclusively pursued, deadens in the mind the interest, nay, the perception of any others."—JOHN HENRY NEWMAN.

ESTABLISHED 1865.

Punctually on the 25th of previous month. PRICE SIXPENCE.

SCIENCE GOSSIP.

EDITED BY JOHN T. CARRINGTON, ASSISTED BY F. WINSTONE.
Illustrated. Most Varied Contents. Largest Circulation.

The only Scientific Magazine with Independent Offices.

"SCIENCE GOSSIP" is now one of the brightest and most diversified monthlies for the lover of science.

SUBSCRIPTIONS (6s. 6d. per annum, including postage) may begin at any time.
Send Six Stamps for Specimen Copy.

Publishing and Editorial Offices,
110, STRAND, LONDON, W.C.

All Business and Editorial
Communications to be addressed to



Editor and Manager

THE IRISH NATURALIST,

A MONTHLY JOURNAL OF GENERAL IRISH NATURAL HISTORY.

BOTANY ZOOLOGY GEOLOGY

EDITED BY GEO. H. CARPENTER, B.Sc., AND R. LLOYD PRAEGER, B.A.

THIS MAGAZINE should be in the hands of all NATURALISTS interested in the distribution of animals and plants over the British Islands.

6d. Monthly. Annual Subscription (Post free) 5s.

DUBLIN: EASON & SON, 40, Lower Sackville Street,

To WHICH ADDRESS SUBSCRIPTIONS SHOULD BE SENT.

LONDON: SIMPKIN, MARSHALL, HAMILTON, KENT & CO.

THE NAUTILUS.

A MONTHLY DEVOTED TO THE INTERESTS OF CONCHOLOGISTS.

EDITORS AND PUBLISHERS:

H. A. PILSBRY,

Conservator Conchological Section, Academy Natural Sciences, Philadelphia.

C. W. JOHNSON,

Curator of the Wagner Free Institute of Science, Philadelphia.

\$1.00 per year. \$1.12 to Foreign Countries. 10 cts. a copy.

The NAUTILUS is the only magazine in America devoted to the study of Mollusks. Its scope is broad, including articles on recent and fossil shells, often illustrated; on the anatomy and classification of *mollusca*; and papers of popular interest dealing with experiences of collectors in the field. Notes on current publications at home and abroad, showing the drift of opinion on conchological subjects, are a valuable feature. *Indispensable to the Conchologist and Paleontologist.*

Exchange Column free to Subscribers.

THE NATURALIST:

A Monthly Journal of Natural History for the Northern Counties of England, viz.:—

Northumberland, Durham, Yorkshire, Lincolnshire, Derbyshire,
Nottinghamshire, Cheshire, Lancashire, Westmoreland,
Cumberland, and the Isle of Man.

EDITED BY W. DENISON ROEBUCK, F.L.S., with the assistance of
J. GILBERT BAKER, F.R.S., F.L.S. CHARLES P. HOBKIRK, F.L.S.
W. EAGLE CLARKE, F.L.S., M.B.O.U. GEO. T. PORRITT, F.L.S., F.E.S.
ALFRED HARKER, M.A., F.G.S. W. BARWELL TURNER, F.R.M.S.

This Journal, established originally in 1833, is devoted to the Natural History and Geology of the Counties included in its scope. The Conchological articles published in it have been numerous, valuable, and interesting.

Price 6d. per Number, if by post 7d. Annual Subscription, 6s. 6d. post free.

ADDRESS—259, HYDE PARK ROAD, LEEDS.

Please mention this Journal in replying to Advertisements.

WERNER & WINTER,

ENGRAVERS & LITHOGRAPHIC PRINTERS,

FRANKFORT ON MAIN, GERMANY.

MAKE A SPECIALITY OF

ILLUSTRATING NATURAL SCIENCE PUBLICATIONS,

ESPECIALLY THOSE DEALING WITH

ZOOLOGY, ANATOMY, & MEDICAL SCIENCES.

Highest References in England and abroad.



J. JACKSON & CO.,

7, SUFFOLK STREET, BIRMINGHAM,

MANUFACTURERS OF

RUBBER STAMPS. INDELIBLE INKS FOR MARKING LINEN.

SOLID RUBBER TYPES & STAMPS OF EVERY DESCRIPTION MADE TO ORDER.

SHELLS—LAND, FRESHWATER, & MARINE.

LARGE AND RICH COLLECTIONS FROM ALL PARTS OF THE
WORLD ALWAYS ON HAND.

Catalogue No. V, Free on application.

H. FRUHSTORFER, THURM STRASSE 37, BERLIN, N.W.

Living Specimens for the Microscope.

Volvox, Spirogyra, Desmids, Diatoms, Amoeba, Arcella, Actinosphaerium, Vorticella, Stentor, Hydra, Floscularia, Stephanoceros, Melicerta, and many other Specimens of Pond Life. Price 1/- per Tube, Post Free. Helix pomatia, Astacus, Amphioxus, Rana, Anodon, &c., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.



JAMES LUCKING & CO.,

Opticians, Spectacle Makers, &c.,

5, CORPORATION STREET, BIRMINGHAM,

And 37, Bond Street, Leeds.

SPECIALITY:—The adaption of Spectacles to remedy defective sight.

OPERA, FIELD, AND MARINE GLASSES.

TELESCOPES, MICROSCOPES, &C.

Barometers and Thermometers.

W. HARRIS, 176, Bristol Street, Birmingham,

HORTICULTURAL BUILDER, CABINET MAKER, &c.

Contractor for Fittings and Joinery Work to Mason University College and the
Queen's Faculty of Medicine.

Estimates given for every description of Woodwork, Cabinet Making,
House Carpentry, &c. *Repairs promptly attended to.*

Please mention this Journal in replying to Advertisements.

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "The Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

LECTURER ON ZOOLOGY AND COMPARATIVE ANATOMY IN THE
 UNIVERSITY OF BIRMINGHAM.

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR.

CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S.

E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

	PAGE
<i>Clausilia</i> mimicked by a Microlepidopteron.	By Dr. H. Simroth. 33
Note sur une Limnée de la faune profonde du lac Léman.	By Dr. Emile André. 35
The Anatomy of the British species of the genus <i>Solen</i> . Pt. i.	By H. H. Bloomer. 36
Notes on some known species of <i>Plectophyllis</i> , and description of a new variety of <i>P. plectostoma</i> , Bens.	By G. K. Gude, F.Z.S. 47
Note on the Anatomy of <i>Amphidromus palacens</i> , Mouss.	By Walter E. Collinge. 50
Proceedings of the Midland Malacological Society. 53
Current Literature. 53
Editor's Notes. 56

"The Journal of Malacology" is issued to Subscribers only. The Prepaid
 Subscription is 12s. per volume.

LONDON MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

Bacteriological, Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.

SPECIALITY: BALANCES & WEIGHTS.

PURE CHEMICALS.

CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, AND SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS,

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

Large Selection of Glass Globes, etc.

CONTRACTORS TO MASON UNIVERSITY COLLEGE.

MICROSCOPICAL & LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6s. per dozen.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1. 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1. 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of my very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

ABRAHAM FLATTERS,

16 & 18, CHURCH ROAD, LONGSIGHT, MANCHESTER.

Preparer of Textile Fibres and Demonstrator in Microscopy to the Manchester Municipal Technical School.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements.

Notice of Removal.



Messrs. W. H. SMITH & Co.

HAVE REMOVED FROM

82-83 HIGH STREET, TO

16-18 ETHEL ST. (New St.)

By Colonnade Hotel.

PATENTEES OF THE CELEBRATED

EUKNEMIDA BOOTS & SHOES.

All Goods made on the Premises.

A SINGLE PAIR AT WHOLESALE PRICE.

Brown and Box Calf Boots and Shoes a Speciality.

The only establishment in Birmingham where the Euknemida
Boots can be obtained.

Living Specimens for the Microscope.

Volvox, Spirogyra, Desmids, Diatoms, Amœba, Arcella, Actinosphærium, Vorticella, Stentor, Hydra, Floscularia, Stephanoceros, Melicerta, and many other Specimens of Pond Life. Price 1/- per Tube, Post Free. Helix pomatia, Astacus, Amphioxus, Rana, Anodon, &c., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.

CONCILIUM BIBLIOGRAPHICUM

ZÜRICH-NEUMÜNSTER, SWITZERLAND.

(Founded in 1895 by the International Congress of Zoology. Reorganized with the support of the Swiss Government.)

Analytical Card Bibliography of Mollusca including all publications since 1896. Price 28s. (with minor notices 38s.) Annual Subs. about 15s.—Any desired choice of topics can also be supplied:—Pelecypoda 10s. 5d., annually about 4s.—Amphineura 1s. 5d., annually about 6d., etc. Without palæontology cheaper. Cheap edition correspondingly less.

MANUSCRIPT CARD CATALOGUE OF NEW SPECIES AND GENERA SINCE 1901.—Copies supplied at 1d. per reference. Any desired combination, e.g. new species of *Helix*, new genera of Tectibranchs, new Molluscs from Borneo, from Devonshire (if any), from Mexico, etc.

A Monograph of the Slugs of the British Isles (In preparation).

It is intended in this work to give a full and exhaustive account of the Natural History of the Slugs of the British Isles, together with figures and full descriptions of all the known species and varieties. Special attention will be given to the anatomy and variation.

Specimens of any British species or varieties will be gratefully acknowledged. All communications should be addressed to—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM.

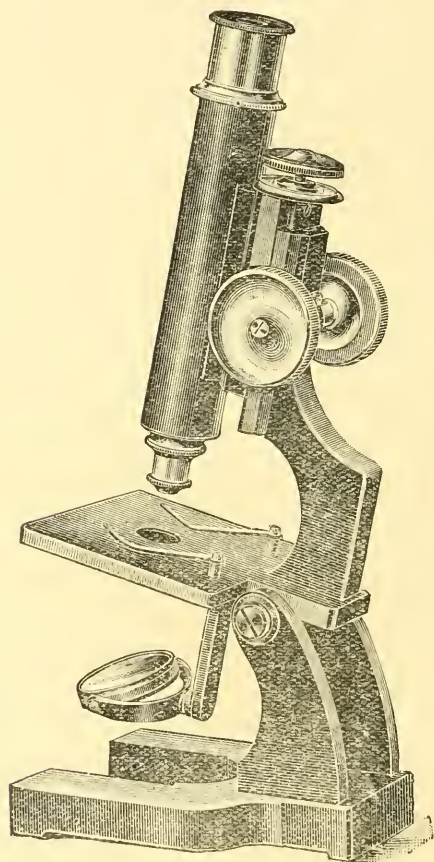
Please mention this Journal in replying to Advertisements.

JAMES PARKES & SON'S NEW 'CENTURY' MICROSCOPE.

Complete with $\frac{2}{3}$ inch. and $\frac{1}{8}$ inch. objectives,
in Mahogany Case.

With coarse rack and fine adjustment, etc.

PRICE - £5. 15. 0.



PRICE - - £4. 10. 0.

With fine adjustment only.

May be had of all Dealers in Surgical and Optical
Instruments.

VESEY STREET,
ST. MARY'S, BIRMINGHAM.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Conchologist, a Journal of Malacology."

No. 2.

JUNE, 1901.

VOL. VIII.

Contents :

	PAGE
<i>Clausilia</i> mimicked by a Microlepidopteron. By Dr. H. Simroth.	33
Note sur une Limnée de la faune profonde du Lac Léman. By Dr. Emile André.	35
The Anatomy of the British species of the genus <i>Solen</i> . Pt. i. By H. H. Bloomer.	36
Notes on some known species of <i>Plectophylis</i> , and description of a new variety of <i>P. plectostoma</i> , Bens. By G. K. Gude, F.Z.S.	47
Note on the Anatomy of <i>Amphidromus palaceus</i> , Mouss. By Walter E. Collinge.	50
Proceedings of the Midland Malacological Society. - - -	53
Current Literature. - - - - -	53
Editor's Notes. - - - - -	56

SALT & SON,

Surgical Instrument & Appliance
Manufacturers

TO THE

BIRMINGHAM & MIDLAND HOSPITALS.

SURGICAL, SCIENTIFIC, & OPTICAL INSTRUMENTS
OF EVERY DESCRIPTION.

5, Cherry Street, Birmingham.

Please mention this Journal in replying to Advertisements.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL. MUSEUMS SUPPLIED.

Address—H. B. PRESTON, F.Z.S.,

3, Sydney Terrace, Fulham Road, London, S.W.

Two minutes walk from South Kensington Station.

JAPANESE SHELLS.

Faultless specimens of the beautiful and interesting shells of Japan and the Loo Choo Islands, both land and marine, are offered at low prices, sent by mail. The land shells include some of the finest Helices of the genera *Eulota*, *Ganescella*, etc. The Clausilias, unlike those of Europe, are the largest of any region. Also many fine operculates and Marine Shells.

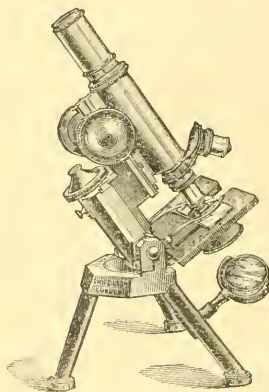
Y. HIRASE, Kyoto, Japan.

SHELLS—LAND, FRESHWATER, & MARINE.

LARGE AND RICH COLLECTIONS FROM ALL PARTS OF THE
WORLD ALWAYS ON HAND.

Catalogue No. V, Free on application.

H. FRUHSTORFER, THURM STRASSE 37, BERLIN, N.W.



JAMES SWIFT & SON, MANUFACTURING OPTICIANS.

Seven Gold Medals awarded for Optical Excellence.

Students Microscope fitted with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, sliding course adjustment, micrometer screw fine adjustment for slow focussing, eyepiece and iris diaphragm, in Cabinet . . . £5 5 0.

Double nosepiece and extra eyepiece . . . 10 0.

Fig. 2. Students Stand, as per illustration with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, eyepiece and iris diaphragm, in Cabinet . . . £7 15 0.

Double nosepiece and extra eyepiece . . . 15 0.

Prof. Delcpine's microscope, as used in the Birmingham University, with course and fine adjustments, extra large stage covered with vulcanite, $\frac{3}{8}$ in. $\frac{1}{2}$ in. and $1\frac{1}{2}$ in. Objectives, Abbe condenser N.A. 1.2, fitted with iris diaphragm and special focussing adjustment, triple nosepiece and eyepiece, in Cabinet . . . £15 0 0.

This stand is used in all the principal laboratories throughout the Kingdom.

UNIVERSITY OPTICAL WORKS,
81, TOTTENHAM COURT ROAD,
LONDON, W.

Please mention this Journal in replying to Advertisements.

ROBERT BIRBECK & SONS,

GENERAL BOOK PRINTERS,

MANUFACTURERS OF ACCOUNT BOOKS,

158, GREAT CHARLES STREET,

BIRMINGHAM.



*College and School Examination Papers executed with Accuracy,
Secrecy, and Despatch.*

R. B. & S. are the Printers of this Journal.

Prepaid Subscription 2/6 per annum, free to any part of the world.

THE NATURALIST'S JOURNAL.

Edited by Charles Mosley.

Illustrated Articles on all branches of Natural History by leading writers. Specially seeks to help beginners and young students.

A superior edition is also issued, printed upon fine paper, with frequent coloured plates. Subscription 5s. per annum post free. **Specimen Copy 6d.**

All Communications to

CHARLES MOSLEY,

MUSEUM PRESS, LOCKWOOD, HUDDERSFIELD.

THE JOURNAL OF CONCHOLOGY,

THE ORGAN OF THE CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.

HON. SECRETARY, W. E. HOYLE, M.A.,

THE OWENS COLLEGE, MANCHESTER.

Annual Subscription, 5s.

The number for January, 1901, commences a new volume and contains a list of British Marine Mollusca, revised and brought up to date by a Committee of the Society.

Please mention this Journal in replying to Advertisements.

RECENT SHELLS AND GLASS-TOPPED BOXES.

CONCHOLOGICAL WORKS FOR SALE BY
SOWERBY & FULTON.

Catalogues of our stock, in scientific order, containing names of
11,500 species.

COLLECTIONS PURCHASED.

EXCHANGE FOR SPECIES NOT IN STOCK.

GLASS-TOPPED BOXES, CARD-BOARD TRAYS, &c.

A stock of £100 worth always in hand.

Very moderate prices and most prompt execution of orders.

Send for Price List.

SOWERBY'S ILLUSTRATED INDEX OF BRITISH SHELLS.
(The latest complete work). 26 hand-coloured Plates (750 figures), cloth,
price 35s. (nett 30s.).

THESAURUS CONCHYLIIORUM, descriptions and coloured figures of
Recent Shells. Prospectus free.

SOWERBY & FULTON,

15, STATION PARADE, KEW GARDENS, NEAR LONDON.

J. A. REYNOLDS & Co. LTD.,

43, COLMORE ROW, BIRMINGHAM.

(WORKS: 44-45, Suffolk Street).

DRAWING MATERIALS

OF EVERY DESCRIPTION,

For Students, Artists, Science and Art Classes, Engineering
Colleges, Technical Schools, etc.

CATALOGUES MAY BE HAD ON APPLICATION.

CAMERAS FOR NATURALISTS.

Messrs. J. H. DALLMEYER LTD. having supplied most of the best known
workers in Natural History Photography with apparatus, are thoroughly conversant
with the special details of construction essential for this class of work, and are ready
to estimate for Cameras, Lenses, or complete outfits of any size or for any purpose.

Specialities in Long Extension HAND & STAND CAMERAS.

TELEPHOTO LENSES FOR TOPOGRAPHY, ORNITHOLOGY, GEOLOGY, ETC.

THE CELEBRATED UNIVERSAL LENSES "STIGMATIC," F/6,

FOR ALL CLASSES OF PHOTOGRAPHY.

J. H. DALLMEYER LTD., 25, Newman St., London, W.

Please mention this Journal in replying to Advertisements.

Recd Oct. 30th

THE
JOURNAL
 OF
MALACOLOGICAL

Established in 1890 as "The Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

LECTURER ON ZOOLOGY AND COMPARATIVE ANATOMY IN THE
 UNIVERSITY OF BIRMINGHAM.

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR.

CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S.

E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

PAGE

Notice sur le Professeur de Lacaze-Duthiers.	By Professor A. Vayssière.	57
Malacological Notes.	By E. R. Sykes, B.A., F.Z.S.	59
Notes upon <i>Trophon umbilicatus</i> , Tenison Woods.	By Henry Suter.	61
On the Anatomy of the <i>Vitrina irradians</i> of Pfeiffer.	By Walter E. Collinge.	63
Note on the Anatomy of <i>Aperia birnupf.</i> E. A. Smith.	By Walter E. Collinge.	71
On the genus <i>Ashmunella</i> , Pils. and Ckll.	By C. F. Ancey.	73
With Anatomical Notes.	By R. Murdoch.	79
Three new Nudibranchs from California.	By T. D. A. Cockerell.	85
Notes		88
Proceedings of the Midland Malacological Society.		88
Current Literature.		89
General Reviews. Editor's Notes.		92

"The Journal of Malacology" is issued to Subscribers only. The Prepaid
 Subscription is 12s. per volume.

LONDON MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE II.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

Bacteriological, Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.

SPECIALITY: BALANCES & WEIGHTS.

PURE CHEMICALS. CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, AND SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS,

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

Large Selection of Glass Globes, etc.

CONTRACTORS TO MASON UNIVERSITY COLLEGE.

MICROSCOPICAL & LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6s. per dozen.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1. 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1. 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of my very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

ABRAHAM FLATTERS,

16 & 18, CHURCH ROAD, LONGSIGHT, MANCHESTER.

Preparer of Textile Fibres and Demonstrator in Microscopy to the Manchester Municipal Technical School.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Conchologist, a Journal of Malacology."

No. 3.

SEPTEMBER, 1901.

VOL. VIII.

Contents :

	PAGE
Notice sur le Professeur de Lacaze-Duthiers.	
By Professor A. Vayssière.	57
Malacological Notes. - - - By E. R. Sykes, B.A., F.L.S.	59
Note upon <i>Trophon umbilicatus</i> , Tenison Woods.	
By Henry Suter.	61
On the Anatomy of the <i>Vitrina irradians</i> of Pfeiffer.	
By Walter E. Collinge.	63
Note on the Anatomy of <i>Apera burnupi</i> , E. A. Smith.	
By Walter E. Collinge.	71
On the genus <i>Ashmunella</i> , Pils. and Ckll. By C. F. Ancey.	73
With Anatomical Notes. - - - - - By R. Murdoch.	79
Three new Nudibranchs from California. By T. D. A. Cockerell.	85
Notes - - - - - - - - - - - - - - - - - - - - -	88
Proceedings of the Midland Malacological Society. - - - - -	88
Current Literature. General Reviews. - - - - -	89
Editor's Notes. - - - - - - - - - - - - - - - - - - - -	92

SALT & SON,

Surgical Instrument & Appliance
Manufacturers

TO THE

BIRMINGHAM & MIDLAND HOSPITALS.

SURGICAL, SCIENTIFIC, & OPTICAL INSTRUMENTS

OF EVERY DESCRIPTION.

5, Cherry Street, Birmingham.

Please mention this Journal in replying to Advertisements.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL. MUSEUMS SUPPLIED.

Address—H. B. PRESTON, F.Z.S.,

3, Sydney Terrace, Fulham Road, London, S.W.

Two minutes walk from South Kensington Station.

JAPANESE SHELLS.

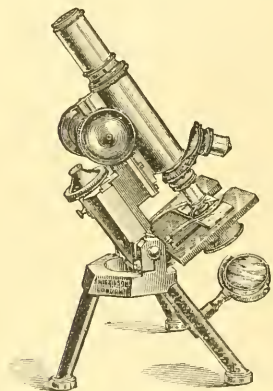
Faultless specimens of the beautiful and interesting shells of Japan and the Loo Choo Islands, both land and marine, are offered at low prices, sent by mail. The land shells include some of the finest *Helices* of the genera *Eulota*, *Gauesella*, etc. The *Clausilias*, unlike those of Europe, are the largest of any region. Also many fine operculates and Marine Shells.

Y. HIRASE, Kyoto, Japan.

Living Specimens for the Microscope.

Volvox, *Spirogyra*, *Desmids*, *Diatoms*, *Amœba*, *Arcella*, *Actinosphaerium*, *Vorticella*, *Stentor*, *Hydra*, *Floscularia*, *Stephanoceros*, *Melicerta*, and many other Specimens of Pond Life. Price 1/- per Tube, Post Free. *Helix pomatia*, *Astacus*, *Amphioxus*, *Rana*, *Anodon*, &c., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.



JAMES SWIFT & SON, MANUFACTURING OPTICIANS.

Seven Gold Medals awarded for Optical Excellence.

Students Microscope fitted with $\frac{3}{8}$ in. and $\frac{1}{8}$ in. Objectives, sliding course adjustment, micrometer screw fine adjustment for slow focussing, eyepiece and iris diaphragm, in Cabinet . . . £5 5 0.

Double nosepiece and extra eyepiece . . . 10 0.

Fig. 2. Students Stand, as per illustration with $\frac{3}{8}$ in. and $\frac{1}{8}$ in. Objectives, eyepiece and iris diaphragm, in Cabinet . . . £7 15 0.

Double nosepiece and extra eyepiece . . . 15 0.

Prof. Delepine's microscope, as used in the Birmingham University, with course and fine adjustments, extra large stage covered with vulcanite, $\frac{3}{8}$ in. $\frac{1}{8}$ in. and $\frac{1}{2}$ in. Objectives, Abbe condenser N.A. 1.2, fitted with iris diaphragm and special focussing adjustment, triple nosepiece and eyepiece, in Cabinet . . . £15 0 0.

This stand is used in all the principal laboratories throughout the Kingdom.

UNIVERSITY OPTICAL WORKS,
81, TOTTENHAM COURT ROAD,
LONDON, W.

Please mention this Journal in replying to Advertisements.

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "The Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

LECTURER ON ZOOLOGY AND COMPARATIVE ANATOMY IN THE
 UNIVERSITY OF BIRMINGHAM.

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR.

CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S.

E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

PAGE

On some Land Shells from British East Africa.	By Edgar A. Smith.	93
The Anatomy of the British Species of the genus <i>Solen</i>	By H. H. Bloomer.	97
Descriptions of five new species of Shells.	By G. B. Sowerby, F.L.S.	101
Descriptions of new species of <i>Nesta</i> , <i>Amphidromus</i> , and <i>Cyclostoma</i> from Madagascar and Perak.	By Hugh Fulton.	103
Malacological Notes.	By E. R. Sykes, B.A., F.L.S.	105
On two new and three hitherto unfigured species of <i>Plectopylis</i> from Tonkin.	By G. K. Gude, F.Z.S.	110
Description of some new species of Slugs collected by Mr. H. Fruhstorfer.	By Walter E. Collinge.	118
Notes on two Californian Nudibranchs.	By T. D. A. Cockerell.	121
Obituary. M. F. Woodward.		123
<i>Physa heterostropha</i> , Say, in South Staffordshire.	By John Linton.	124
<i>Amalia gagates</i> , Drp., at Sutton Coldfield.	By H. Overton.	124
<i>Limax maximus</i> , L., at Los Angeles, California.	By T. D. A. Cockerell.	124
Proceedings of the Midland Malacological Society.		124
Current Literature.		125
General Reviews. Editor's Notes.		132

"The Journal of Malacology" is issued to Subscribers only. The Prepaid Subscription is 12s. per volume.

LONDON ... MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

Bacteriological, Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.

SPECIALITY: BALANCES & WEIGHTS.

PURE CHEMICALS. CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, AND SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS,

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

Large Selection of Glass Globes, etc.

CONTRACTORS TO MASON UNIVERSITY COLLEGE.

MICROSCOPICAL & LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6s. per dozen.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1. 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1. 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of my very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

ABRAHAM FLATTERS,

16 & 18, CHURCH ROAD, LONGSIGHT, MANCHESTER.

Preparer of Textile Fibres and Demonstrator in Microscopy to the Manchester Municipal Technical School.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements.

Notice of Removal.



Messrs. W. H. SMITH & Co.

HAVE REMOVED FROM

82-83 HIGH STREET, TO

16-18 ETHEL ST. (New St.)

By Colonnade Hotel.

PATENTEES OF THE CELEBRATED

EUKNEMIDA BOOTS & SHOES.

All Goods made on the Premises.

A SINGLE PAIR AT WHOLESALE PRICE.

Brown and Box Calf Boots and Shoes a Speciality.

The only establishment in Birmingham where the Euknemida
Boots can be obtained.

IN NUMBERS 2 AND 3 OF THIS JOURNAL

R. HORNIG, BOOKSELLER, & PUBLISHER, LEIPZIG,

offered Valuable Works on Conchology
and Molluscs,

AT VERY LOW PRICES.

YOU ARE REQUESTED TO NOTE THESE OFFERS.

CONCILIUM BIBLIOGRAPHICUM

ZÜRICH-NEUMÜNSTER, SWITZERLAND.

(Founded in 1895 by the International Congress of Zoology. Reorganized with the support of the Swiss Government.)

Analytical Card Bibliography of Mollusca including all publications since 1896. Price 28s. (with minor notices 38s.) Annual Subs. about 15s.—Any desired choice of topics can also be supplied:—Pelecypoda 10s. 5d., annually about 4s.—Amphineura 1s. 5d., annually about 6d., etc. Without palaeontology cheaper. Cheap edition correspondingly less.

MANUSCRIPT CARD CATALOGUE OF NEW SPECIES AND GENERA SINCE 1901.—Copies supplied at 1d. per reference. Any desired combination, e.g. new species of *Helix*, new genera of Tectibranchs, new Molluscs from Borneo, from Devonshire (if any), from Mexico, etc.

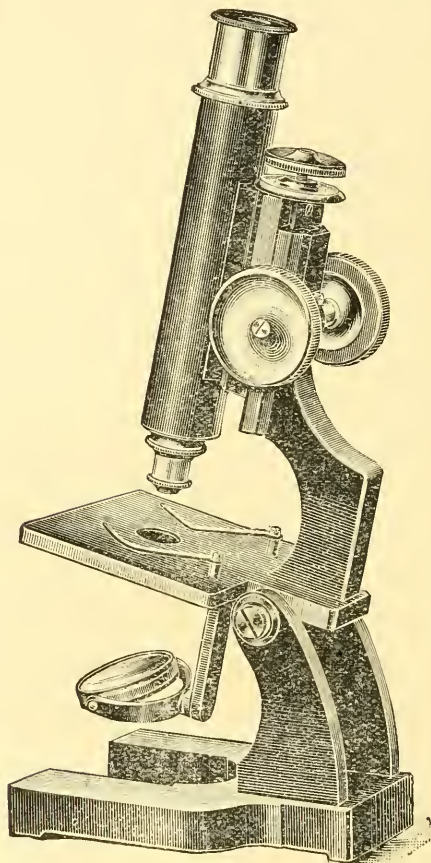
Please mention this Journal in replying to Advertisements.

JAMES PARKES & SON'S NEW 'CENTURY' MICROSCOPE.

Complete with $\frac{3}{8}$ inch. and $\frac{1}{8}$ inch. objectives,
in Mahogany Case.

With course rack and fine adjustment, etc.

PRICE - £5. 15. 0.



PRICE - - £4. 10. 0.

With fine adjustment only.

May be had of all Dealers in Surgical and Optical
Instruments.

VESEY STREET,
ST. MARY'S, BIRMINGHAM.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Conchologist, a Journal of Malacology."

NO. 4.

DECEMBER, 1901.

VOL. VIII.

Contents:

	PAGE
On some Land shells from British East Africa.	
By Edgar A. Smith.	93
The Anatomy of the British species of the genus <i>Solen</i> . Pt. ii.	
By H. H. Bloomer.	97
Descriptions of five new species of Shells.	
By G. B. Sowerby, F.L.S.	101
Descriptions of new species of <i>Xesta</i> , <i>Amphitromus</i> , and <i>Cyclostoma</i> from Madagascar and Perak. By Hugh Fulton.	103
Malacological Notes. - - - By E. R. Sykes, B.A., F.L.S.	105
On two new and three hitherto unfigured species of <i>Plectopyllis</i> from Tonkin. - - - By G. K. Gude, F.Z.S.	110
Description of some new species of Slugs collected by Mr. H. Fruhstorfer. - - - - By Walter E. Collinge.	118
Notes on two Californian Nudibranchs.	
By Professor T. D. A. Cockerell.	121
Obituary: M. F. Woodward. - - - - -	123
Notes: <i>Physa heterostropha</i> , Say, in South Staffordshire.	
By J. Linton.	
<i>Analia gagates</i> , Drp., at Sutton Coldfield. By H. Overton.	
<i>Limax maximus</i> , L., at Los Angeles, Cal.	
By Prof. T. D. A. Cockerell.	124
Proceedings of the Midland Malacological Society. - -	124
Current Literature. - - - - -	125
General Reviews. - - - - -	132
Editor's Notes. - - - - -	132
Title-Page, Contents, Index, etc., to Vol. viii.	

IMPORTANT NOTICE.

On and after January 10th, 1902, the price of Volume viii will be advanced to 15s. 6d. NEW SUBSCRIBERS may obtain copies of either Volume vii or viii at the original price, 12s., if ordered when subscribing to Volume ix. As only a few complete sets of Volume vii and viii remain, early application should be made.

The Editor desires to purchase clean copies of

Volumes iv, v, and vi, in their original paper covers.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL. MUSEUMS SUPPLIED.

Address—H. B. PRESTON, F.Z.S.,

3, Sydney Terrace, Fulham Road, London, d.W.

Two minutes walk from South Kensington Station.

JAPANESE SHELLS.

Faultless specimens of the beautiful and interesting shells of Japan and the Loo Choo Islands, both land and marine, are offered at low prices, sent by mail. The land shells include some of the finest Helices of the genera *Eulota*, *Gauesella*, etc. The Clausilias, unlike those of Europe, are the largest of any region. Also many fine operculates and Marine Shells.

Y. HIRASE, Kyoto, Japan.

Living Specimens for the Microscope.

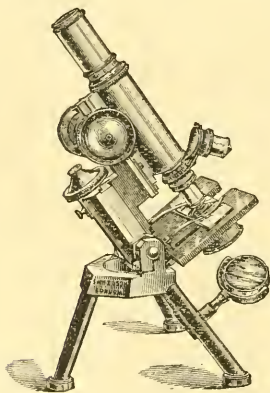
Volvox, Spirogyra, Desmids, Diatoms, Amoeba, Arcella, Actinosphaerium Vorticella, Stentor, Hydra, Floscularia, Stephanoceros, Melicerta, and many other Specimens of Pond Life. Price 1/- per Tube, Post Free. Helix pomatia, Astacus Amphioxus, Rana, Anodon, &c., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.

JAMES SWIFT & SON,

MANUFACTURING OPTICIANS.

Seven Gold Medals awarded for Optical Excellence.



Students Microscope fitted with $\frac{3}{8}$ in. and $\frac{1}{8}$ in. Objectives, sliding course adjustment, micrometer screw fine adjustment for slow focussing, eyepiece and iris diaphragm, in Cabinet . . . £5 5 0.

Double nosepiece and extra eyepiece . . . 10 0.

Fig. 2. Students Stand, as per illustration with $\frac{3}{8}$ in. and $\frac{1}{8}$ in. Objectives, eyepiece and iris diaphragm, in Cabinet . . . £7 15 0.

Double nosepiece and extra eyepiece . . . 15 0.

Prof. Delepine's microscope, as used in the Birmingham University, with course and fine adjustments, extra large stage covered with vulcanite, $\frac{3}{8}$ in. and $\frac{1}{8}$ in. Objectives, Abbe condenser N.A. 1.2, fitted with iris diaphragm and special focussing adjustment, triple nosepiece and eyepiece, in Cabinet . . . £15 0 0.

This stand is used in all the principal laboratories throughout the Kingdom.

UNIVERSITY OPTICAL WORKS,

81, TOTTENHAM COURT ROAD,

LONDON, W.

Please mention this Journal in replying to Advertisements.

Recd June 10th.

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

THE UNIVERSITY, BIRMINGHAM,

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR,

CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S.

E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

	PAGE.
A Classified List of the Helicoid Land Shells of Asia.	1
On the Anatomy of the genus <i>Myotesta</i> , Clige.	11
Description of a new species of <i>Onchidium</i> from South Africa.	17
The Anatomy of the British species of the Genus <i>Solen</i> . Pt. iii.	18
Descriptions of six new Land Shells from the Malay Peninsula.	22
Obituary: C. A. F. Wiegmann.	24
Proceedings of the Midland Malacological Society.	24
Current Literature.	26
Editor's Notes.	34

"The Journal of Malacology" is issued to subscribers only. The Prepaid Subscription is 12/- per volume.

LONDON MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

EDE, SON & RAVENSCROFT

ESTABLISHED 1689.

TELEPHONE 602 HOLBORN.

ROBE



MAKERS

By Special appointment

To H.M. THE KING and H.M. THE QUEEN,

CHURCH, UNIVERSITY, LAW AND MUNICIPAL ROBES.

93 & 94, CHANCERY LANE, LONDON.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

Bacteriological, Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.

SPECIALITY: BALANCES & WEIGHTS.

PURE CHEMICALS.

CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, & SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS.

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

LARGE SELECTION OF CLASS GLOBES, ETC.

CONTRACTORS TO THE UNIVERSITY.

MICROSCOPICAL AND LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6/- per doz.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of our very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

FLATTERS & GARNETT, LTD.,

48, DEANSGATE, MANCHESTER.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements

JOHN J. HEATH,

ESTABLISHED 1828.

General Engraver, Stationer, etc.

BRASS DOOR PLATES.

Medical Account Forms Engraved & in Facsimile.

FLEET STREET,
SUMMER ROW, Birmingham.

A. S. HUTH, Of the late Firm of
F. Huth, Edinburgh.
LITHOGRAPHER.

Illustrations for Scientific Publications

Carefully reproduced from natural Specimens or Drawings,
Estimates, and Specimens of work sent on application.

114, VILLIERS ROAD, WILLESDEN GREEN,
LONDON, N.W.

CHAS. A. SNAZELLE, NATURALIST,

And Dealer in MICROSCOPIC SUNDRIES, LANTERN SLIDES, Etc.

A Large Number of Botanical and Zoological Micro Preparations, by
J. HORNELL of Jersey, in Stock.

To TEACHERS, STUDENTS, and Others.

Type Collections offered as below correctly named and localised.

MOLLUSCA (Land, Freshwater, and Marine).	LEPIDOPTERA (British and Exotic).
100 Species in 4-drawer Deal Cabinet .. 25/-	100 Specimens—(well selected) .. 20/-
150 " 6 " " " .. 40/-	200 " " " " .. 60/-
250 " 10 " " " .. 70/-	<i>Cabinets or Book Pattern Store Boxes extra.</i>
	COLEOPTERA (British).
	100 Species in Store Box .. 7/6 & 10 6
	250 " " " " .. 30/-
	500 " " " " .. 70/-

Larger Collections offered at special terms
PRICE LISTS ON APPLICATION.

4, Tollington Park, LONDON, N.

CONCILIIUM BIBLIOGRAPHICUM,

ZURICH-NEUMUNSTER, SWITZERLAND.

*(Founded in 1895 by the International Congress of Zoology. Reorganized with the support
of the Swiss Government.)*

Analytical Card Bibliography of Mollusca including all publications since 1896. Price 28s. (with minor notices 38s.) Annual Subs. about 15s.—Any desired choice of topics can also be supplied:—Pelecypoda 10s. 5d., annually about 4s.—Amphineura 1s. 5d., annually about 6d., etc. Without palaeontology cheaper. Cheap edition correspondingly less.

MANUSCRIPT CARD CATALOGUE OF NEW SPECIES AND GENERA SINCE 1901.
—Copies supplied at 1d. per reference. Any desired combination, e.g. new species of *Helix*, new genera of Tectibranchs, new Molluscs from Borneo, from Devonshire (if any), from Mexico, etc.

Please mention this Journal in replying to Advertisements.

ALFRED H. SAUNDERS,
109, CITY ROAD, BIRMINGHAM
Lantern Slide Artist and
Manufacturer, (Wet Collodion Process.)

LANERNIST BY APPOINTMENT TO

The University of Birmingham.

Birmingham Temperance Society's P.L.S. at Queen's Theatre.

Birmingham Athletic Institute Health Lectures.

Birmingham Sunday Lecture Society.

Birmingham Suburban Institutes, etc.

QUALIFIED OPERATORS

with High-Class Bi-unial Lanterns sent to all parts of
the Midlands.

Vacancies for Pupils.

Dealer in all kinds of . .

PHOTOGRAPHIC GOODS, CAMERAS, LENSES, LANTERNS and ACCESSORIES
LANTERN SLIDES, Etc.

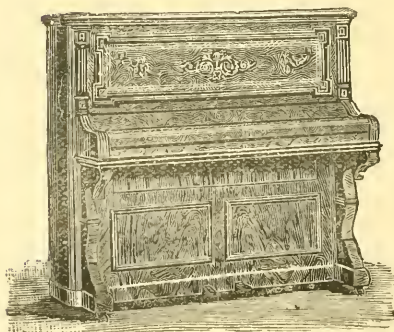
Office of the BIRMINGHAM & MIDLAND LECTURE BUREAU.

Established 9 Years.

ARCHIBALD WILSON,

14, Broad Street Corner, BIRMINGHAM.

Pianoforte Merchant.



N.B.—We are specialists in
Pianoforte Tuning, and
have the best Tuners
possible to obtain.

Awarded Gold Medal at Polytechnic
Exhibition.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Concho'gist, a Journal of Malacology."

No. 1.

APRIL 10th, 1902.

VOL. IX.

Contents :

	PAGE
A Classified List of the Helicoid Land Shells of Asia. By G. K. Gude, F.Z.S.	1
On the Anatomy of the genus <i>Myotesta</i> , Cllge. By Walter E. Collinge.	11
Description of a new species of <i>Onchidium</i> from South Africa. By Walter E. Collinge.	17
The Anatomy of the British species of the genus <i>Solen</i> . Pt. iii. By H. H. Bloomer.	18
Descriptions of six new land shells from the Malay Peninsula. By E. R. Sykes, B.A., F.L.S.	22
Obituary: C. A. F. Wiegmann. By Dr. O. F. von Mollendorff.	24
Proceedings of the Midland Malacological Society. - - -	24
Current Literature, - - - - -	26
Editor's Notes. - - - - -	34

TO SMOKERS.

☛ Pure Tobacco and Cigarettes. ☛

PURE TOBACCO ! PURE TOBACCO !!

Manufactured before the Public.

"Havanah Blend" Smoking Mixture -	10/-	per lb.
"Full Cry" Smoking Mixture - -	7/6	"
"Kremlin Blend" Smoking Mixture -	7/6	"
Burley Cut, No. 1 (Pure Virginia) -	8/-	"
Burley Cut, No. 2 (Pure Virginia) -	5/9	"
Sweet Honeydew - - - - -	5/-	"
Oxford Virginia Mild (for pipe or cigarette)	6/6	"
Oxford Virginia Medium - - - - -	6/6	"
B. & C. Smoking Mixture (Blend of Pure Virginia)	5/9	"
B. & C. Virginia (cool and free smoking)	5/9	"
Brown Virginia (Medium strength) -	5/-	"
Hand Cut Virginia (Pure)	5/-, 6/6, and 8/-	"

THE BRITISH & COLONIAL TOBACCO INDUSTRIES,
2 and 3, Easy Row, BIRMINGHAM.

Please mention this Journal in replying to Advertisements.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL.

MUSEUMS SUPPLIED.

Address—H. B. PRESTON, F.Z.S.,

3, Sydney Terrace, Fulham Road, London, S.W.

Two minutes walk from South Kensington Station.

JAPANESE SHELLS.

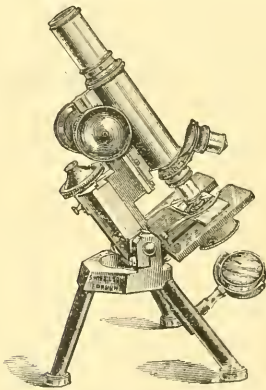
Faultless specimens of the beautiful and interesting shells of Japan and the Loo Choo Islands, both land and marine are offered at low prices, sent by mail. The land shells include some of the finest Helices of the genera *Eulota*, *Ganesella*, etc. The Clausilias, unlike those of Europe, are the largest of any region. Also many fine operculates and Marine Shells.

Y. HIRASE, Kyoto, Japan.

Living Specimens for the Microscope.

Volvox, Spirogyra, Desmids, Diatoms, Amoeba, Arcella, Actinosphaerium, Vorticella, Stentor, Hydra, Floscularia, Stephanoceros, Melicerta, and many other Specimens of Pond Life Price 1/-per Tube, Post Free. Helix pomatia, Astacus, Amphioxus, Rana, Anodon, etc., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.



JAMES SWIFT & SON,

MANUFACTURING OPTICIANS,

Seven Gold Medals awarded for Optical Excellence.

Student's Microscope fitted with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, sliding course adjustment, micrometer screw fine adjustment for slow focussing, eye-piece and iris diaphragm, in Cabinet - - - £5 5 0

Double nose-piece and extra eye-piece 10 0

Fig. 2 Student's Stand, as per illustration with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, eye-piece and iris diaphragm, in Cabinet - - - £7 15 0

Double nose-piece and extra eye-piece 15 0

Prof. Delepine's microscope, as used in the Birmingham University, with coarse and fine adjustments, extra large stage covered with vulcanite, $\frac{3}{8}$ in. $\frac{1}{2}$ in. and $\frac{1}{2}$ in. Objectives, Abbe condenser N.A. 1.2 fitted with iris diaphragm and special focussing adjustment, triple nose-piece and eyepiece, in Cabinet - - - £15 0 0.

This stand is used in all the principal laboratories throughout the Kingdom.

UNIVERSITY OPTICAL WORKS,

81, TOTTENHAM COURT RD.,
LONDON, W.

Please mention this Journal in replying to Advertisements.

Rec'd Aug 14th.

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

THE UNIVERSITY, BIRMINGHAM,

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR, CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S. E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

	PAGE.
Notes on the British Species of <i>Buccinum</i> , <i>Fusus</i> , etc.	By J. T. Marshall, 35
A Classified List of the Helicoid Land Shells of Asia.	By G. K. Gude, F.Z.S. 51
Description of a new species of <i>Chloritis</i> from New Guinea.	By G. K. Gude, F.Z.S. 59
On a collection of Land and Freshwater Shells from Kelantan, Malay Peninsula	
By E R Sykes, B.A., F.L.S.	60
Is <i>Amalia carinata</i> , Risso, a British Slug?	By Walter E. Collinge. 63
On a Malformed Variety of <i>Limnaea pereger</i>	By H. Overton. 64
Description of a new species of <i>Separatista</i> from New Zealand.	By Henry Suter. 65
Proceedings of the Midland Malacological Society.	67
Current Literature.	67
Editor's Notes.	70

"The Journal of Malacology" is issued to subscribers only. The Prepaid Subscription is 12/- per volume.

LONDON MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

EDE, SON & RAVENSCROFT

ESTABLISHED 1689.

TELEPHONE 602 HOLBORN.

ROBE



MAKERS

By Special appointments

To H.M. THE KING, H.M. THE QUEEN, & H.R.H. THE PRINCE OF WALES.

CHURCH, UNIVERSITY, LAW & MUNICIPAL ROBES.

93 & 94, CHANCERY LANE, LONDON.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

Bacteriological, Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.

SPECIALITY: BALANCES & WEIGHTS.

PURE CHEMICALS.

CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, & SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS.

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

LARGE SELECTION OF CLASS GLOBES, ETC.

CONTRACTORS TO THE UNIVERSITY.

MICROSCOPICAL AND LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6/- per doz.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of our very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

FLATTERS & GARNETT, LTD.,

48, DEANSGATE, MANCHESTER.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements

JOHN J. HEATH,

ESTABLISHED 1828.

General Engraver, Stationer, etc.

BRASS DOOR PLATES.

Medical Account Forms Engraved & in Facsimile.

FLEET STREET,
SUMMER ROW, Birmingham.

A. S. HUTH, Of the late Firm of
F. Huth, Edinburgh.
LITHOGRAPHER.

Illustrations for Scientific Publications

Carefully reproduced from natural Specimens or Drawings,
Estimates, and Specimens of work sent on application.

114, VILLIERS ROAD, WILLESDEN GREEN,
LONDON, N.W.

CHAS. A. SNAZELLE, NATURALIST,

And Dealer in MICROSCOPIC SUNDRIES, LANTERN SLIDES, Etc.

A Large Number of Botanical and Zoological Micro Preparations, by
J. HORNELL of Jersey, in Stock.

To TEACHERS, STUDENTS, and Others.

Type Collections offered as below correctly named and localised.

MOLLUSCA (Land, Freshwater, and Marine).	
100 Species in 4-drawer Deal Cabinet ..	25/-
150 " 6 " " " ..	40/-
250 " 10 " " " ..	70/-

LEPIDOPTERA (British and Exotic).	
100 Specimens—(well selected)	20/-
200 " " " "	60/-
Cabinets or Book Pattern Stove Boxes extra.	
COLEOPTERA (British).	
100 Species in Store Box ..	7/6 & 10/6
250 " " " "	30/-
500 " " " "	70/-

Larger Collections offered at special terms
PRICE LISTS ON APPLICATION.

4, Tollington Park, LONDON, N.

CONCILIVM BIBLIOGRAPHICUM,

ZURICH-NEUMUNSTER, SWITZERLAND.

(Founded in 1895 by the International Congress of Zoology. Reorganized with the support
of the Swiss Government.)

Analytical Card Bibliography of Mollusca including all publications
since 1896. Price 28s. (with minor notices 38s.) Annual Subs. about 15s.—Any
desired choice of topics can also be supplied:—Pelecypoda 10s. 5d., annually
about 4s.—Amphineura 1s. 5d., annually about 6d., etc. Without palaeontology
cheaper. Cheap edition correspondingly less.

MANUSCRIPT CARD CATALOGUE OF NEW SPECIES AND GENERA SINCE 1901.
—Copies supplied at 1d. per reference. Any desired combination, e.g. new species
of *Helix*, new genera of Tectibranchs, new Molluscs from Borneo, from Devonshire
(if any), from Mexico, etc.

Please mention this Journal in replying to Advertisements.

ALFRED H. SAUNDERS,

109, CITY ROAD, BIRMINGHAM
Lantern Slide Artist and
Manufacturer, (Wet Collodion Process.)

LANTERNIST BY APPOINTMENT TO

The University of Birmingham.

Birmingham Temperance Society's P.L.S. at Queen's Theatre.
Birmingham Athletic Institute Health Lectures.
Birmingham Sunday Lecture Society.
Birmingham Suburban Institutes, etc.

Slides made from
Lecturer's Diagrams, Negatives,
Book Illustrations, etc.
Terms on application.

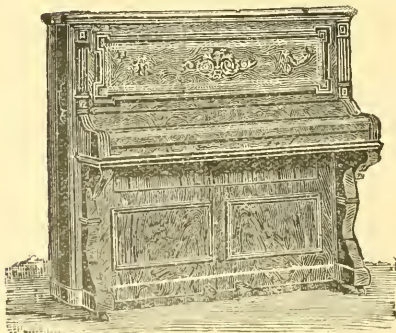
Office of the BIRMINGHAM & MIDLAND LECTURE BUREAU.

Established 9 Years.

ARCHIBALD WILSON,

14, Broad Street Corner, BIRMINGHAM.

Pianoforte Merchant.



N.B.—We are specialists in
Pianoforte Tuning, and
have the best Tuners
possible to obtain.

Awarded Gold Medal at Polytechnic
Exhibition.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Conchologist, a Journal of Malacology."

No. 2.

JUNE, 1902.

VOL. IX.

Contents:

	PAGE
Notes on the British Species of <i>Buccinum</i> , <i>Fusus</i> , etc. By J. T. Marshall.	35
A Classified List of the Helicoid Land Shells of Asia. Pt. ii. By G. K. Gude, F.Z.S.	51
Description of a new species of <i>Chloritis</i> from New Guinea. By G. K. Gude, F.Z.S.	59
On a collection of Land and Freshwater Shells from Kelantan, Malay Peninsula. By E. R. Sykes, B.A., F.L.S.	60
Is <i>Amalia carinata</i> , Risso, a British Slug? By Walter E. Collinge.	63
On a Malformed Variety of <i>Limnaea pereger</i> . By H. Overton	64
Description of a new species of <i>Separatista</i> from New Zealand. By Henry Suter.	65
Proceedings of the Midland Malacological Society. - - -	67
Current Literature, - - - - -	67
Editor's Notes. - - - - -	70

TO SMOKERS.

➡ Pure Tobacco and Cigarettes. ⬅

PURE TOBACCO! PURE TOBACCO!!

Manufactured before the Public.

"Havanah Blend" Smoking Mixture -	10/-	per lb.
"Full Cry" Smoking Mixture -	7/6	"
"Kremlin Blend" Smoking Mixture -	7/6	"
Burley Cut, No. 1 (Pure Virginia) -	8/-	"
Burley Cut, No. 2 (Pure Virginia) -	5/9	"
Sweet Honeydew -	5/-	"
Oxford Virginia Mild (for pipe or cigarette) -	6/6	"
Oxford Virginia Medium -	6/6	"
B. & C. Smoking Mixture (Blend of Pure Virginia) -	5/9	"
B. & C. Virginia (cool and free smoking) -	5/9	"
Brown Virginia (Medium strength) -	5/-	"
Hand Cut Virginia (Pure) -	5/-, 6/6, and 8/-	"

THE BRITISH & COLONIAL TOBACCO INDUSTRIES,
2 and 3, Easy Row, BIRMINGHAM.

Please mention this Journal in replying to Advertisements.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL.

MUSEUMS SUPPLIED.

Address—H. B. PRESTON, F.Z.S.,

3, Sydney Terrace, Fulham Road, London, S.W.

Two minutes walk from South Kensington Station.

JAPANESE SHELLS.

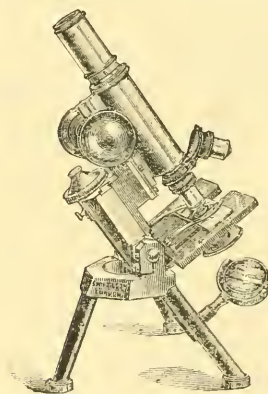
Faultless specimens of the beautiful and interesting shells of Japan and the Loo Choo Islands, both land and marine are offered at low prices, sent by mail. The land shells include some of the finest Helices of the genera *Eulota*, *Ganesella*, etc. The Clausilias, unlike those of Europe, are the largest of any region. Also many fine operculates and Marine Shells.

Y. HIRASE, Kyoto, Japan.

Living Specimens for the Microscope.

Volvox, Spirogyra, Desmids, Diatoms, Amœba, Arcella, Actinosphærium, Vorticella, Stentor, Hydra, Floscularia, Stephanoceros, Melicerta, and many other Specimens of Pond Life Price 1/-per Tube, Post Free. Helix pomatia, Astacus, Amphioxus, Rana, Anodon, etc., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.



JAMES SWIFT & SON,

MANUFACTURING OPTICIANS,

Seven Gold Medals awarded for Optical Excellence.

Student's Microscope fitted with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, sliding course adjustment, micrometer screw fine adjustment for slow focussing, eye-piece and iris diaphragm, in Cabinet - £5 5 0

Double nose-piece and extra eye-piece 10 0

Fig. 2 Student's Stand, as per illustration with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, eye-piece and iris diaphragm, in Cabinet - £7 15 0

Double nose-piece and extra eye-piece 15 0

Prof. Delepine's microscope, as used in the Birmingham University, with coarse and fine adjustments, extra large stage covered with vulcanite, $\frac{2}{3}$ in. $\frac{1}{2}$ in. and $\frac{1}{4}$ in. Objectives, Abbe condenser N.A. 1.2 fitted with iris diaphragm and special focussing adjustment, triple nose-piece and eyepiece, in Cabinet - £15 0 0.

This stand is used in all the principal laboratories throughout the Kingdom.

UNIVERSITY OPTICAL WORKS,

81, TOTTENHAM COURT RD.,
LONDON, W.

Please mention this Journal in replying to Advertisements.

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

THE UNIVERSITY, BIRMINGHAM,

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR,

CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S.

E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

PAGE.

On the Non-Operculate Land and Fresh-water Molluscs collected by the Members of the "Skeat Expedition" in the Malay Peninsula, 1899-1900. By Walter E. Collinge, B.Sc.	71
Notes on some further Malformed Specimens of <i>Anodonta cygnea</i> L. By H. H. Bloomer.	95
A Classified List of the Helicoid Land Shells of Asia. Part iii. By G. K. Gude, F.Z.S.	97
Current Literature.	105
Editor's Notes.	108

"The Journal of Malacology" is issued to subscribers only. The Prepaid Subscription is 12/- per volume.

LONDON ... MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

EDE, SON & RAVENSCROFT

ESTABLISHED 1689.

TELEPHONE 602 HOLBORN.

ROBE



MAKERS

By Special appointments

TO H.M. THE KING, H.M. THE QUEEN, & H.R.H. THE PRINCE OF WALES.

CHURCH, UNIVERSITY, LAW & MUNICIPAL ROBES.

93 & 94, CHANCERY LANE, LONDON.

W. & J. GEORGE, LTD.,

(Late F. E. BECKER & CO.)

LONDON AND BIRMINGHAM.

**Bacteriological. Microscopical, Chemical, Electrical,
and General Apparatus Manufacturers.****SPECIALITY: BALANCES & WEIGHTS.**

PURE CHEMICALS.

CONTRACTORS TO THE GOVERNMENT.

NIVOC WORKS,
CAMBRIDGE STREET.OFFICES, WAREHOUSE, & SHOW ROOMS,
159 & 160, GREAT CHARLES STREET,
BIRMINGHAM.**THE NEW LIGHT CO., LTD.,**

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS.

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

LARGE SELECTION OF GLASS GLOBES, ETC.

CONTRACTORS TO THE UNIVERSITY.

MICROSCOPICAL AND LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6/- per doz.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Aleyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of our very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

FLATTERS & GARNETT, LTD.,

48, DEANSGATE, MANCHESTER.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements.

Recd Jan 27/03

THE
JOURNAL
 OF
MALACOLOGY

Established in 1890 as "The Conchologist, a Journal of Malacology."

EDITED BY

WALTER E. COLLINGE,

THE UNIVERSITY, BIRMINGHAM,

PRESIDENT OF THE MIDLAND MALACOLOGICAL SOCIETY.

WITH THE CO-OPERATION OF

DR. JOSEF F. BABOR, CHARLES HEDLEY, F.L.S.

THE REV. A. H. COOKE, M.A., F.Z.S. E. R. SYKES, B.A., F.Z.S., F.L.S.

B. B. WOODWARD, F.G.S., F.L.S.

Contents.

	PAGE.
Description of a new species of <i>Gomphina</i> from New Zealand.	By Edgar A. Smith. 109
On the Systematic Position of <i>Patella kermadecensis</i> , Pilsbry.	By Henry Suter. 111
A Classified List of the Helicoid Land Shells of A-ia. Part iv.	By G. K. Gude, F.Z.S. 112
Some notes on the Genus <i>Prisma</i> , Simroth.	By Walter E. Collinge, B.Sc. 129
Further notes on <i>Amalia carinata</i> , Risso.	By Walter E. Collinge, B.Sc. 132
The Anatomy of the British species of the genus <i>Solen</i> , Part iv.	By H. H. Bloomer. 133
Obituary.	W.E.C. 137
<i>Physa virgate mut alba</i> , nov.	By Prof. T. D. A. Cockerell. 138
<i>Limax maximus</i> , L., in the Hawaiian Islands.	By Walter E. Collinge. 138
Proceedings of the Midland Malacological Society.	138
Current Literature.	139
Editor's Notes.	144

"The Journal of Malacology" is issued to subscribers only. The Prepaid
 Subscription is 12/- per volume.

LONDON MESSRS. DULAU & CO., 37, SOHO SQUARE.

BERLIN ... MESSRS. R. FRIEDLÄNDER & SOHN, CARLSTRASSE 11.

All communications should be addressed—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM, ENGLAND.

EDE, SON & RAVENSCROFT

ESTABLISHED 1689.

TELEPHONE 602 HOLBORN.

ROBE**MAKERS**

By Special appointments

TO H.M. THE KING, H.M. THE QUEEN, & H.R.H. THE PRINCE OF WALES.

CHURCH, UNIVERSITY, LAW & MUNICIPAL ROBES.

93 & 94, CHANCERY LANE LONDON.

CONCILIUM BIBLIOGRAPHICUM,

ZURICH-NEUMUNSTER, SWITZERLAND.

(Founded in 1895 by the International Congress of Zoology. Reorganized with the support of the Swiss Government.)

Analytical Card Bibliography of Mollusca including all publications since 1896. Price 28s. (with minor notices 38s.) Annual Subs. about 15s.—Any desired choice of topics can also be supplied:—Pelecypoda 10s. 5d., annually about 4s.—Amphineura 1s. 5d., annually about 6d., etc. Without palaeontology cheaper. Cheap edition correspondingly less.

MANUSCRIPT CARD CATALOGUE OF NEW SPECIES AND GENERA SINCE 1901.—Copies supplied at 1d. per reference. Any desired combination, e.g. new species of *Helix*, new genera of Tectibranchs, new Molluscs from Borneo, from Devonshire (if any), from Mexico, etc.

THE NEW LIGHT CO., LTD.,

47, JOHN BRIGHT STREET, BIRMINGHAM.

LEADING HOUSE FOR

GAS FITTINGS, OUTSIDE LAMPS.

ENORMOUS REDUCTIONS IN

INCANDESCENT LIGHT & ACCESSORIES, &c.

LARGE SELECTION OF GLASS GLOBES, ETC.

CONTRACTORS TO THE UNIVERSITY.

MICROSCOPICAL AND LANTERN SLIDES

Illustrative of every Department of

ZOOLOGY, BOTANY, AND GEOLOGY,

At the uniform rate of 6/- per doz.

The Student's Series of 48 Preparations in Elementary and Advanced Botany, sent out packed in rack boxes at £1 1s. net, post free. This Series contains 14 Type Preparations, which can only be supplied separately at 1s. to 1s. 6d. per slide.

Stem Structure, Leaf Structure, Floral Structure, Ovaries, Fruits, Seeds, Plant Hairs, Scales, and Glands, 6s. per dozen. Type Slide Preparations of the Mouse, the Newt, the Earthworm, Peripatus, Cerianthus, and Alcyonium, 1s. to 1s. 6d. per slide.

Sets Slides of Foraminifera, 9d. to 1s. per Slide.

Sections of Cotton, Flax, Hemp, Jute, China Grass, Wool, Silk, &c., at 1s. per slide.

MICROSCOPICAL AND LANTERN SLIDE CIRCULATING LIBRARY.

Slides, to the number of 300 per year, supplied in sets as required by Subscribers will be sent, post paid, for the Annual Subscription of £1 1s. payable in advance.

The Slides will be sent one or two days prior to the day of the Lecture or Exhibition, and must be returned *the day following the lecture, post paid*. Special post boxes will be provided for this purpose, which will obviate the usual trouble of packing.

The whole of our very extensive stock will be at the disposal of Subscribers, and Lists of additions to it will be sent from time to time.

FLATTERS & GARNETT, LTD.,

48, DEANSGATE, MANCHESTER.

SEND FOR LISTS, &c., FREE PER POST.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

Established in 1890 as "The Conchologist, a Journal of Malacology."

No. 4.

DECEMBER, 1902.

VOL. IX.

Contents :

	PAGE.
Description of a new species of <i>Gomphina</i> from New Zealand. By Edgar A. Smith, F.Z.S.	109
On the Systematic Position of <i>Patella kermadecensis</i> , Pilsbry. By Henry Suter.	111
A Classified list of the Helicoid Land Shells of Asia. Part iv. By G. K. Gude, F.Z.S.	112
Some notes on the Genus <i>Prisma</i> , Simroth. - - - - By Walter E. Collinge, B.Sc.	129
Further notes on <i>Amalia carinata</i> , Risso. - - - - By Walter E. Collinge, B.Sc.	132
The Anatomy of the British Species of the genus <i>Solen</i> . Part iv. By H. H. Bloomer.	133
Obituary. - - - - - W.E.C.	137
<i>Physa virgata</i> mut. <i>alba</i> , nov. By Prof. T. D. A. Cockerell.	138
<i>Limæ maximus</i> , L., in the Hawaiian Islands By W. E. Collinge.	138
Proceedings of the Midland Malacological Society. - -	138
Current Literature. - - - - -	139
Editor's Notes. - . - - - - -	144



Don't forget
to ask
your Stationer
for

BARKER & GOODRIDGE'S

(Late with HENRY STONE & SON, Ltd., Banbury.)

LETTER FILES, LETTER TRAYS, INDEX LETTER FILES,
STATIONERY BOXES & CABINETS, LETTER FILING
CABINETS, OFFICE PIGEON HOLES, &c., &c.

Special Cabinet Boxes and Files made to order for any purpose.

ESTIMATES GIVEN.

Please mention this Journal in replying to Advertisements.

To Conchologists.

H. B. PRESTON, F.Z.S.,

Begs to inform Collectors and others that he will be pleased to forward on application price list of any GENERA included in his

LARGE AND VARIED STOCK OF SHELLS.

SELECTIONS SENT ON APPROVAL. MUSEUMS SUPPLIED,

Address—**H. B. PRESTON, F.Z.S.,**

3, Sydney Terrace, Fulham Road, London, S.W.

Two minutes walk from South Kensington Station.

W. HARRIS, 176, Bristol Street, Birmingham,

HORTICULTURAL BUILDER, CABINET MAKER, &c.

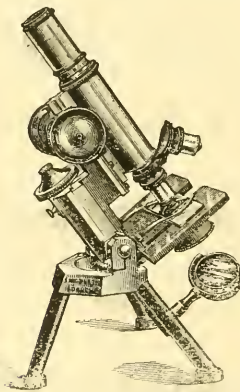
Contractor for Fittings and Joinery Work to The University of Birmingham, and the Queen's Faculty of Medicine.

Estimates given for every description of Woodwork, Cabinet Making, House Carpentry, &c. *Repairs promptly attended to.*

Living Specimens for the Microscope.

Volvox, Spirogyra, Desmids, Diatoms, Amœba, Arcella, Actinosphærium, Vorticella, Stentor, Hydra, Floscularia, Stephanoceros, Melicerta, and many other Specimens of Pond Life Price 1/-per Tube, Post Free. Helix pomatia, Astacus, Amphioxus, Rana, Anodon, etc., for Dissection purposes.

THOMAS BOLTON, 25, BALSALL HEATH ROAD, BIRMINGHAM.



JAMES SWIFT & SON,

MANUFACTURING OPTICIANS,

Seven Gold Medals awarded for Optical Excellence.

Student's Microscope fitted with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, sliding course adjustment, micrometer screw fine adjustment for slow focussing, eye-piece and iris diaphragm, in Cabinet - £5 5 0

Double nose-piece and extra eye-piece 10 0

Fig. 2. Student's Stand, as per illustration with $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Objectives, eye-piece and iris diaphragm, in Cabinet - £7 15 0

Double nose-piece and extra eye-piece 15 0

Prof. Delepine's microscope, as used in the Birmingham University, with coarse and fine adjustments, extra large stage covered with vulcanite, $\frac{3}{8}$ in. $\frac{1}{2}$ in. and $\frac{1}{2}$ in. Objectives, Abbe condenser N.A. 1.2 fitted with iris diaphragm and special focussing adjustment, triple nose-piece and eyepiece, in Cabinet - £15 0 0

This stand is used in all the principal laboratories throughout the Kingdom.

UNIVERSITY OPTICAL WORKS,

81, TOTTENHAM COURT RD.,

LONDON, W.

Please mention this Journal in replying to Advertisements.

THE JOURNAL OF MALACOLOGY.

IMPORTANT NOTICE.

On an after December 16th, the price of Volumes vii, viii, and ix, will be advanced to 21s. each. NEW SUBSCRIBERS may obtain copies at the original price, 12s., if ordered when subscribing to volume x. As only a few complete sets of these Volumes remain, early application should be made.

The Editor desires to purchase clean copies of Volumes iv, v, and vi in their original paper covers.

A Monograph of the Slugs of the British Isles (In preparation).

It is intended in this work to give a full and exhaustive account of the Natural History of the Slugs of the British Isles, together with figures and full descriptions of all the known species and varieties. Special attention will be given to the anatomy and variation.

Specimens of any British species or varieties will be gratefully acknowledged. All communications should be addressed to—

W. E. COLLINGE, THE UNIVERSITY, BIRMINGHAM.

R. FIELD & CO.,

Opticians and Scientific Instrument

MAKERS,

142, Suffolk Street, BIRMINGHAM.

MAKERS OF . . .

Established 1817.

WRIGHT & ANDERTON'S Striated Silver Lantern Screens.

BAYLEY'S Polarimeter.

WELDON Range Finder, &c., &c.

STUDENT'S MICROSCOPE

Of best Continental model, with best diagonal rack and pinion coarse adjustment, best triangular bar screw fine adjustment, draw tube, joint for inclination, $\frac{1}{8}$ -in. or $\frac{1}{6}$ -in. objective, and 1-inch (double combination) objective, and eye-piece, etc., in case

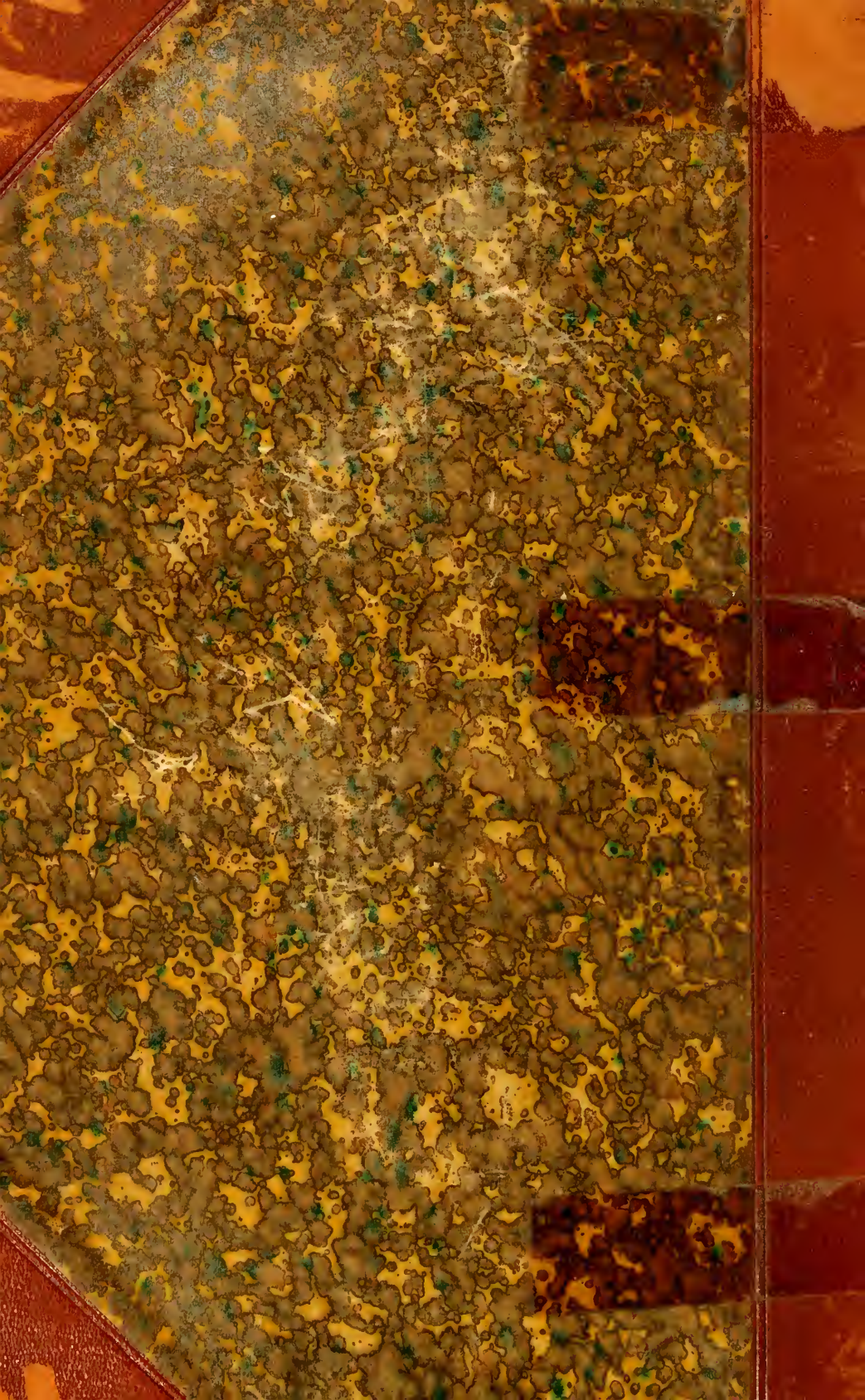
£5 - 5 - 0.

Please mention this Journal in replying to Advertisements.

Microformed by
Preservation
Services

mfm # 5071
3-22-94

Carded



SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01276 5947