

Lastly, we must know the spawn and brood of those kinds of *Natica* or other mollusks" (Archiv, p. 29.).

"I do not give up the hope, that we may yet determine at least the genus of this mollusk; and I found this hope mainly upon the very characteristic form of the spermatozoa, in addition to the other features enumerated.

"It is very interesting, that from the form of the spermatozoa, our mollusk can hardly belong to either the Nudibranchiata or the Tectibranchiata, whose linear spermatozoa have been made perfectly well-known by Kölliker. This is so much the more worthy of notice, since it is in harmony with the indications afforded by the shell and by the general structure of the young mollusk, from which the animal would be referred to the Pectinibranchiata.

"Among these, the peculiar form both of the shell and of the spermatozoa excludes the Canalifera from consideration. But among the Trochoidæ to which *Natica* belongs, cercariform or knitting-needle-shaped spermatozoa occur among a few genera, and were observed by Kölliker in *Trochus cinerarius*, L. Wagner, Erdl, and Kölliker observed similar ones in *Patella* and *Chiton*. Wagner and Erdl found them in *Haliotis* among the Scutibranchiata, and Siebold in *Vermetus* among the Tubulibranchiata. The spermatozoa of *Natica* and its allies are yet unknown.

"In investigations with reference to this matter, it will be especially important to recollect the terminal enlargement of the spermatozoa, which up to this time has been observed in no Gasteropod, but in the spermatozoa of our mollusk is never wanting."

IX.—*Brief Diagnostic Notices of new Maderan Land Shells.*

By R. T. LOWE, M.A.

VITRINA, Drap.

1. VITRINA BEHNII.—Prim. (in Trans. Cam. Phil. Soc. vol. iv. Part 1), tab. 5. f. 1 b. *V. Ruivensis*, Couth. Pf. Mon. ii. 507. Differt a *V. Lamarckii*, Fér. (Prim. loc. cit. f. 1 a) testa haliotoidea patula depressa, apertura auriformi ad apicem usque pervia, anfractibus tantum duobus, spira laterali vix ulla, &c.; necnon animale.

Speciem icone supra citata distinctam, et plures jam annos in honorem cl. Professoris Kielensis dicatam stabilivi.

Hab. in Madera.

HELIX, L.

§. *Leptaxis*, Lowe.

2. HELIX MEMBRANACEA.—Ab *H. furva*, Lowe, juniore caute

distinguenda. Differt testa tenuiore flexili fere membranacea, semper imperforata, efasciata, lacteo coagulatum liturata, carina obsoletiore.

Hab. in Madera.

3. *HELIX HYÆNA*.—*H. erubescens*, Lowe, proxima. Differt testa majore tenuiore inflatuscula omnino ecarinata, subtus convexiore, colore fulvo intensiore, distinctius fusco subquinquefasciata, apertura magis rotundata, peristomate simplici, nec intus sublabiato.

Hab. in Insula Deserta Australi.

4. *HELIX FLUCTUOSA*.—*H. phlebophoræ*, Lowe, affinis. Differt testa subtrochoideo-depressa acute carinata lævigata s. obsolete malleata, spira depressa, sutura parum impressa, anfractibus planiusculis, ultimo subtus convexo, apertura transverse ovato-lunata, labris disjunctis.

Hab. semifossilis in Portu S^{to}. Collegit amiciss. T. V. Wollaston, Arm.

5. *HELIX PSAMMOPHORA*.—*H. phlebophoræ*, Lowe, affinis. Differt testa tenuiuscula subtiliter arenoso-granulata striolisque spiralibus subtilissime decussata, striata nec undulatum plicato-costellata.

Hab. semifoss. in P^{tu} S^{to}. Coll. Wollaston.

6. *HELIX CRATICULATA*.—*H. phlebophoræ*, Lowe, proxima. Differt testa minore tenuiore globulosa ruguloso-cancellata vel reticulatum scrobiculata, anfractibus convexioribus, coloribus lætioribus s. fasciis distinctis.

Hab. in Insula Ferro juxta Portum S^{tum}. Coll. Wollaston.

7. *HELIX VULCANIA*.—*H. Porto-sanctanæ*, Sow., magnitudine formaque similis. Differt testa imperforata, subundulatum æquistriata, glabra (nec hispidogranulata), virescente, fusco bi- (nec tri-) fasciata, peristomate intus costa annulari marginato.

Hab. in Insulis Desertis Majore et Minore.

8. *HELIX LEONINA*.—*H. vulcaniæ* affinis. Differt testa magis globosa, tenui, subinflata, fulvo-flavescente, obsolete undulato-striata, peristomate simplici.

Hab. in Insula Deserta Australi.

§. *Xerophila*, Held.

9. *HELIX ARMILLATA*.—*H. striata*, Drap. ? Prim. 53. no. 44. *H. Lowei*, Pot. et Mich. Pf. i. 149. nec Fér. *H. striatæ*, Drap. affinis. Differt testa minore omnino magis depressa, umbilico majore largiore, anfractibus convexioribus distinctioribus, sutura profundiore, peristomate simplici nec intus costato-annulato.

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Ab *H. conspurcata*, Drap., differt testa nunquam hispida, umbilico patulo largiore, &c.

Hab. in Madera.

§. *Theba*, Leach.

10. *HELIX USTULATA*.—*H. pisanae*, Müll., proxima. Differt testa subimperforata subconoidea semper ecarinata, spira elevata subpyramidata, anfractibus convexis, ultimo subtus subinflato, sutura distincta, perforatione clausa obvelata, peristomate simplici, nec intus costato-annulato.

Hab. in Insulis "Salvages."

§. *Plebecula*, Lowe.

11. *HELIX GIRAMICA*.—*H. vulgatæ* (*H. nitidiusculæ*, Lowe, Pf., nec Sow.) proxima. Differt testa majore largiore s. minus compacto-globosa, intensius colorata, fasciis spadiceis duabus superioribus sæpissime confluentibus, tertia inferiore latiore, umbilico majore subpatulo. *H. nitidiuscula* β , Pf. Mon. i. 197, eadem videtur.

Hab. in Madera Insulaque Deserta Minore.

12. *HELIX VULGATA*.—*H. nitidiuscula*, Prim. 52. no. 40. t. 6. f. 6 (omissis syn. Sow. verbisque "et Portu S^{to}"); Pf. Mon. i. 196 (omiss. syn. Sow.). *H. nitidiuscula*, Sow., vera est *H. lurida*, Prim. 52. no. 39. t. 6. f. 5; Pf. Mon. i. 197. no. 510.

Hab. in Madera vulgatiss. In Insulis Desertis minus frequens. In Portu S^{to} omnino deest.

13. *HELIX CANICALENSIS*.—*H. vulgatæ* proxima nimis affinis, forsan var. tantum. Differt spira paullo elevatiore subturrita apice acuto prominente, anfractibus convexioribus distinctioribus, sutura magis impressa, testa solidiore crassiore rudiore.

Hab. semifoss. in Madera.

§. *Irus*, Lowe.

14. *HELIX LACINIOSA*.—Species pulcherrima, *H. depauperatæ*, Lowe, affinis, sed umbilico strictiore, testa intensius colorata distincte fasciata, haud granulata, arcte plicato-striata, epidermide ad strias in lacinias excurrente tota echinato-aculeata, aspera.

Hab. in Insula Deserta Minore s. Septentrionali.

15. *HELIX SQUALIDA*.—*H. depauperatæ*, Lowe, etiam affinis. Differt testa minore erosulo-scrobiculata nec granulata, umbilico majore largiore, &c.

Hab. in Madera semifoss. vulg.; recens rariss. Coll. Wollaston.

§. *Spirorbula*, Lowe.

16. *HELIX LATENS*.—*H. obtectæ*, Lowe, proxima. Differt

testa tenuiore fere membranacea flexili, diametro transverso majore, spira planiore fere immersa, anfractibus paucioribus.

Hab. in Madera. Coll. Wollaston.

§. *Euromphala*, Beck.

17. *HELIX GUERINIANA*.—Species elegantissima pulchre et læte colorata, *H. rotundata*, Müll., proxima, sed vere distincta. Differt testa pellucidior, lætius colorata, carina acutior, spira valide et remote costata nec arcte striata, anfractibus pluribus, ultimo infra carinam omnino lævigata lucida nitente, umbilico multo majore largiore ampliore.

Hab. in Madera. Prima coll. Jemima Carolina Guerin.

§. *Lucilla*, Lowe.

18. *HELIX SCINTILLA*.—*H. crystallina*, Drap., affinis. Differt umbilico largo patulo spirali, colore pallide virescente, &c. Ab *H. pulchella*, Müll., juniore differt nitore, umbilico majore, anfractibus magis æque crescentibus pluribus. Ab *H. excavata*, Bean, differt testa multo minore discoidea, colore, anfractibus paucioribus. Ab *H. radiatula*, Ald., æque ac ab *H. cellaria*, Müll., juniore magis ac magis recedit.

Hab. in Madera.

§. *Janulus*, Lowe.

19. *HELIX CALATHUS*.—Species elegans, *Hylostomatibus*, Alb. analoga, *H. bifronti*, Lowe, affinis. Differt testa minore, forma magis compacta, spira elevatiore castaneo-subtessellata, anfractibus pluribus distinctius transverse concinne et arctissime costatis spiraliterque exilissime striatis, umbilico paullo majore, apertura callo intus 4-lamellosoplicato.

Hab. in Madera.

§. *Hispidella*, Lowe.

20. *HELIX ARMITAGEANA*.—*H. revelata*, Fér., necnon *H. sericea*, Drap., affinis. Differt striis exilissimis flexuoso-capillaceis spiralibus, ad interstitia strias transversas membranaceas decussantibus, testa depressiore subcarinata, fusco bifasciata. Testa admodum tenuis perfragilis pellucens, pallide brunnea, virescens, arcte et minute hispida. Perforatio cylindrica nec pervia, parva. Animal muco scatet.

Hab. in Madera. Coll. Armitage et Wollaston.

§. *Caseolus*, Lowe.

21. *HELIX SPHÆRULA*.—Inter *H. compactam* et *abjectam*, Lowe, media. Ab *H. compacta* differt testa magis grosse v. distinctius (præsertim subtus) granulata, forma magis conico-tro-

choidea, labro ad axin expanso calloso-reflexo. Ab *H. abjecta* differt testa magis lævigata (nec rudi, anfractibus inæqualiter costatis), carina obsoletiore, perforatione minore, labrisque disjunctis (nec ore circinato). Differt ab utraque labro deorsum intus calloso.

Hab. semifoss. in Madera.

§. *Discula*, Lowe.

22. *HELIX PULVINATA*.—*H. polymorpha* ζ. *pulvinata*, Prim. 56. Differt ab *H. polymorpha* α, Lowe, testa minus grosse granulata, subtus planiore, umbilico majore latiore, nec parietibus declivibus, carina acutiore inferiore, sutura magis impressa, anfractibus semetipsis quasi superimpositis.

Hab. in Portu S^{to}.

23. *HELIX ATTRITA*.—*H. polymorpha* δ. *attrita*, Prim. 55. t. 6. f. 14. *H. tectiformis*, Wood, Suppl. t. 8. f. 83 (nec Sow.). Forma et habitu peculiari ab affinibus omnino distincta.

Hab. in Portu S^{to}.

24. *HELIX TABELLATA*.—Species tenuitate, spira tabellata attrito-planata, umbilico patulo spirali ab affinibus distinctissima. *H. maderensem*, Wood, quodammodo refert, sed testa prætenui discoideo-planata prorsus aliena.

Hab. in Madera.

25. *HELIX SENILIS*.—*H. linctæ*, Lowe, proxima. Differt testa magis depressa, subtus convexa, tota scabra grosse granulata, spira subplanata, anfractibus attritis planatis, sutura subobsoleta, carina acuta limbata supera.

Hab. in Insulis Desertis Majore et Minore.

26. *HELIX POROMPHALA*.—*H. senili* proxima, nimis forsan affinis. Differt umbilico minuto poriformi parietibus minus declivibus, spira elevatiuscula anfractibus convexiusculis distinctis, sutura subimpressa, carina subacuta exacte media. Testa quoque minor, magis fere lucida.

Hab. in Deserta Australi.

27. *HELIX LINCTA*.—*H. polymorpha* β. et γ, Prim. 54. t. 6. ff. 12, 13. Differt ab *H. polymorpha* α. testa discoidea minus rude granulata, subtus præsertim lucida, umbilico subpatulo spirali nec parietibus subdeclivibus.

Hab. in Madera.

28. *HELIX PAPILIO*.—*H. polymorpha* ε. *calcigena*, Prim. 56. t. 6. f. 15. Differt ab *H. lincta* testa subtus fere egranulata lævi, anfractibus planiusculis subindistinctis, carina acuta nec obtusa, umbilico patulo largiore. Sequenti nimis affinis; differt præci-

pue testa subtus fere lævi. Testa subtus læte alba, fasciis interruptis pallidis castaneis vel fulvis, ab utraque specie differt.

Hab. in Insula Baxo juxta Portum S^m.

29. *HELIX DISCINA*.—Differt ab *H. papilione* colore, testa magis depressa tota exilissime reticulato-granulata, anfractibus magis planatis attritis, sutura obsoleta.

Hab. in Portu S^{to} vulg.

30. *HELIX TESTUDINALIS*.—Species inter nobiliores ob magnitudinem et colores pulcherrime testudinales enumeranda. *H. papilioni* et *discinæ* proxima; sed duplo fere major nitidiuscula, supra exilissime granulata et arcte striata, subtus convexa lævis lucida, anfractibus convexiusculis, sutura impressa, carina obtusa supera (nec media), linea angusta fusca distinctissima supra carinam, eamque quasi duplicante, usque ad apicem fere supra suturam continuata.

Hab. in Portu S^{to}. Coll. Wollaston et Armitage.

§. *Tectula*, Lowe.

31. *HELIX LYELLIANA*.—*H. Bulverianæ*, Lowe, similis. Differt testa lævi, supra omnino egranulata, spira trochiformi apice minus obtusa nec cupuloidea, anfractibus minus attritis sutura distinctiore, umbilico minus profundo, labro reflexo infra carinam descendente, apertura ad carinam haud angulata.

Hab. in Deserta Majore.

32. *HELIX ALBERSII*.—Species eximia inter insigniores, in honorem cl. J. C. Albers, M.D., Helicosophi peritissimi necnon taxophilorum omnium optime meriti dicata. *H. Bulverianæ* similis differt testa subminore solidiore trochiformi colore cerino-corneo magis opaco, minus (præsertim juniore) planato-depressa, subtus convexiore, carina media minus limbato-prominente, apertura ad carinam haud angulata.

Hab. in Portu S^{to}.

§. *Craspedaria*, Lowe.

33. *HELIX DELPHINULA*. Prim. 64.—*Delphinula*, Bowd. Exc. 140. figs. 33 *a*, *b*. Species mirabilis, *H. turcicæ*, Chemn., affinis. Differt umbilico patulo parietibus haud carinato-declivibus, apertura circulari, labro relevato expanso-reflexo sinuato-dentato v. inciso quasi fimbriato.

Hab. semifoss. in Madera.

§. *Coronaria*, Lowe.

34. *HELIX CORONULA*.—Species perelegans, *H. tiarella*, Webb, affinis. Differt testa discoideo-depressa, subtus exquisite can-

cellata ecarinata, anfractibus supra acute carinatis, umbilico largo patulo profundo pervio.

Hab. in Deserta Australi.

35. *HELIX JULIFORMIS*.—Species pulchella perquam singularis subpellucida, subtus subopaco-lactea, supra pallide cornea, *H. coronulæ* affinis. Differt testa magis depressa discoidea, subtus costis flexuosis remotis rotato-radiantibus nec cancellata, striis spiralibus nullis, anfractibus supra obtuse carinatis, apertura valde constricta quasi duplicata trigona, labro intus unidentato. Apertura *H. pauperculam*, Lowe, refert.

Hab. in Portu S^{to}. Coll. Wollaston et Armitage.

§. *Placentula*, Lowe.

36. *HELIX SPIRORBIS*.—*H. maderensi*, Wood, proxima, sed multo minor fere unicolor fasciisve obsoletis, testa tota granulata magis discoidea, spira depressiore apice obtusissima, anfractibus convexioribus (nec attritis) sutura impressa tenuiter et æquistriatis, nec hic inde stria rudi validiore quasi varicosis, carina media obtusiore, umbilico majore magis perspectivo.

Hab. in Madera.

37. *HELIX FICTILIS*.—*H. dealbata*, Lowe, proxima. Differt testa omnino egranulata nitida lævi, plerumque distincte fasciata, magis discoidea, spira depressiore, carina distinctiore, umbilico largo patulo majore. Testa omnino minus rudis, plerumque (in α .) minor. Var. β . est *H. dealbata* β . Prim. 48.

Hab. in Portu S^{to}.

38. *HELIX MICROMPHALA*.—*H. fictili* proxima. Differt testa tota subtiliter reticulato-granulata, spira elevatiuscula, umbilico minuto subporiformi.

Hab. in Insulis Desertis Majore et Minore.

§. *Actinella*, Lowe.

39. *HELIX STELLARIS*.—Species parvula fere minuta, *H. lentiginosæ*, Lowe, nimis affinis, et forsitan var. tantum pusilla; sed duplo fere minor, solidior, magis lævigata, subnitens, terra v. limo arcte obducta, periphæria eximie calcarata s. epidermide stellatim radiata. Ab *H. arcta*, Lowe, cui magnitudine per-similis, testa tenuiore, tota scobinata, tenui- (nec grosse) striata, umbilico majore subpatulo, laminaque ventrali nulla statim dignoscitur.

Hab. in Madera. Coll. Wollaston.

§. *Rimula*, Lowe.

40. *HELIX OBSERATA*.—*H. faustæ*, Lowe, proxima, sed paullo

major, minus globosa, magis discoidea, carina acutior, subtus convexior, plica laminave ventrali nulla, perforatione omnino clausa quasi obserata. Inter *H. faustam* et *H. rotulam*, Lowe, intermedia.

Hab. in Madera.

§. *Iberus*, Montf.

41. *HELIX WOLLASTONI*.—Speciem statu semifossili a meipso A.D. 1828 olim inventam, vivam inter *Helices Maderenses* pulchritudine superbientem detexit Entomologicus peritissimus nec non Molluscorum Maderensium scrutator oculatissimus indefessus felicissimus Wollaston. *H. scabriusculæ*, Desh., affinis. Differt colore virescenti-castaneo spadiceo fasciato, carina media (nec supera) ad suturam immersa nec per spiram prominente, perforatione omnino nulla, labro simplici (nec reflexo), axin versus late dilatato, verticaliter deciso v. planato, roseo.

Hab. in Portu S^{to}. Inv. Wollaston.

BULIMUS.

§. *Zua*, Leach.

42. *BULIMUS MADERENSIS*.—*Helix C. lubrica*, Prim. 61. t. 6. f. 29 (haud Müll.). A *B. lubrico*, Müll., testa graciliore angustiore, aperturaque quoad longitudinem totam brevior, latitudinem testæ sc. æquante, constantissime differt.

Hab. in Madera.

ACHATINA.

§. *Cylichnidia*, Lowe.

43. *ACHATINA LEACOCIANA*.—Testa parvula subminuta, *Bul. maderensi*, Lowe, forma et colore persimilis, *Achat. folliculo*, Gron., affinis. Ab hac differt, præter magnitudinem, forma e basi latiore sensim decrescente, apertura sursum subangustata, labro sursum arcuato-prominente, columella basi distincte truncata prominente. Differt ab *Achat. gracili*, Lowe, forma oblongiore nec fusiformi, spira obtusissima, apertura sursum subangustata labroque arcuato-prominente, columella basi prominente distincte truncata v. emarginata. Ab *Achat. cylichna* et *ovuliformi*, Lowe, quibus affinitate naturali proxima, apertura edentula statim dignoscitur.

Hab. in Madera. Inv. T. S. Leacock.

44. *ACHATINA CYLICHNA*.—Species notabilis pulchella, *Achat. ovuliformi*, Lowe, affinis. Differt apertura ringente 5-plicata, anfractibus planatis, apice obtusior, labro intus triplicato.

Hab. semifoss. in Madera.

§. *Fusillus*, Lowe.

45. *ACHATINA ORYZA*.—*H. triticea* β . *edentula*, Prim. 61. t. 6. f. 26. Differt ab *H. triticea*, Lowe, apertura spira longiore, spira brevior, plica ventrali nulla obsoletissime, columellari plane nulla.

Hab. in Portu S^{to}.

46. *ACHATINA TUBERCULATA*.—*Achat. oryzae* proxima. Differt testa majore, forma ventricosiore (ut in *Achat. tornatellina* Lowe) magis abbreviata, apertura longiore, spira brevior, ventre sursum obsolete calloso-tuberculato.

Hab. in Portu S^{to}.

47. *ACHATINA TEREbella*.—Differt ab *Achat. oryza* testa graciliore tenuiore inter illam et *Achat. gracilem*, Lowe, intermedia, huic propior, sed colore magis fusco-corneo intensiore, minus splendide hyalino-lævi, testa ventricosiore, spira brevior, apertura longior, labro subarcuato-prominente distincta.

Hab. in Portu S^{to}. Coll. Wollaston et Armitage.

§. *Acicula*, Risso.

48. *ACHATINA PRODUCTA*.—*Achat. aciculæ*, Müll., affinis, sed testa duplo majore solidiore robustiore aspectu omnino distincta. Ab *Achat. gracili*, Lowe, testa solidiore nec hyalina, apertura sursum oblique retro producta et angustata, columella basi prominente distincte truncata v. emarginata differt.

Hab. in Deserta Australi.

§. *Amphorella*, Lowe.

49. *ACHATINA MITRIFORMIS*.—*Achat. tornatellinae*, Lowe, affinis. Differt testa graciliore magis elongata, apertura brevior, spira longior, &c. Species proculdubio distincta.

Hab. in Madera.

X.—On the probable Dimensions of *Carcharodon Megalodon* from the Crag. By J. S. BOWERBANK, F.R.S., L.S. &c.*

WHEN we view small portions only of extinct animals, such as teeth or fragments of bone, there is often a considerable degree of difficulty in picturing in our minds anything like the size and proportions of the creature to which such remains have belonged, and it is with a view of endeavouring to realize in our imaginations the fish to which the great teeth of *Carcharodon Megalodon* from the Crag has belonged, which has induced me to introduce this subject to your notice on the present occasion.

* Communicated by the author, having been read at the Meeting of the British Association in July, 1851.



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