

UNIVERSITY OF PITTSBURGH



Dar.
gQL5
B414

Darlington Memorial Library

THE
ZOOLOGY
OF
CAPTAIN BEECHEY'S VOYAGE.



Digitized by the Internet Archive
in 2009 with funding from
University of Pittsburgh Library System

<http://www.archive.org/details/zoologyofcaptain00beec>

THE
ZOOLOGY
OF
CAPTAIN BEECHEY'S VOYAGE;

COMPILED FROM THE

COLLECTIONS AND NOTES MADE BY CAPTAIN BEECHEY,

THE OFFICERS AND NATURALIST OF THE EXPEDITION,

DURING A VOYAGE TO THE PACIFIC AND BEHRING'S STRAITS PERFORMED IN
HIS MAJESTY'S SHIP BLOSSOM,

UNDER THE COMMAND OF

CAPTAIN F. W. BEECHEY, R. N., F.R.S., &c. &c.

IN THE YEARS 1825, 26, 27, AND 28,

BY

J. RICHARDSON, M.D., F.R.S., &c.; N. A. VIGORS, Esq., A.M., F.R.S., &c.; G. T. LAY, Esq.;

E. T. BENNETT, Esq., F.L.S., &c.; RICHARD OWEN, Esq.;

JOHN E. GRAY, Esq., F.R.S., &c.; THE REV. W. BUCKLAND, D.D., F.R.S., F.L.S., F.G.S., &c.

AND G. B. SOWERBY, Esq.

ILLUSTRATED WITH UPWARDS OF
FIFTY FINELY COLOURED PLATES BY SOWERBY.

PUBLISHED UNDER THE AUTHORITY OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:
HENRY G. BOHN, 4, YORK STREET, COVENT GARDEN.

MDCCCXXXIX.

HOWLETT AND SON, PRINTERS,
10, FRITH STREET, SOHO.

INTRODUCTION.

THE specimens of Natural History described in this Work were collected during a voyage to the Pacific and Behring's Strait, in H. M. Ship Blossom in 1825, and the three consecutive years.

From the nature of this voyage it was not practicable to retain the ship long at any one place, and her stay was sometimes limited to a few days only. It cannot therefore be expected that under these circumstances we should have been able to collect a series of specimens illustrative of the natural history of any particular place; but we have had the good fortune to bring together a variety of rare species from distant localities, some of which have been but seldom, if ever, visited by any collector.

In arranging the work for publication it was found necessary from the extent of the collection to separate the natural history from the narrative of the voyage, and to divide it into the several branches under which it appears, of which the Botany forms no inconsiderable

portion. This last mentioned department has been undertaken by Dr. HOOKER,* Professor of Botany at Glasgow, by whose assiduity eight numbers have been already published; the remainder are in course of preparation, and the work when complete will comprise ten numbers, containing one hundred plates.

It must be well known to those who are conversant with matters of science that a work of this nature could not have been presented to the public without a considerable loss to the publisher, had there not been among the community gentlemen, who were eminently qualified for the task, sufficiently liberal to bestow gratuitously their time and their talents upon the descriptions; and had not the Government with its accustomed liberality and desire for the promotion of science, contributed towards the publication by granting a sum of money to defray the cost of the plates.

To the gentlemen who have interested themselves in forwarding the work in so able and so liberal a manner, I have already expressed my thanks in the narrative of my voyage, but I cannot forego the opportunity which now presents itself of renewing my acknowledgements to Professors BUCKLAND, HOOKER, Dr. RICHARDSON, Messrs. VIGORS, BENNETT, and OWEN, for their cordial and ready co-operation. Nor will I omit to repeat my thanks to Messrs. COLLIE, LAY,

* Now Sir WILLIAM HOOKER.

and Lieutenant (now Commander) BELCHER, for their attention to the collection and preservation of the specimens, as it is chiefly owing to their assiduity that the collection has been so far extended.*

I wish I could with sincerity have included with the above-mentioned names that of Mr. J. E. GRAY, who undertook to describe the shells, but the publication has suffered so much by delay in consequence of his having been connected with it, that it is a matter of the greatest regret to me that I ever acceded to his offer to engage in it. This delay has from various causes been extended over a period of eight years, and I cannot with justice or propriety conceal from the government, the collectors, and especially from the contributors to the work, whose MSS. have been so long printed, that it has been occasioned entirely by Mr. GRAY's failing to furnish his part in spite of every intercession from myself and others: promising his MS. from time to time, and thereby keeping the department in his own hands, yet always disappointing the printer, until at length, from other causes, the publisher (Mr. Richter) fell into difficulties, and all the plates and letterpress were sold by the assignees and lost to the government.

* Since this part of the Introduction was written, science has been deprived of two of its valuable members in Mr. E. T. BENNETT, a gentleman whose talents are too well known to need any eulogium, and Mr. COLLIE, by whose death science has been deprived of an able and assiduous collector, and the service of a skilful, humane, and experienced surgeon.

The plates and sheets thus dispersed were however with difficulty and at considerable expence brought together by the spirited conduct of the present publisher, Mr. H. G. BOUN, who, anxious that the work should if possible be completed, again applied to Mr. GRAY, but much against my wishes. That gentleman however repeated his offer of assistance, but as before it served only to delay the work another year. At length Mr. G. B. SOWERBY was engaged to complete the Conchology, and to revise the unprinted portion of Mr. GRAY'S MS., and thus after an unprecedented and vexatious delay, and with a considerable additional expense, I am now only able to submit the work to the public.

F. W. BEECHEY.

JULY, 1839.

LIST OF THE PLATES.

MAMMALIA.

PLATE	DESCRIBED AT PAGE	PLATE	DESCRIBED AT PAGE
1. SCIURUS COLLIEI	8	2. PTEROPUS PSELAPHON	11

ORNITHOLOGY.

3. SIALIA CERULEOCOLLIS 18 4. <i>fig.</i> 1 TROGLODYTES SPILURUS 18 — — 2 SITTA PYGMEA 18 5. GARRULUS CALIFORNICUS 21 6. PICUS BEECHEI 22 7. PICA COLLIEI 22 8. COCCOTHAUSTES FERREOROSTRIS 22	9. COLAPTES COLLARIS 24 10. COLUMBA MONILIS 26 11. ORTYX DOUGLASHI 27 12. RECURVIROSTRA OCCIDENTALIS 28 13. ANAS CAROLINENSIS 30 14. — UROPHASIANUS 31
--	---

FISHES.

15. <i>fig.</i> 1 ASPIDOPHORUS QUADRICORNIS 59 — — 2 COTTUS DICERAUS 57 16. <i>fig.</i> 1 } COTTUS CLAVIGER 58 — — 2 } — — 3 PEROPUS BILOBUS 59 17. <i>fig.</i> 1 CHATODON VINCTUS 62 — — 2 ———— STRIGANGULUS 60 — — 3 ———— VITTATUS 61 18. <i>fig.</i> 1 HENIOCHUS CHRYSOSTOMUS 62 — — 2 JULIS BIFER 64 19. <i>fig.</i> 1 ———— PÆCILA 66 — — 2 ———— LUTESCENS 65	19. <i>fig.</i> 3 SCARUS? QUINQUE-VITTATUS 66 20. <i>fig.</i> 1 OPHIDIUM STIGMA 67 — — 2 CYBIUM SARA 63 — — 3 ELIOTRIS LONGIPINNIS 64 — — 4 OPHISURUS SEMI-CINCTUS 66 21. <i>fig.</i> 1 SYNGNATHUS PERLATUS 68 — — 2 BALISTES WILLUGHBEII 68 — — 3 ———— SESQUILINEATUS 69 22. <i>fig.</i> 1 MONACANTHUS SPILOSOMA 70 — — 2 BALISTES ACULEATUS 69 — — 3 CALLORHYNCHUS SMYTHII 75 23. CHIMERA COLLIEI 71
--	---

CRUSTACEA.

24. <i>fig.</i> 1 GELASIMUS TELESCOPICUS 78 — — 2 ———— MINOR 79 — — 3 GRAPSUS THUKUHAR 80 — — 4 PARTHENOPE PUNCTATISSIMA 81	25. <i>fig.</i> 1 PAGURUS SPLENDESCENS 81 — — 2 ———— PICTUS 83 — — 3 CÆNOBITA CLYPEATA 85 26. PORCELLANA COCCINEA 87
--	---

PLATE	DESCRIBED		PLATE	DESCRIBED	
	AT PAGE			AT PAGE	
27. <i>fig.</i> 1	CRANGON	88	28. <i>fig.</i> 1	CRANGON LAR	88
— — 2	HIPPOLITE ARMATA	89	— — 2	HIPPOLITE CORNUTA	89
— — 5	SQUILLA CILIATA	90	— — 3	———— PALPATOR	89
— — 6	IDOTEA BICUSPIDA	92	— — 4	GAMMARUS TYPHLOPS	91

REPTILIA.

29. <i>fig.</i> 1	PHRYNOSOMA BLAINVILLII	96	30. <i>fig.</i> 3	TROPIDOLEPIS SCALARIS	95
— — 2	EMYS ORNATA	93	31. <i>fig.</i> 1	GERRHONOTUS IMBRICATUS	96
— — 3	LEIOCEPHALUS CARINATUS	97	— — 2	———— BURNETTII	96
30. <i>fig.</i> 1	CHAMELEOPSIS HERNANDESI	94	— — 3	SALAMANDER BEECHEYII	99
— — 2	TROPIDOLEPIS TORQUATUS	95	32. COLUBER (NATRIX) SUBCARINATA		97

MOLLUSCOUS ANIMALS AND THEIR SHELLS.

33. <i>fig.</i> 1	MUREX BRASSICA	108	35. <i>fig.</i> 4	HELIX LUHANA	143
— — 2	CONUS INTERRUPTUS	119	36. <i>fig.</i> 1	TURBO NIGER	143
— — 3	———— SOLANDRI	119	— — 2	NATICA DEPRESSA	136
— — 4	MUREX VITULINUS	108	— — 3	NASSA XANTHOSTOMA	127
— — 5	CONUS CYLINDRACEUS	119	— — 4	RICINULA ELEGANS	155
— — 6	MUREX VITULINUS	108	— — 5	MITRA RETUSA	134
34. <i>fig.</i> 1	PLEUROTOMA CINGULIFERA	120	— — 6	BUCCINUM ANGULOSUM	127
— — 2	HELIX MANDARINA	143	— — 7	MITRA STRIATA	135
— — 3	NATICA CLAUSA	136	— — 8	LITTORINA PERUVIANA	138
— — 4	PLEUROTOMA ALBINA	120	— — 9	COLUMBELLA COSTELLATA	129
— — 5	HARPA ROSEA CRENATA	122	— — 10	OLIVA SEMISTRIATA	130
— — 6	} CYPREA SPURCA, VAR.	133	— — 11	COLUMBELLA MARMORATA	129
— — 7			— — 12	FUSUS BUCCINEUS	155
— — 8	PLEUROTOMA CRYPTORRAPHE	120	— — 13	———— LAMELLOSUS	118
— — 9	———— MARMORATA	119	— — 14	———— PALLIDUS	117
— — 10	PYRULA PATULA (YOUNG)	115	— — 15	PYRULA SUBROSTRATA	115
— — 11	MARGARITA STRIATA	143	— — 16	POLLIA SCABRA	111
— — 12	LITTORINA SQUALIDA	139	— — 17	HARPA MINOR B. GRACILIS	122
— — 13	NATICA OTIS	136	— — 18	RANELLA LEVIGATA	110
— — 14	TROCHISCUS NORRISII	143	— — 19	BUCCINUM TENUE	128
— — 15	NATICA PALLIDA	136	— — 20	MARGINELLA PULCHRA	135
35. <i>fig.</i> 1	PYRULA PATULA (ADULT)	115	— — 21	OLIVA GRACILIS	130
— — 2	MITRA CHINENSIS	135	— — 22	CONUS ARCUATUS	119
— — 3	PYRULA PATULA (YOUNG)	115	— — 23	OLIVA UNDATELLA	131

PLATE		DESCRIBED AT PAGE		DESCRIBED AT PAGE
36. <i>fig.</i> 24	OLIVA LEUCOZONIAS .	130	38. <i>fig.</i> 29	CYCLOSTOMA IMMACULATUM 146
— — 25	— ZONALIS .	131	— — 30	— ALBICANS . 146
— — 26	— UNDATA .	131	— — 31	— FILOSUM . 146
— — 27	— UNDATELLA .	131	— — 32	— BRASILIENSE 147
37. <i>fig.</i> 1	NATICA IMPERFORATA .	135	39. <i>fig.</i> 1	LOTTIA? PALLIDA . 147
— — 2	— BOREALIS .	136	— — 2	— ? COSTATA . 147
— — 3	— OTIS .	136	— — 3	
— — 4	— SUTURALIS .	136	— — 4	} LOTTIA VARIABILIS . 147
— — 5	— SORDIDA VAR. GLOBOSA	136	— — 5	
— — 6	— CLAUSA .	136	— — 6	MOURETIA PERUVIANA 147
38. <i>fig.</i> 1	LITTORINA IRRORATA .	138	— — 7	PATELLA ARGENTATA . 148
— — 2	HELIX ROSACEA .	143	— — 8	FISSURELLA LATIMARGINATA 148
— — 3	— MANDARINA .	143	— — 9	— CRASSA . 148
— — 4	PARTULA FABA .	144	— — 10	} INFUNDIBULUM RADIANIS 148
— — 5	HELIX DESPECTA .	143	— — 11	
— — 6	— FRASERI .	143	— — 12	PATELLA MAZATLANDICA . 148
— — 7	— SPECIOSA .	144	— — 13	CALYPTREA STRIGATA 148
— — 8	BULINUS OPALINUS .	144	40. <i>fig.</i> 1	CHITON HENNAHI . 148
— — 9	HELIX VIRGULATA .	144	— — 2	— JANEIRENSIS . 148
— — 10	— INVERSICOLOR .	144	— — 3	— PUNCTULATISSIMUS 149
— — 11	PALUDINA UNICOLOR .	155	— — 4	— ALBO-LINEATUS 149
— — 12	BULINUS SCALARIFORMIS	144	— — 5	— GRANOSUS . 149
— — 13	BULINI GUADALOUPENSIS, } 144		— — 6	— COQUIMBENSIS 149
	VAR. ALBA .		— — 7	— SETIGER . 149
— — 14	BULINUS VITTATUS .	144	— — 8	— ACULEATUS . 149
— — 15	— ROSACEUS .	145	41. <i>fig.</i> 1	} PECTEN PULCHERRIMUS . 150
— — 16	— MELO .	145	— — 2	
— — 17	— CONSPERSUS .	145	— — 3	VENUS GNIDIA . 151
— — 18	CHILINA OVALIS .	145	— — 4	GLAUCONOME CHINENSIS . 153
— — 19	— FLUVIATILIS .	145	— — 5	TELLINA EDENTULA . 154
— — 20	BULINUS MUTABILIS .	145	— — 6	— INCONSPICUA . 153
— — 21	HELICINA GONIOSTOMA .	145	— — 7	VENUS TRICOLOR . 151
— — 22	— GLOBOSA .	145	— — 8	— NEGLECTA . 151
— — 23	— FESTIVA .	145	— — 9	— DECORATA . 151
— — 24	— OXYTROPIS .	146	— — 10	CHITON BARNESII . 149
— — 25	— MAUGERIE .	145	— — 11	— PLATYMERUS 149
— — 26	— SOLIDULA .	146	— — 12	— UNDULATUS . 149
— — 27	AURICULA PALLIDA .	146	— — 13	— STRAMINEUS . 150
— — 28	MELAMPUS PALLESCENS	146	— — 14	— VESTITUS . 150

PLATE		DESCRIBED AT PAGE	PLATE		DESCRIBED AT PAGE
41. <i>fig.</i> 15	CHITON TUNICATUS .	150	43. <i>fig.</i> 7	CYTHEREA ROSEA .	151
— — 16	ARTICULATUS	150	— — 8	PULLASTRA NEBULOSA .	151
— — 17	SETOSUS .	150	— — 9	CHAMA ECHINATA .	150
— — 18	RUGULATUS .	150	44. <i>fig.</i> 1	CARDITA BOREALIS .	152
42. <i>fig.</i> 1	CARDIUM FIMBRIATUM .	152	— — 2	SOLENI MEDIUS .	153
— — 2	TELLINIDES PURPUREUS	153	— — 3	LUCINA INTERRUPTA, VAR. .	154
— — 3	PECTUNCULUS INÆQUALIS .	152	— — 4	TELLINA PRONIMA .	154
— — 4	CARDITA CRASSA .	152	— — 5	ALTERNIDENTATA .	153
— — 5	CARDIUM BIANGULATUM .	152	— — 6	MACTRA AUSTRALIS .	154
— — 6	DIONÆUM .	152	— — 7	TELLINA EDENTULA .	154
— — 7	PANAMENSE .	152	— — 8	MACTRA SIMILIS .	154
43. <i>fig.</i> 1	ARCA GRADATA .	152	— — 9	ASTARTE STRIATA? .	152
— — 2	SOLENI ACUTIDENS .	153	— — 10	BANKSII? .	152
— — 4	GLADIOLUS .	153	— — 11	MULINIA BYRONENSIS .	154
— — 5	CYTHEREA BIRADIATA	151	— — 12	ASTARTE LACTEA .	152
— — 6	PLANULATA .	151	— — 13	MULINIA DONACIFORMIS .	154

MAMMALIA;

BY

JOHN RICHARDSON, M. D., F. R. S., &c.

THE opportunities which a voyage of discovery offers to the naturalist, of becoming acquainted with the animals of the countries that are visited, are necessarily very limited; the stay in port is generally short, communication with the shore often inconvenient, and frequently dangerous to small parties; and as the crew and officers can seldom be spared from the necessary business of the vessel, excursions in-land are rarely attempted. Under such circumstances, the large collection of objects of Natural History made on the present voyage are highly creditable to the Commanding Officer, Mr. Lay the Naturalist, and other members of the expedition. Mr. Collie, the Surgeon, is particularly deserving of commendation for the great attention he paid to Zoology during the voyage, evinced by his copious and interesting notes on the anatomy of the various animals he dissected,* and an ample collection

* The limits of this work admit of our giving a few extracts merely from the notes of his dissections, which he has recorded at considerable length.

of specimens presented by him to the Museum at Haslar Hospital. The specimens of the Mammalia brought home are, as might be expected, fewer than those of the other classes of animals. Captain Cook mentions, that during one month's stay in Nootka Sound, the only quadrupeds seen by his crews were two or three racoons, martins, and squirrels, though he obtained the skins of many other species from the natives; and Kotzebue, who passed a whole season at the Russian American Company's settlement of Sitka, in Norfolk Sound, obtained specimens only of the black bear, a fox, a stag, the beaver, two species of bat, and a seal. The skins placed in my hands for examination by Captain Beechey belong to the arctic fox, common fox, lynx, land otter, sea otter, musk rat, Parry's marmot, Beechey's marmot, Collie's squirrel, the polar hare, and a bat—all except the last one obtained on the west coast of North America. As our knowledge of the Zoology of that coast, from California northwards, has been derived from expeditions of discovery, and the details are scattered through a number of works, it appears to us that the most useful plan we can adopt is, to give a general list of the Mammalia known to belong to its Fauna, with detailed accounts of the new species.

MELVILLE HOSPITAL,
Chatham, March 1st, 1831.

LIST OF MAMMALIA

HITHERTO DETECTED IN THE COUNTRY BETWEEN THE RIDGE OF THE ROCKY MOUNTAINS
AND THE PACIFIC,

FROM NORTH CALIFORNIA TO THE NORTHERN EXTREMITY OF THE CONTINENT;

With references to detailed descriptions in the FAUNA BOREALI-AMERICANA.

1 & 2. VESPERTILIO. BAT.

Kotzebue found two small bats, with short ears, in Norfolk Sound, lat. 56³⁰ N.

3. SOREX PARVUS. SMALL SHREW-MOUSE. (Faun. Bor. Am. No. 5.)

Killed by Mr. Collie, on the shores of Behring's Straits.

4. SCALOPS CANADENSIS. SHREW-MOLE. (F. B. A. No. 6.)

Common on the banks of the Columbia.

5. CONDYLURA MACROURA. THICK-TAILED STAR-NOSE. (F. B. A. No. 83, p. 284.)

Banks of the Columbia.

6. URSUS AMERICANUS. AMERICAN BLACK BEAR. (F. B. A. No. 8.)

Northern California, New Caledonia, and Norfolk Sound. Its skins are enumerated by Langsdorff among those procured by the Russian American Company at Kodiak; but the animal is stated by him not to exist on the islands of Alaska. Cook obtained many bear skins of a shining black colour on the island of Nootka.

7. URSUS ARCTOS, *Americanus*. BARREN-GROUND BEAR. (F. B. A. No. 9.)

The *brown bear skins* of Oonalaska, mentioned by Langsdorff, and the *brown or sooty bear skins* got by Cook in Prince William's Sound, lat. 61° 11' N., were probably the spoils of this species.

I have not sufficient data for determining whether this American animal ought to be ranked as specifically distinct from the European *URSUS ARCTOS*, or merely considered as a local variety; hence, to avoid unnecessarily introducing a new specific name, it is given under this appellation.

8. URSUS FEROX. GRISLY BEAR. (F. B. A. No. 10.)

Northern California, and upper branches of the Columbia.

9. URSUS MARITIMUS. POLAR OR SEA BEAR. (F. B. A. No. 10 bis.)

Prince William's Sound, and within Behring's Straits.*

* Through a mistake, this animal and the walrus are erroneously stated in the *Fauna Boreali-Americana* not to inhabit Behring's Straits.

10. PROCYON LOTOR. THE RACCOON. (F. B. A. No. 11.)

Raccoons were seen in considerable numbers by Lewis and Clarke, in the woody tracts near the mouth of the Columbia, and their skins were procured by Cook at Nootka Sound, and along the coast up to Prince William's Sound. The identity of the raccoon of the Pacific with that of the Atlantic coasts of America, has not been ascertained; and it is likely that several species exist west of the Rocky Mountains. Captain Cook mentions that the pelt of the raccoon skins of Prince William's Sound was much finer, and of a lighter brown colour, than of those of Nootka.—Mr. Collie says that a raccoon, or small bear, is common near La Puerta of San Blas, in California. It inhabits the woods, climbs trees, and feeds partly on nuts, but principally on crustacea, which it obtains on the sea-shore. The largest that was seen was about the size of a pointer dog, which is greater than either the *P. lotor* or *P. cancrivorus*.

11. MELES LABRADORIA. AMERICAN BADGER. (F. B. A. No. 12.)

The description of the "*bravo*" of the Columbia, by Lewis and Clarke (3. p. 40), agrees with this species, except that it has one of the nails of each foot double, like that of the beaver.

12. GULO LUSCUS. THE WOLVERENE. (F. B. A. No. 13.)

Inhabits all the northern parts of America. Cook obtained skins of a very bright colour in Prince William's Sound.

13. MUSTELA (PUTORIA) VULGARIS. THE COMMON WEASEL. (F. B. A. No. 14.)

The "small ermine skins" obtained by Captain Cook at Nootka were in all probability the spoils of the common weasel, killed in winter, when it is clothed in a white dress like the ermine.

14. MUSTELA (PUTORIA) ERMINEA. THE ERMINE. (F. B. A. No. 15.)

Prince William's Sound. (Capt. Cook.)

15. MUSTELA (PUTORIA) VISON. THE VISON-WEASEL. (F. B. A. No. 16.)

Columbia river, and New Caledonia. It is perhaps the "marsh otter" of Langsdorff, found in Onalaska.

16. MUSTELA MARTES. THE PINE MARTIN. (F. B. A. No. 17.)

From North California to Prince William's Sound. The pale skins obtained by Captain Cook were summer specimens.

17. MUSTELA CANADENSIS. THE PEKAN, OR FISHER. (F. B. A. No. 18.)

Columbia river, and New Caledonia. Termed by Lewis and Clarke the "black fox," and said to abound in the woody country at the mouth of the Columbia, where it preys on squirrels, bounding after them from tree to tree with great activity.

18. MEPHITIS AMERICANA. THE SKUNK. (F. B. A. No. 19.)

New Caledonia, and the banks of the Columbia.—Langsdorff saw pole-cats in Monterey bay, California, where they are termed "zorillo," doubtless a distinct species from the more northern skunk.

19. LUTRA CANADENSIS. THE CANADA OTTER. (F. B. A. No. 20.)

From North California to Behring's Straits.

20. **LUTRA (ENHYDRA) MARINA.** THE SEA OTTER. (F. B. A. No. 21.)

From Alaska to California. Named "natooneeshuck," at Nootka.

21. **CANIS LUPUS, var. grisea.** GREY WOLF. (F. B. A. No. 22, p. 66.)

Nootka (Capt. Cook), and doubtless the whole north-west coast.

CANIS LUPUS, var. fusca. BROWN WOLF. (F. B. A. p. 61.)

A large brown wolf, said by Lewis and Clarke to resemble those of the United States in all respects; inhabits California and the banks of the Columbia. They are represented as having the long narrow head, high ears, long legs, and narrow feet of the Pyrenean wolves. The grey wolf, on the other hand, is stronger limbed, has a broad, compact head, shorter ears, and, as might be expected from its more northern habitat, its fur is finer and longer.

22. **CANIS LATRANS.** THE PRAIRIE WOLF. (F. B. A. No. 23.)

Plains of the Columbia.

23. **CANIS OCHROPUS.** THE CAJOTE. (ESCHSCHOLTZ, Zool. Atl. pl. 11.)

California. This animal differs from the prairie wolf in the same way that the brown wolf does from the grey one. It has a long narrow head, high ears, and a gaunt appearance; but it barks like a dog as well as the *canis latrans*. It differs more decidedly from the prairie wolf of the Saskatchewan plains, than from that of the Missouri and Columbia, described by Say (Long's Exped.), so that the variations may be owing to climate or local causes.

24. **CANIS FAMILIARIS, var. Novæ Caledoniæ.** CARRIER INDIAN DOG. (F. B. A. p. 82.)

This variety of dog is reared for the chase of the moose, by the Indians of the Columbia and New Caledonia. It is singular that the domestic dog of the tribes dwelling west of the Rocky Mountains should have a short sleek coat of hair, while all the varieties of dog to the eastward in the same parallels are shaggy.

25. **CANIS (VULPES) LAGOPUS.** ARCTIC FOX. (F. B. A. No. 25.)

From Alaska northwards.

CANIS LAGOPUS, var. fuliginosa. SOOTY FOX. (F. B. A. p. 89.)

Common in Behring's Straits.

26. **CANIS (VULPES) FULVUS.** AMERICAN FOX. (F. B. A. No. 26.)

Plains of the Columbia, New Caledonia, Nootka, Prince William's Sound.

CANIS FULVUS, var. argentata et decussata. SILVER & CROSS FOXES. (F. B. A. p. 93.)

Same localities.

27. **CANIS (VULPES) VULGARIS.** THE FOX. (F. B. A. No. 28.)

A fox skin, with shorter and coarser fur, and of a duller colour than *C. fulvus*, was brought from the north-west coast by Captain Beechey. It exhibits no characters by which it can be distinguished from the common European fox, and is doubtless the "common red fox" of Lewis and Clarke, which they found near the mouth of the Columbia, and describe as identical with the red fox of the United States.

28. *CANIS (VULPES) CINEREO-ARGENTATUS*. THE KIT-FOX. (F. B. A. No. 29.)
Plains of the Columbia.
29. *FELIS CONCOLOR*. THE COUGAR. (HARLAN, Faun. Am. p. 94.)
Monterey bay. (Langsdorff.)
30. *FELIS ONCA*. THE JAGUAR. (HARLAN, Faun. Am. p. 95.)
Banks of the Columbia. (Lewis and Clarke.)
31. *FELIS RUFUS?* BAY LYNX. (F. B. A. No. 31.)*
Banks of the Columbia and North California.—This is perhaps the animal named “wanshee,” whose skins were obtained at Nootka by Captain Cook.
32. *FELIS FASCIATA*. BANDED LYNX. (F. B. A. No. 32.)
Borders of the plains of the Columbia, and woody districts at the mouth of that river.
33. *PHOCA (CALOCEPHALA) VITULINA*. COMMON SEAL. (CUV. Reg. An. p. 168.)†
34. *PHOCA (CALOCEPHALA) GREENLANDICA*. HARP SEAL. (IDEM, p. 168.)
35. *PHOCA (CALOCEPHALA) BARBATA*. GREAT SEAL. (IDEM, p. 168.)
36. *PHOCA (OTARIA) JUBATA*. LEONINE SEAL. (IDEM, p. 170.)
37. *PHOCA (OTARIA) URSINA*. URSINE SEAL. (IDEM, p. 170.)
38. *PHOCA (OTARIA?) FASCIATA*. RIBBON SEAL. (PENN. Arct. Zool. 2. p. 165.)
All these seals are mentioned by authors as having been found on the north-west coast of America, but the species in some instances have been imperfectly determined. Other seals are enumerated in Krascheninikoff's history of Kamtschatka, and if really proper species, most likely range over to the American shores.
39. *TRICHECHUS ROSMAREUS*. THE MORSE. (HARLAN, Faun. Am. p. 114.)
Behring's Straits, and the Icy Sea to the northward: seen by Cook as far south as Bristol bay, lat. 58° 42'. It is unknown to the Esquimaux of the Coppermine and Mackenzie rivers.
40. *DIDELPHIS VIRGINIANA*. THE OPOSSUM. ‡ (HARLAN, Faun. Am. p. 119.)
California. (Mr. Collie.) No specimen brought home.
41. *CASTOR FIBER, Americanus*. AMERICAN BEAVER. (F. B. A. No. 33.)
Russian America, New Caledonia, and North California.

* No. 31. Neck of the gall-bladder tortuous, like the *vesiculae seminales* in the human subject. Intestinal canal, 9 feet long. (Collie.)

† No. 33. A seal, referred by Mr. Collie to this species, was killed, on the 18th July, 1826, close to the St. Lawrence Islands. Thermometers, put into the cavity of the abdomen and of the heart, while it was in the act of dying, stood at 92½ Fahr., the temperature of the sea being at the time 43½, and of the air 44½.

‡ No. 40. Mr. Collie mentions that the tongue of this animal is set above with prickles pointing backwards, and that its tip is dentated.

42. FIBER ZIBETHICUS. THE MUSQUASH. (F. B. A. No. 34.)*

43. ARVICOLA RUBRICATUS. RED-SIDED MEADOW-MOUSE.

CH. SP. ARVICOLA RUBRICATUS, *supra obscurè plumbeus: subtus pallidè cinereus, lateribus miniatis, caudâ breviusculâ, pollice minimo.*

SP. CH. RED-SIDED MEADOW-MOUSE, back slate-coloured, belly ash-coloured, sides nearly scarlet, tail rather short; thumb of fore-foot rudimentary.—*Size*, a little greater than that of the common domestic mouse.

The above are the characters of a meadow-mouse, which burrows in the turfy soil on the shores of Behring's Straits, drawn up from Mr. Collic's notes. In the colours of its fur, and dimensions, it most resembles the *arvicola œconomus* (PALL. *glir.* No. 125, *pl.* 14, *A*), and appears to be quite distinct from any American meadow-mouse hitherto described. There is no specimen in the Collection.

44. NEOTOMA DRUMMONDII. ROCKY MOUNTAIN NEOTOMA. (F. B. A. No. 44.)

Near the sources of the Columbia.

45. MUS LEUCOPUS. AMERICAN FIELD-MOUSE. (F. B. A. No. 45.)

Banks of the Columbia, and New Caledonia.

46. ARCTOMYS CALIGATA (Eschscholtz). TARPOGAN.†

Arctomys caligata. (ESCHSCHOLTZ, *Zool. Atl. pl.* vi.)

CH. SP. ARCTOMYS CALIGATA, *ex griseo alboque nigrescens, capite supra caudâque decem-pollicari ferrugineis, tarsis nigris, ore albo, auriculis rotundatis breviusculis.*

SP. CH. TARPOGAN MARMOT, hoary, top of the head and the ten-inch tail rust-coloured, feet black, muzzle white, roundish and rather short ears.

DESCRIPTION.

FUR of two kinds, a fine wool, and longer stiff hairs; the former two inches long on the back and sides, where it is blackish-brown towards the bottom, and whitish-grey upwards; it is almost deficient on the belly. The *hairs*, white, with black tips, are longest on the neck, being $2\frac{1}{2}$ inches, white on the belly they measure only half an inch. The top of the head is brown, sprinkled with black hairs; a black stripe passes behind the ear from the side of the head to the shoulder; hairs of the forehead white; medial line of the nose dark-brown, its tip and the lips quite white. *Ears* brown. *Extremities* brown; the tarsi, soles and toes, covered with moderately long black hairs. Hairs of the *tail* rusty brown, with a wide white ring towards their tips. The black claws equal the toes in length; the thumb tubercle of the fore-foot is very evident. Total length of the animal almost two feet, tail included.

47. ARCTOMYS BRACHYURUS. SHORT-TAILED MARMOT. (F. B. A. No. 49.)

Plains of the Columbia.

48. ARCTOMYS (SPERMOPHILUS) PARRYI. PARRY'S MARMOT. (F. B. A. No. 50.)

New Caledonia to Icy Cape. The skins are made into dresses by the Esquimaux of Behring's Straits.

* No. 42. Mr. Collie states that the *kidneys* of this animal are surmounted by a *renal gland* about the size of a pea. The *cæcum* is wide, sacculated, and nearly a foot long, and the *colon*, at its commencement, is twisted several times round itself.

† As no English account of this marmot has hitherto appeared, the following description is abridged from Eschscholtz's. There is a great resemblance between the Tarpogan and the Whistler of the Rocky Mountains (*Arctomys pruinosus*), noticed in the *Fauna Boreali-Americana*.

49. *ARCTOMYS (SPERMOPHILUS) GUTTATUS?* AMERICAN SOUSLIK. (F. B. A. No. 51.)
Banks of the Columbia, and New Caledonia, on the mountains.
50. *ARCTOMYS (SPERMOPHILUS) BEECHEYI.* BEECHEY'S MARMOT. (F. B. A. p. 170.)*
San Francisco, and Monterey in California.
51. *ARCTOMYS (SPERMOPHILUS) DOUGLASII.* DOUGLAS' MARMOT. (F. B. A. No. 54.)
Banks of the Columbia.
52. *ARCTOMYS (SPERMOPHILUS) LATERALIS.* SAY'S MARMOT. (F. B. A. No. 53.)
Rocky Mountains, near the sources of the Columbia.
53. *SCIURUS HUDSONIUS.* THE CHICKAREE. (F. B. A. No. 59.)
New Caledonia, and banks of the Columbia.
Lewis and Clarke mention a "large grey squirrel," which inhabits the oak forests of the Columbia.
54. *SCIURUS COLLIÆI* (Richardson). COLLIE'S SQUIRREL.
GENUS, *Sciurus*, AUCT. *Tlalmototli*. (FERNANDEZ, *Quad. Nov. Hisp.* p. 9.?) *Ardillito-zorito*. SPANISH CALIFORNIANS.
CH. SP. *SCIURUS COLLIÆI*, *supra cervinus medio dorsi nigrescens; subter albus, lateribus extremitatibus caudâque elongatâ e nigro canescentibus: hæc quando distichâ fasciatâ; naso umbrino.*
SP. CH. COLLIE'S SQUIRREL, above of a mixed yellowish-brown and black, darkest on the dorsal line; below, white; sides, extremities, and long tail, hoary, the latter striped when distichous; nose umber-brown.

PLATE I.

Mr. Collie observed this squirrel, in considerable numbers, sporting on trees at San Blas in California, where its vernacular name signifies "little fox-squirrel." It feeds on fruits of various kinds. Although unwilling to incur the risk of adding to the number of synonyms with which the history of this large genus is already overburthened, I do not feel justified in referring it to any of the species admitted into recent systematic works, and I have therefore described it as new, naming it in compliment to the able and indefatigable naturalist who procured the specimen. Fernandez enumerates five different squirrels which inhabit Mexico. The *first*, or "Quauhtechallotl," (*Sciurus Mexicanus* of Hernandez,) has black fur, and seems to be nearly allied to the *Sc. capistratus* of authors. The *second*, named "Cozticotequallin," from its tawny belly, lives in burrows, and is very probably the *Arctomys (Spermophilus) Beecheyi* of this list. The *third*, "Techallotl," has an almost naked tail, burrows, and is also likely to prove a Spermophile. The *fourth*, "Tlalmototli," agrees, as far as the short description of it goes, with the subject of this article;† but its absolute identity can be established only by one who has an opportunity of studying the Mexican and Californian animals in their native retreats. The *fifth* of Fernandez's squirrels, or the "Quimichtpatlan," is a *pteromys*.

The *Sciurus Colliæi* differs from all the varieties of the *Sc. cinereus*, in the colours of its fur, and the smallness of its ears. The *Sc. vulpinus* is a much larger animal. The *Sc. magnicaudatus* may be distinguished by its lips being black in place of white, and the feet and under surface of its tail ferruginous instead of grey. The *Sc. grammurus* has very coarse fur.

* No. 50. This marmot was discovered by this expedition. A detailed account of it, and figure, first appeared in the *Fauna Boreali-Americana*. Mr. Collie informs us that it has an *epiglottis*—a strong bony *clavicle*—and a large curved *cæcum*, $3\frac{1}{4}$ inches long, having a diameter three or four times greater than that of the rest of the intestinal tube.

† "Quartus *Tlalmototli* dictus spithamæus est, caput et oculos habet pro corporis magnitudine maxima, caudam vero longam, pilosamque et lineis totius corporis variis est, et quandoque inclinans in fulvum, cætera præcedentibus similis."



Sciurus boltoni

DESCRIPTION

Of a *male*, killed at San Blas.

FORM, &c.—*Head* and *feet* large in proportion to its body. *Eyes* large. *Nose* obtuse. *Whiskers* black, longer than the head. *Incisors* yellow. *Ears* rather small, semi-ovate, rounded at the tip and not tufted, well clothed on both sides with short hair. *Tail* long, very hairy, cylindrical or distichous, at the will of the animal. *Toes* long, and well separated. *Fore-toes* rather slender; third one longest; their *claws* strong, much compressed, short, curved and sharp-pointed; a small callous wart in place of a thumb, protected by a rounded flat nail; palms naked, with, as usual, five tubercles. The soles of the *hind-feet* are longer and broader in proportion, and are naked much further back than those of *Sc. Hudsonius*; they are nearly as long, and are somewhat broader, than those of *Sc. capistratus*, which is a considerably bigger animal.

FUR, COLOUR, &c.—Upper surface of the head and back presenting a mixture of pale yellowish-brown and black, without spots, the black predominating on the dorsal line; the forehead sprinkled with a few white hairs. Checks, flanks, outside of the shoulders and thighs, and anterior surfaces of the legs and feet grizzled or hoary, from an equal and intimate intermixture of black and white hairs. End of the nose covered with a smooth coat of short, shining, number-brown hairs. Sides of the nose, circumference of the mouth, throat, belly, and insides of the extremities, white. *Tail* grizzled when cylindrical; having a broad black bar on each side, with a white margin, when distichous. The *fur of the back* has some lustre on its surface; its colour, from its roots for three quarters of its length upwards, is greyish-black; which is succeeded by a pretty broad ring of wood-brown, and tipped with black; the black tips of some hairs being much longer than the rest. The *hairs of the tail* are about two inches long; white at the roots and tip, the intermediate part shewing three black rings, of which the one next the tip is by much the broadest. At the extremity of the tail there is a tuft of long hair, brownish-black to the tip, which is white.

DIMENSIONS.

In. L.		In. L.	
Length of head and body	10 6	Length from heel to top of middle hind claw.....	2 4
„ of head	2 6	„ of furry part of heel	0 6
„ of tail (vertebræ).....	8 6	„ of naked sole.....	1 0
„ of tail, including fur.....	11 0	„ of longest hind-toe and claw.....	0 9
„ from wrist to tip of middle claw	1 9	Breadth of sole adjoining the toes	0 6
„ of middle fore-toe	0 8	Height of the ear posteriorly.....	0 6
„ of its claw	0 4	„ of the ear anteriorly	0 8

55. GEOMYS DOUGLASHII. COLUMBIA SAND-RAT. (F. B. A. No. 62.)

Neighbourhood of Fort Vancouver, on the Columbia.

56. DIPLOSTOMA BULBIVORUM. THE CAMAS RAT. (F. B. A. No. 65.)

Notwithstanding Mr. Schoolcraft's positive testimony respecting the use and external openings of the cheek pouches of the *gophers*, as referred to in the *Fauna Boreali-Americana*, doubts on the subject, and consequently of the existence of *diplostoma* as a distinct genus from *geomys*, have been excited since we lately received several specimens of the *mus bursarius* of Shaw, (which is a true *geomys*, with pouches opening internally,) from the banks of the Saskatchewan. The figure in the Linnean Transactions is a correct representation of the form of the animal, and gives the true appearance of its cheek pouches when distended with food. They cannot in a recent specimen be made to assume the form of the pouches of *diplostoma*.

57. APLDONTIA LEPORINA. THE SEWELLEL. (F. B. A. No. 66.)

Banks of the Columbia.

58. *HYSTRIX PILOSUS*. CANADA PORCUPINE. (F. B. A. No. 67.)
New Caledonia.

59. *LEPUS AMERICANUS*. AMERICAN HARE. (F. B. A. No. 68.)
Woody districts from the Columbia to Behring's Straits.

60. *LEPUS GLACIALIS*. POLAR HARE. (F. B. A. No. 69.)
Russian America, north of Alaska.

61. *LEPUS VIRGINIANUS*. PRAIRIE HARE. (F. B. A. No. 70.)
Plains of the Columbia.

62. *EQUUS CABALLUS*. THE HORSE. (F. B. A. No. 72.)

Immense numbers of horses are possessed by the native tribes, which inhabit the plains of the Columbia lying between the fortieth and fiftieth parallels of latitude, and many herds of wild horses exist in that district. Some native tribes, and the resident fur traders on the Columbia, subsist principally upon horse-flesh.

63. *CERVUS ALCES*. THE MOOSE-DEER. (F. B. A. No. 73.)
New Caledonia, in small numbers.

64. *CERVUS TARANDUS*. THE REIN-DEER. (F. B. A. No. 74.)
Russian America, and at some seasons of the year in New Caledonia.

65. *CERVUS STRONGYLOGERUS*. THE WAPITI. (F. B. A. No. 75.)
Plains and timbered lands of the Columbia. (Lewis and Clarke.)

66. *CERVUS MACROTIS*. BLACK-TAILED DEER. (F. B. A. No. 76.)
Rocky Mountains, on the Kooskooskee, and near the falls of the Columbia.

CERVUS MACROTIS, var. *Columbiana*. (F. B. A. p. 257.)

This is the *black-tailed fallow deer* of Lewis and Clarke, who state that it is peculiar to the sea-coast at the mouth of the Columbia.

67. *CERVUS LEUCURUS*. LONG-TAILED DEER. (F. B. A. No. 77.)
Prairies of the Cowladiskø and Multnomah, and on the Columbia.

A small stag was procured at Sitcka, in Norfolk Sound, by Kotzebue, which he thinks may be the *Cervus Virginianus*.

68. *ANTILOPE FURCIFER*. PRONG-HORNED ANTILOPE. (F. B. A. No. 78.)
Plains of the Columbia. (Lewis and Clarke.)

69. *CAPRA AMERICANA*. ROCKY MOUNTAIN GOAT. (F. B. A. No. 79.)
Summits of the Rocky Mountains, and lofty peaks lying nearer the coast, up to the 62nd parallel.



Pteropus papuanus

70. OVIS MONTANA. ROCKY MOUNTAIN SHEEP. (F. B. A. No. 80.)

Timbered parts of the Rocky Mountains, and hilly countries between that range and the Pacific, from North California to the 62nd parallel. The Kamtschatka *argali*, described and figured by Eschscholtz in the Zoologischer Atlas (pl. 5), appears to be sufficiently distinct from the American one.

PTEROPUS PSELAPHION. Lay's Pteropus.

Pteropus pselaphon, LAY, Zool. Journ. No. 16, May, 1829.

PLATE II.

This pteropus bears considerable resemblance to the "roussette laineuse" of M. Temminck, in its external form; but the interfemoral membrane is more developed, and the colours of its fur quite different. It is very numerous in the island of Bonin, (Loo Choo,) where it feeds on the fruits of the Sapota and Pandanus. A detailed account of it is given by Mr. Lay, in the work above referred to.*

Mr. Collie makes the following observations on its habits:—"During the day, these bats were generally observed hanging or climbing among the branches of the trees, the head almost always lowest and at right angles with the body, suspending themselves by one or both hind claws. They not unfrequently came down close to our men, and were caught. Sometimes they alighted from an adjoining tree, at other times they ran down a branch to pick off one of the fruits. In all cases, I believe, they ascended by climbing, and they never seemed to be aware that they were taking a short branch, until they came to its termination, when they tried all round for something to cling to, seldom trusting themselves to their wings on such occasions. In the night we heard a loud and frequent screeching, which we attributed to these animals."

* Mr. Collie having dissected several specimens with great care, we shall here quote a few of his notes.—Length of the animal, from the forehead to the coccyx, (the face being at right angles to the spine,) 7 inches. Extent of wings, 37 inches. Length of the intestinal canal from the cardia, 90 inches. When the *wing membrane* is extended, the nail of the index finger is half sheathed. Slender bands of muscular fibres, ending in fine tendons, lie between the two surfaces of this membrane. The *third eyelid* has a black lunated margin, which can be brought nearly to the middle of the eye. The *tongue* is very large, and is folded within the mouth. It is covered above with fleshy papilla pointing backwards, each tipped with from two to four fleshy spines. Lining of the mouth rugous, admitting of great dilatation. *Parotid gland*, large. *Sterno-mastoid muscle* having a clavicular origin, about a quarter of an inch from the sternal one. Mr. Collie says, "This double origin being contrary to that described by Baron Cuvier as peculiar to the bat tribe, I ascertained that I was correct, by dissecting another specimen." *Liver*, consisting of three lobes, the middle one bipartite; lobulus spigelii, large. *Spleen* long and narrow, in the female lying close to the *fundus uteri*. No *omentum*; no *cæca*. *Penis*, 1½ inches long, with a hard cartilaginous saddle-formed substance near the point above.

ADDITIONAL OBSERVATIONS.

HASLAR HOSPITAL, GOSPORT,

February, 1839.

The progress of science during the years that the Zoology of Captain Beechey's Voyage has lain unpublished, requires some amendments to be made in the preceding list of *Mammalia* inhabiting the north-west coast of America, and enables us to add a few species.

3. SOREX PARVUS.

The Shrews of America have not until recently been examined and named by competent authority, and the specific name of *parvus* in particular has been applied to various small species whose diminutive size is the principal point of their agreement with each other. This is in fact the case with the individual mentioned in the text as having been killed by Mr. Collie, in Behring's Straits:—it accorded tolerably with Say's short description, and want of authentic specimens for comparison prevented us from giving it another appellation, or of applying that of *parvus* with confidence. An excellent paper in the Journal of the Academy of Sciences of Philadelphia, for 1837, by the Rev. Dr. Bachman, raises the number of North American shrews to thirteen, and contains correct descriptions of no fewer than ten which came under the author's personal observation. It is to be regretted that Say's *Sorex parvus* has not been identified by the United States' naturalists since its first discovery, so that its detailed characters, its range, and its identity with the Behrings' Strait animal remain to be made out. The *Sorex parvus* of the *Fauna Boreali-Americana* has been named *S. Richardsonii* by Dr. Bachman. The original specimen is in the Zoological Museum.

4. SCALOPS CANADENSIS.

The Rev. Dr. Bachman informs me that he has materials for the description of at least three *scalopes* which differ in their dentition, and will enable him to clear up the discrepancies to be found in authors who have included all in one species.

II. MELES LABRADORIA.

Two skins of a badger brought from the parts of California, bordering on Mexico, were compared by Mr. Bennett with the specimen from the plains of the Saskatchewan, described and figured in *Fauna Boreali-*

Americana, and considered by him to be the same species, though their fur is shorter, less woolly, and of a brownish and darker tint in the body. He takes the species to be the *tlucyotl* of Hernandez, thus ascribing to it a range from Mexico to the 55th parallel of north latitude. The description of *Meles labradoria* in the *Fauna Boreali-Americana* is defective, owing to the loss of the skull of the individual killed on the plains of the Saskatchewan, when the specimen was in the stuffer's hands. From materials collected by Mr. Waterhouse it would appear that the form of the cranium of the American animal is very peculiar, and altogether different from that of the European badger.

13. PUTORIUS VULGARIS.

The *common weasel* of America differs from that of Europe in several characters, which were pointed out by the Prince of Musignano, in a paper read this season before the Linnean Society. Specimens from the fur countries, described in the *Fauna Boreali-Americana* were declared by the Prince to be exactly similar to those obtained by him much farther south. The American species which now bears the name of *PUTORIUS CICOGNANII* is readily distinguished from its European congener by the brownish black tip of its tail.*

14. PUTORIUS ERMINEA.

The *American Ermine* is also different from the European species, and has been named by the Prince of Musignano *PUTORIUS RICHARDSONII*. The same eminent naturalist after examining my specimens of the Carlton-house variety, mentioned in p. 47 of the *Fauna Boreali-Americana*, named it as a distinct species, *Putorius longicauda*.

15. MUSTELA MARTES.

American Pine-Martins from various localities have been described by different naturalists as distinct from the European species; and recently Mr. Yarrell on comparing a series of Martin skulls from the fur countries with those of English pine and stone Martins found strongly-marked differences between them. Hitherto I have seen but one American species; it varies with the season in the color and quality of its fur: when in prime winter condition, and of a more than usually dark tint, (as is especially the case when it inhabits certain rocky districts), it is sold by furriers as "the Sable." Frederick Cuvier has described a summer specimen under the specific appellation of *huro*, which ought to be retained as the distinctive name of the American Martin.

17. MUSTELA CANADENSIS.

A dissection of this animal by Mr. Martin is recorded in the Zoological proceedings for 1833, p. 97.

18(2). MEPHITIS NASUTA. LONG NOSED SKUNK.

A Skunk from the parts of California, adjoining to Mexico, described by Mr. Bennett in the Zoological proceedings for 1833, differs from the northern species not only in its more prolonged snout, but also in having a broad white mærial stripe down the back, instead of a lateral one uniting with its fellow on the shoulder and rump.

* An exact description of the *Putorius Cicognanii* is given in the *Fauna Boreali-Americana*, under the designation of "the common weasel." It is there stated "to agree in all respects with the European species;" but when that remark was made the Loudon museums were sadly deficient in authenticated examples of the smaller native quadrupeds, and I compared my specimens with other American weasels, under the impression that they were European ones.

19. LUTRA CANADENSIS.

This Otter was considered in the *Fauna Boreali-Americana* to be the only one which frequents the fur countries, but Captain Back on his recent over-land expedition brought home a specimen of *lutra lataxina* from the vicinity of Great Slave Lake, and as the skins of both kinds are packed indiscriminately at the fur posts it is doubtful which is the species that inhabits the rivers of North west America. The *canadensis*, or *braziliensis* has a hairy muzzle. The *lataxina* is so like the common European otter that Baron Cuvier was unwilling to admit that they were distinct.

22. CANIS LATRANS.

Skins of the *coyoté* obtained in Mexico by Captain Sutherland, exhibited to the Zoological Society in August, 1833, were considered by the members to be identical with the *prairie wolf* of Say, specimens of which exist in the museum of the society.

23. CANIS OCHIROPUS.

From the preceding remark it appears that this animal is but a slight local variety of *canis latrans*.

25. CANIS LAGOPUS.

Thieneman distinguishes two species of Arctic Fox, hitherto included under the Linnæan name of *lagopus*: one for which he retains this old specific name he considers to be confined to the north of Europe; the other, for which he adopts the appellation of *isatis*, has for its assigned habit at the Arctic parts of Asia and America. If he be correct, this list should have contained *Canis* or *vulpes isatis*, to the exclusion of *lagopus*, but all the specimens that I have seen from the Greenland coasts and Hudson's Bay territories have had the rounded ears of *lagopus*, with the tip of the tail more or less coloured. The range of these two foxes is therefore less limited than Thieneman believes, if the species be really distinct.

29. FELIS CONCOLOR. THE COUGAR, OR PUMA.

An interesting dissection of an animal of this species, which died in the Zoological Gardens, is recorded by Mr. Martin in the Zoological proceedings for 1835, (page 120). He particularly notices the approximation of the glottis to the base of the tongue, the intervening space not exceeding an inch, or, when the tongue is protruded, an inch and a half: hence the *puma* is incapable of producing the "roar" of the lion, or the "growl" of the jaguar, its voice being merely a shrill "snarl."

30. FELIS ONCA.

The difficulty of distinguishing the species of this genus is so great that naturalists doubt whether the animal seen by Lewis and Clarke on the Columbia was the *jaguar* or not. Temminck denies that there is any proof of the *jaguar* having been killed within the limits of the United States. The resemblance of the glottis of this animal to that of the lion, and its distance from the base of the tongue rather exceeding three inches, furnishes a valuable character for distinguishing it at any age from the allied American species. In the *ocelot*, (*felis pardalis*), which is also an American animal, the *rima glottidis* and the base of the tongue are in close proximity. (vide Zool. pr. for 1832, p. 9.) Dr. Bachman informs me that an undescribed species of *Felis*, with a long tail and not larger than a house cat, is an inhabitant of Texas.

40(2). *DIDELPHIS CALIFORNICA*. *Zool. pr. for 1833, page 40.*

This is the name given by Mr. Bennett to an opossum from California, easily distinguishable from previously described species.

40(3). *DIDELPHIS BREVICEPS*.

This is another new species from the same locality, also described by Mr. Bennett. As it may have been one of these two species which was observed by Mr. Collie at Monterey, the existence of the Virginian opossum on the north-west coast remains to be ascertained.

46. *ARCTOMYS CALIGATUS*.

There is a living animal of this species now in the Zoological gardens. It was brought to England by Mr. King, surgeon to Captain Back's overland expedition, and is figured and described in his recent work under the appellation of *arctomys ochanaganus* derived from the river upon whose banks it was caught. The *arctomys pruinosus* of Pennant is perhaps the same with *caligatus*, but the brief account of it in Arctic Zoology is insufficient for correct determination.

49(2). *SPERMOPHILIS SPILOSOMA*. CALIFORNIAN SOUSLIK. *Zool. pr. 1833, p. 40.*

This spermophile very nearly resembles the American *guttatus?* which was so named from an unwillingness to give a new specific appellation to an American animal while unable to point out characters by which it may be distinguished from the almost similarly spotted Asiatic *souslik*. Since the publication of the *Fauna Boreali-Americana* I have received a number of sousliks from the Rocky Mountains, differing from each other very considerably in size, but agreeing exactly in all other external characters with the description contained in that work. From the very greasy condition of all these skins it would appear that this is the fattest of all the American spermophiles.

51.(2). *SPERMOPHILIS MACROURUS*. *Zool. pr. for 1833, p. 40.*

This Californian marmot, described by Mr. Bennett, is nearly allied to *sp. Beecheyi* and *Douglasii*, differing from them chiefly in its black head and somewhat longer tail.

54(2). *SCIURUS NIGRESCENS*. *Benn. Zool. pr. 1833, p. 41.*

The Zoological Society obtained a skin of this squirrel from California, at the same time with those of several of the preceding animals. In the Proceedings of the Zoological Society, for 1836, page 88, there is a notice by J. E. Gray, Esq. of *Sciurus Douglasii*, collected by the lamented naturalist whose name it bears, on the north-west coast.

55(2). *GEOMYS TOWNSENDII*.

Dr. Bachman kindly submitted to my inspection specimens of two kinds of sand-rat taken by Mr. Townsend on the plains of Columbia. One, the *G. Douglasii*, has a rusty-brown coloured fur above, hair-brown on the abdomen, and blackish head. Tail, feet, and pouches, white. *Townsendii* differs in having the wood-brown coloured back of *borealis*, and is distinguished from the latter by its longer tail. Total length of head and body of *G. Townsendii*, $7\frac{1}{2}$ inches, of tail, $2\frac{3}{4}$ inches. An individual of *G. borealis* of equal size of body, has the tail a very little exceeding an inch in length, and just equal to that of a young specimen of *Townsendii*, whose head and body measures only $5\frac{1}{4}$ inches.

56. DIPLOSTOMA BULBIVORUM.

As we now consider that this genus ought never to have been separated from *geomys*, and that the latter is the preferable generic term, the name of the species ought in future to be *GEOMYS BULBIVORUS*. In a paper on American Zoology, published in the Report of the British Association for the advancement of science, for 1836, I have enumerated eight species of *geomys* which may be grouped by the sculpture of their incisors.

61(2). LEPUS NIGRICAUDATUS. *Benn. Zool. pr. 1833. p. 41.*

This species inhabits California.

61(3). LEPUS CAMPESTRIS. *Bachman. Journ. Acad. of Sc. Phil. vii. p. 353.*

This species, which is described in the *Fauna Boreali-Americana* under the appellation of *Virginianus*, being in fact distinct from the *Virginianus* of Harlan, with which I had confounded it, has been named as above by Dr. Bachman. From the observations of Professor Nuttall, it appears to be very common on the prairies west of the Rocky Mountains, and especially on the Wallawallah, as well as on the banks of the Platte to the eastward. Its flesh is dark-coloured, like that of the European hare, to which it was likened by Mr. Drummond. A confusion has crept into the synonyms of the American species of this genus, which the Rev. Dr. Bachman has ably laboured to unravel in the paper above quoted.

61(4). LEPUS NUTTALLII. NUTTALL'S LITTLE HARE. *Bach. Op. Cit. p. 345, pl. 22. 1.*

This pigmy hare was observed by Professor Nuttall on the banks of several small streams which flow into the Shoshonee and Columbia rivers, having habits similar to those of the common American grey rabbit, *Lepus sylvaticus* of Bachman, or *Americanus* of Harlan and some other naturalists of the United States.

See Proceedings of the Zoological Society for 1836, page 88, for notices of *Lepus longicaudatus*, *L. Californica* and *L. Douglasii*, (GRAY), all discovered by the late Mr. Douglas, in North America. The recent visit of Dr. Bachman to London will enable him to ascertain how far these are distinct from those mentioned in his paper.

67(2). CERVUS ————— ?

Exclusive of the six deer enumerated in the list as frequenting the north-west coast two others are known to the traders on the banks of the Columbia. One of these is called the "jumping deer," or "cabree," and must therefore bear some resemblance to the prong-horned antelope, which is also termed cabree, with the addition of the distinguishing epithet "white tailed." The deer of North America greatly need elucidation. Mr. Ogilby has lately described a skin found in the repositories of the Zoological Society mixed with some others obtained on Sir John Franklin's expedition as belonging to a new genus or species which he names *Ixalus probaton*, (vide *Zool. pr. 1836, p. 119*). The animal in question is perhaps the "jumping cabree" of the traders, or one of the other imperfectly described deer of the north-west coast, and the skin was most likely presented to the Zoological Society by the Hudson's Bay Company, though afterwards accidentally placed in the same box with Sir John Franklin's specimens.

PTEROPUS PSELAPHON.

Having recently had an opportunity of comparing a skull of an old individual of this species with Temminck's figure of that of his *Pt. dasymallus*, I can perceive no other difference than that the teeth of the former are more worn down.

JOHN RICHARDSON.

ORNITHOLOGY;

BY

N. A. VIGORS, Esq., A. M., F. R. S., &c.

ALTHOUGH a great portion of the Birds brought home by Captain Beechey are of considerable interest, as being either entirely new to science, or species that have hitherto been rarely found in European museums, still, from the nature of the expedition, the general observations that result from the collection are not of such importance as under other circumstances might have been expected from the zeal and science of the commander and his officers. The expedition touched at various points, without making a lengthened stay at any; and the collection consequently consists of a variety of species met with at detached and distant localities, rather than of an extensive series which might serve to illustrate the zoology of a particular spot. Under these circumstances, the same comprehensive deductions as to the geographical distribution of animal life, which affords the chief interest of foreign collections, cannot be made from the present collection, as would have been the case if the researches of the collectors had been more concentrated.

Various difficulties also attended the preservation of the skins when collected; and we have to regret that, from the length of time which elapsed before they reached England, so much injury has in many instances accrued to the specimens as to prevent an accurate decision respecting their characters. The number of species described, which is strictly limited to such as from their good condition afford distinctive characters, will consequently be no adequate criterion of the extent of the subjects actually collected, or of the active exertions of the collectors.

The most important part of the following observations is that supplied by the officers of the expedition from their notes on the comparative anatomy of many of the species. Information of this nature is so valuable, and so seldom afforded to the home naturalist, who rarely has more than the superficies of a subject to work upon, that we cannot sufficiently praise the practice in this respect of our present voyagers, or hold it out with sufficient earnestness as an example to others similarly circumstanced. For the liberal and friendly feelings with which information on every subject connected with my department of the present undertaking has been communicated to me by every officer connected with the expedition, I have to express my warm acknowledgments.

ORDER I. RAPTORES.

FAM. FALCONIDÆ.

POLYBORUS VULGARIS. *Vieill., Gal. des Ois., tom. 1. p. 23. pl. 7.*

Milvus Brasiliensis, Caracara dictus? Ray, Syn. Av. p. 17.

Polyborus Brasiliensis. King, Zool. Journ. vol. 3. p. 423.

This species appears to have a very extensive range on both sides of the South American continent. It is very doubtful whether the species is the same as the *Caracara* originally described by Maregrave (*Hist. Braz. p. 111.*), and the description of which is copied from him by Ray as quoted above, although writers in general consider them as identical. Maregrave's description, if accurate, which is not always the case, indicates a very different species.

ACCIPITER VELOX.

Falco velox. Wilson, Am. Orn. vol. 5. p. 116. pl. 45. f. 1.—Prince of Musignano, Syn. p. 29. sp. 14.

Falco Pennsylvanicus. Wils., Am. Orn. vol. 6. p. 13. pl. 46. f. 1.

Autour à bec sinueux. Temm., Pl. Col. 67.

FALCO SPARVERIUS. *Linn., Syst. Nat. vol. 1. p. 128. sp. 20.—Wils., Am. Orn. vol. 4. p. 57. pl. 32. f. 2.—Prince of Musignano, Syn. p. 27. sp. 10.*

Little Falcon. Penn., Arct. Zool. vol. 2. p. 211. sp. 110.

Emerillon de Cayenne. Buff., Pl. Enl. 444.

This species was found at Monterey.

BUTEO BOREALIS.

Falco borealis. Lath., Ind. Orn. p. 25. sp. 50.—Wils., Am. Orn. vol. 6. p. 75. pl. 52. f. 1.—Prince of Musignano, Syn. p. 32. sp. 20.

Falco Leverianus. Wils., Am. Orn. vol. 6. p. 78. pl. 52. f. 2.

L'Autour à queue rousse. Vieill., Ois. de l'Am. Sept. tom. 1. p. 43. pl. 14 bis.

Red-tailed Falcon. Penn., Arct. Zool. vol. 2. p. 205. sp. 100.

BUTEO VULGARIS. *Ray.*

Falco Butco. Linn., Syst. Nat. vol. 1. p. 127, sp. 15

Buzzard. Penn., Brit. Zool. vol. 1. sp. 54. t. 25.

La Buse. Buff., Pl. Enl. 419.

FAM. STRIGIDÆ.

BUBO VIRGINIANUS. *Briss., tom. 1. p. 484. sp. 2.*

Strix Virginiana. Lath., Ind. Orn. p. 52. sp. 2.

Virginian Eagle Owl. Edw., t. 60.

A female specimen was killed at San Francisco. Mr. Collie informs us, that "before it was shot, which was in the day time, it was attended by a number of different birds, that were said to carry

something in their bills. The stomach, a muscular bag, filled the whole anterior part of the *abdomen*, and occasioned considerable protrusion of its forepart. It contained a compact mass of feathers, bones, and portions of the skins of birds, and the whole leg and foot of a *duck*, the external surface of which was unaltered by the dissolving power of the gastric juice. The internal surface was thinly covered with a yellowish viscid matter. A short intestinal canal conducted to the *rectum*, from which two *cæca* were given off four inches long. They expanded into a wide *sac* near the base, and were filled with a dark green and rather consistent fluid.

“The *irides* were a light golden yellow.”

OTUS BRACHYOTUS.

Strix brachyotus. *Phil. Trans. vol. 62. p. 384. sp. 2.—Wils., Am. Orn. vol. 4.*

p. 64. pl. 33. f. 3.—Pr. of Musignano, Syn. p. 27. sp. 29.

Short-eared Owl. *Penn., Arct. Zool. vol. 2. p. 229. sp. 116.*

La Chouette. *Buff., Pl. Enl. 438.*

There appears little difference between the characters of this bird, and of our European species, with the exception of its colours being much deeper and inclining to rufous. The same difference may be also observed in the following species, and I have in fact traced it in birds from Madeira, Ceylon, Bengal, New Holland, South America and Cuba. All these differ in some slight degree in their markings, but accord in their colour being generally more suffused than in the European specimens. Whether they are all distinct species, or merely varieties, can be determined only by an examination of numerous specimens from each locality, and an accurate comparison with each other.

STRIX FLAMMEA. *Linu., Syst. Nat. vol. 1. p. 133. sp. 8.*

White Owl. *Penn., Brit. Zool. vol. 1. sp. 67.*

L'Effraye, ou la Fresaye. *Buff., Pl. Enl. 440.*

ORDER II. INSESSORES.

Tribe FISSIROSTRES.

FAM. HALCYONIDÆ.

ALCEDO HALCYON. *Linu., Syst. Nat. vol. 1. p. 180. sp. 7.—Wils., Am. Orn. vol. 3.*

p. 59. pl. 23. f. 1.—Pr. of Musignano, Syn. p. 48. sp. 47.

Belted Kingfisher. *Penn., Arct. Zool. vol. 2. p. 279. sp. 169.*

Martin-pêcheur de la Louisiane. *Buff., Pl. Enl. 715.*

———— huppé de St. Domingue, *Id., Ib. 593.*

This species was met with at San Francisco.

Tribe DENTIROSTRES.

FAM. MUSCICAPIDÆ.

MUSCICAPA CORONATA. *Lath., Ind. Orn. p. 486. sp. 81.*

Round-crested Flycatcher. *Id., Gen. Hist. vol. 6. p. 246. sp. 145.*

Le Rubin, ou Gobe-mouche rouge huppé. *Buff., Pl. Enl. 675. f. 1.*

MUSCICAPA SEMIATRA, *n. s.*

Musc. capite, collo, pectore abdomineque summo atris; abdomine imo, crisso, reetricumque extimarum pogoniis externis ad latera albis; dorso, alis, caudâque cinereo-fuscis.

Rostrum pedesque atri. Longitudo corporis, 6½; rostri, ¾; alæ, a carpo ad apicem remigis tertiæ, 3½; caudæ, 3½; tarsi, ¾.

TYRANNUS CINEREUS. *n. s.*

Tyr. supra cinereus, subtus albescens; remigibus fuscis; tectricibus inferioribus alarum, pectorisque lateribus rufescentibus.

Rostrum pedesque atri. Longitudo corporis, 8; rostri, 7/8; alæ, a carpo ad apicem remigis tertiæ, 4½; caudæ, 4; tarsi, 1½.

This bird belongs to that restricted portion of M. Vieillot's genus *Tyrannus*, to which Mr. Swainson retains the name. (*Zool. Journ.*, vol. 3. p. 165.) They are well distinguished by the strong emargination at the apex of the two external quill-feathers.

FAM. LANIADÆ.

PITANGUS SULPHURATUS. *Swains.*

Tyrannus sulphuratus. Vieill., Ois. de l'Am. Sept. tom. 1. p. 77. pl. 47.

Lanius sulphuratus. Linn., Syst. 1. p. 137. sp. 19.

Becarde à ventre jaune. Buff., Pl. Enl. 296.

Yellow-bellied Shrike. Lath., Gen. Hist. vol. 2. p. 84. sp. 104.

LANIUS LUDOVICIANUS. *Linn., Syst. 1. p. 134. sp. 6.—Pr. of Musignano, Syn. sp. 92.*

Loggerhead Shrike. Wils., Am. Orn. vol. 3. p. 57. pl. 22. f. 5.—Audubon, Birds of Amer. pl. 57.

FAM. MERULIDÆ.

TURDUS NÆVIUS. *Lath., Ind. Orn. p. 331. sp. 13.*

Varied Thrush. Penn., Arct. Zool. vol. 2. p. 337. sp. 197. t. 15.

TURDUS MIGRATORIUS. *Linn., Syst. Nat. 1. p. 292. sp. 6.—Wils., Am. Orn. vol. 1. p. 35. pl. 2. f. 2.—Pr. of Musignano, Syn. p. 75. sp. 97.*

Red-breasted Thrush. Penn., Arct. Zool. vol. 2. p. 336. sp. 196.

Several specimens were brought home from Monterey.

ORPHEUS LEUCOPTERUS. *n. s.*

Turdus supra cinereus; alis caudâque nigris; gulâ, abdomine, ptilorum apicibus, pteromatibus, remigibus primariis ad basin, reetricibusque lateralibus albis; pectore cinerascens.

Rostrum pedesque atri. Pteromata basesque remigum primariarum albæ, fasciam albam latam alarem exhibentes. Rectrices, extima tota alba, notâ gracili ad latus pogonii interni nigrâ exceptâ; secunda alba, lineâ elongatâ nigrâ utrinque notata; tertia nigra, apice albo; cæteræ totæ nigre. Tectrices alarum inferiores albæ, nigro parè in medio notatæ. Longitudo corporis, 9; rostri, 7/8; alæ, a carpo ad apicem remigis quartæ, 5½; caudæ, 5; tarsi, 1½.

This bird has the general appearance of the well-known *mocking Thrush*, *Turdus polyglottus* of North America, as well as of the allied species, *Turdus Orpheus* of South America. Its chief distin-

guishing mark is the white *fascia* on the wing, formed by that colour prevailing in the primary wing-coverts, and on the base of the primary quill-feathers. The markings of the lateral tail-feathers afford also a mark of distinction. There is no appearance of a white streak over the eye. There are three or four specimens in the collection, differing somewhat in size, but according in general character. Unfortunately, no note is attached to any, to indicate their locality.

FAM. SYLVIADÆ.

SIALIA CERULEOCOLLIS. *n. s.*

Sial. capite, gulâ, collo, corporeque superiori cæruleis; dorso interscapulari brunnescenti; pectore abdominisque lateribus rufis, hoc imo albescenti.

Longitudo corporis, 6½; rostri, ⅝; alæ, a carpo ad apicem remigis secundæ, 4½; caudæ, 3; tarsi, ⅞.

PLATE III.

This species may be readily distinguished from the *Sylvia sialis*, Lath., which forms the type of Mr. Swainson's genus *Sialia*, by the blue colour of the throat in front, and the brown colour of the back. The bill also is slighter than in the latter bird. A young specimen, or perhaps a female of the species, is in the collection, which has the colours much less vivid than in the adult bird; the rufous colour of the lower body seems also to extend further up the throat. It, however, evinces its distinction from the young of the allied species by the slighter bill, and by a white mark extending over the outer web of the interior quill-feathers, at their base.

TRICHAS PERSONATUS. *Swains.*

Turdus Trichas. Linn., Syst. Nat. vol. 1. p. 293. sp. 7.

Sylvia Trichas. Lath., Ind. Orn. p. 519. sp. 36.—Pr. of Musignano, Syn. p. 84. sp. 129.

Sylvia Marylandica. Wils., Am. Orn. vol. 1. p. 88. pl. 6. f. 1.

Yellow-throated Warbler. Penn., Arct. Zool. vol. 2. p. 400. sp. 286.

SYLVICOLA CORONATA. *Swains.*

Motacilla coronata. Linn., Syst. Nat. vol. 1. p. 332. sp. 31.

Sylvia coronata. Lath., Ind. Orn. p. 538. sp. 115.—Wils., Am. Orn. vol. 2. p. 138. pl. 17. f. 4.—Pr. of Musignano, Syn. p. 77. sp. 105.

Golden-crowned Fly-catcher. Edw., t. 298.

Golden-crowned Warbler. Penn., Arct. Zool. vol. 2. p. 403. sp. 294.

MOTACILLA LEUCOPTERA. *n. s.*

Mot. corpore supra, gulâ, pectore, rectricibusque mediis atris; fronte, strigâ superciliari, alterâque suboculari ad nuquam extendente, abdomine, pteromatibus, remigibus ad basin, rectricibusque duabus utrinque lateralibus albis.

Rostrum pedesque nigri. Tectrices alarum inferiores albæ. Longitudo corporis, 6; rostri, ⅝; alæ, a carpo ad apicem remigis primæ, 3½; caudæ, 3½; tarsi, ⅞.

TROGLODYTES SPILURUS. *n. s.*

Trogl. supra rufescenti-brunneus, subtus albescens, crisso nigro fasciato; gulâ lineâque superciliari albis; alis caudâque fusco fasciatis, hujus plumis, quatuor mediis exceptis, ad apicem albo maculatis, laterali utrinque pogonio externo albo gustato.

Rostrum pedesque cornei, illius mandibulâ inferiori pallidiori. Longitudo corporis, 4½; alæ, a carpo ad apicem remigis quartæ, 2; rostri, ⅓; caudæ, 2; tarsi, ⅔.

PLATE IV. F. 1.



Psaltriparus carolinensis



Ceryle alcyon
2. 1871

The *Wrens* of America are so numerous, and they approach each other so nearly in general character, that it is not easy to ascertain the distinguishing marks of the species. The bird before us, however, appears to differ from all those best known to us, in the white markings of the side feathers of the tail. In these characters it approaches most nearly to the *Troglodytes Bewickii*, lately figured by M. Audubon. But the disposition of the spots on the tail is different; and the colour of the lower body also differs, as far at least as can be judged from a figure. With a reference to these characters, I have ventured to characterize the bird as distinct.

SAXICOLA CENANTHOÏDES. n. s.

Sax. supra brunnescenti-cana; subtus rufa, crisso pallidiori; fasciâ angustâ frontali, gulâ, uropygio, basique caudæ albis; remigibus rectricibusque nigris, apice leviter rufescentibus.

Rostrum pedesque nigrescentes. *Rectricum* mediarum quarta pars longitudinis solummodò alba, cæterarum ad apicem tertia pars nigra. Longitudo corporis, $5\frac{1}{2}$; alæ, a carpo ad remigis secundæ apicem, $3\frac{2}{3}$; rostri, ad rictum, $\frac{1}{2}$; caudæ, $2\frac{1}{4}$; tarsi, 1.

The *Wheatear* of Europe has not as yet been recorded as having been found in the New World. I should otherwise have been inclined to refer this bird to that species, so similar are the general characters of both, the chief apparent difference being in their size. There are two specimens in the collection, but they are not in sufficiently good condition to enable me to enter minutely into their characters, or make a very accurate comparison between them and our own species. It is upon their relative size, and their locality, chiefly, that I at present suggest their differing as species.

Tribe CONTROSTRES.

FAM. FRINGILLIDÆ.

SALTATOR RUFIVENTRIS. n. s.

Salt. supra plumbeo-cinereo, dorso caudâque olivascens; corpore infra rufescenti, crisso saturatiore; superciliis albescentibus.

Rostrum pedesque plumbei. *Tectrices* alarum inferiores rufescenti-albidæ. Longitudo corporis, $7\frac{1}{2}$; alæ, a carpo ad apicem remigis tertiæ, $4\frac{1}{2}$; rostri, $\frac{7}{8}$; caudæ, 4; tarsi, 1.

FRINGILLA CRISSALIS. n. s.

Fring. supra fusciscenti-brunnea, subtus fusco-albescens, lineâ per oculos, gulâ, crissoque rufis.

Rostrum mandibula superior nigricans; inferior, pedesque flavescens. *Tectrices* alarum inferiores, abdominisque latera rufescentes. Longitudo corporis, 8; alæ, a carpo ad apicem remigis tertiæ, $3\frac{1}{2}$; rostri, $\frac{5}{8}$; caudæ, 4; tarsi, 1.

FRINGILLA MERULOÏDES. n. s.

Fring. supra brunnea, alis, uropygio, crissoque rufescentibus; subtus alba, rufo-brunneo maculata.

Rostrum mandibula superior nigricans, lateribus medioque flavis. *Pedes* flavicantes. Longitudo corporis, $6\frac{1}{2}$; alæ, a carpo ad apicem remigis tertiæ, $3\frac{1}{2}$; rostri, $\frac{5}{8}$; caudæ, $3\frac{1}{2}$; tarsi, $\frac{7}{8}$.

This species was met with at Monterey. It and the preceding species, which I do not recognise among those hitherto described, are distinguished by the comparative strength of their legs and feet, and the elongation of the claws, together with some other characters of wing and bill. They will be found to form a separate group among the *Fringillidæ*, which I should here attempt to characterize, but that I do not consider we have at present materials enough to assign the limits to it. I look moreover to the speedy publication of some observations on the subdivisions of this and other of the neighbouring families by Mr. Swainson, whose labours, we have every reason to anticipate, will clear away much of the confusion that has hitherto existed in these extensive groups.

FRINGILLA CANADENSIS? *Lath., Ind. Orn. p. 434. sp. 3.—Pr. of Musignano, Syn. p. 109. sp. 175.*

Moineau de Canada? *Buff., Pl. Enl. 223. f. 2.*

I mark this species with a doubt. Three specimens which are in the collection, two from San Francisco and one from Monterey, agree generally with the descriptions of the above species, and the plates of Buffon and Wilson, with the exception of their exhibiting a tinge of yellow on the under wing-coverts, and on the adjoining feathers at the bend of the wing. This being a character which is likely to be passed over in description, I leave the species in doubt until a comparison with specimens of the described species enables us to decide the point.

FRINGILLA HYEMALIS. *Linn., Syst. Nat. vol. 1. p. 183. ed. 10.—Prince of Musignano, Syn. p. 109. sp. 173.*

Emberiza hyemalis. *Linn., Syst. Nat. vol. 1. p. 308. sp. 2.*

Snow-bird. *Cat. Car. vol. 1. t. 36.*

Black Bunting. *Penn., Arct. Zool. vol. 2. p. 359. sp. 223.*

Several specimens of this species are in the collection. One is marked Monterey.

FRINGILLA ARCTICA.

Emberiza arctica? *Lath., Ind. Orn. p. 414. sp. 55.*

Unalasha Bunting? *Penn., Arct. Zool. vol. 2. p. 363. sp. 229.*

I feel some doubt also of the propriety of assigning the above name to the present bird, which is much smaller than the bird described under that name, at least as far as can be judged from the descriptions. The strong mark, however, of the yellow line over the eye, as well as the locality, in which both birds agree, incline me to consider them the same. Our bird, it is true, is not a *Bunting*; but several Finch-like birds are described by the old writers as *Buntings*, which no more belong to that group than the present bird.

PYRRHULA INORNATA. *n. s.*

Pyrr. supra brunnea, fusco obsolete lineatim maculata; subtus albescens, brunneo maculata.

Rostrum pedesque brunnescentes. Alæ caudaque subtus griseo-fuscæ. Longitudo corporis, 4 $\frac{3}{4}$; alæ, a carpo ad apicem remigis secundæ, 3; rostri, $\frac{1}{2}$; caudæ, 2 $\frac{1}{2}$; tarsi, $\frac{3}{4}$.

Besides the birds belonging to the present family enumerated above, there are four or five species more in the collection, which, from their deficiency in condition, it is not easy to refer to any known species, and which it would be dangerous to describe as new. Even respecting those few which have been referred to, I feel much doubt; and I am by no means satisfied with the place assigned them in the family. But for the reasons assigned before (page 14), I consider it more advisable to leave them as they are, than to attempt a more accurate distribution of them from imperfect materials.

FAM. STURNIDÆ.

STURNELLA MILITARIS. *Vieill.*

Sturnus militaris. Linn., Mant. 1771. p. 527.

Etourneau des Terres Magellaniques. *Buff., Pl. Enl. 113.*

Magellanic Stare. *Lath., Gen. Hist. vol. 5. p. 8. sp. 5.*

This species appears to have been found in some abundance at Conception. A specimen examined by Mr. Collie had "the tip of the tongue penicillated. The stomach was chiefly muscular, containing beetles, seeds, and hard earth. Two worms were in the membranous part."



Zonotrichia salicivora

STURNELLA LUDOVICIANA. Vieill.

Sturnus Ludovicianus. Linn., *Syst. Nat.* vol. 1. p. 290. sp. 3.—*Pr. of Musignano, Syn.* p. 50. sp. 48.

Alauda magna. Linn., *Syst. Nat.* vol. 1. p. 289. sp. 11.—*Wils., Am. Orn.* vol. 3. p. 20. pl. 19. f. 2.

Etourneau de la Louisiane. Buff., *Pl. Enl.* 256.

Louisian Stare. Penn., *Arct. Zool.* vol. 2. p. 331. sp. 193.

Crescent Stare. *Id., ib.* p. 230. sp. 192.

XANTHORUS MEXICANUS. Briss., tom. 2. p. 118. sp. 23. t. 11. f. 2.

Oriolus xanthornus. Linn., *Syst.* 1. p. 162. sp. 3.

Lesser Bonana bird. Edw., t. 243.

Carouge du Mexique. Buff., *Pl. Enl.* 5. f. 1.

AGELAIUS PHŒNICEUS. Vieill.

Oriolus phœniceus. Linn., *Syst.* tom. 1. p. 161. sp. 5.

Red-winged Starling. Albin., vol. 1. t. 38.—*Catesby*, 1. t. 13.

Red-winged Oriole. Penn., *Arct. Zool.* vol. 2. p. 255. sp. 140.

Le Troupiale à ailes rouges. Buff., *Pl. Enl.* 402.

Mr. Collie's specimens were taken at San Francisco, where he observed that the species "were greyish-black the first year, all black the second, and assumed the scarlet mark on the shoulder the third." Of those which he dissected, he found "the stomach doubly membranous and fleshy. It contained larvæ of insects, and some farinaceous roots, with gravel. They were found in large and numerous flocks, both among the houses and in the plains, feeding on the ground."

FAM. CORVIDÆ.

CORVUS CORAX. Linn., *Syst. Nat.* vol. 1. p. 155. sp. 2.—*Wils., Am. Orn.* vol. 9. p. 113. pl. 75. f. 3.—*Prince of Musignano, Syn.* p. 56. sp. 58.

Raven. Penn., *Arct. Zool.* vol. 2. p. 245. sp. 134.

Corbeau. Buff., *Pl. Enl.* 495.

GARRULUS CALIFORNICUS. n. s.

Garr. supra pallidè cæruleus, dorso brunnescenti-fusco; gulâ, collo anteriori, plumis paucis superciliaribus, corporeque infra albis; rectricibus lateralibus fuscis obsolete fuscis notatis.

Remiges rectricesque infra, illorumque pognonia interna supra, fuscæ. Tectrices alarum inferiores, pectorisque latera pallido-rufo leviter tinctæ. Rostrum pedesque nigri. Longitudo corporis, 10½; rostri, 1½; alæ, a carpo ad apicem remigis quintæ, 5¾; tarsi, 1¾; caudæ, 5.

PLATE V.

This species partakes so much of the general character that belong to the *Jays* of North America, that it is difficult at first to distinguish it. Upon close inspection, however, it will be found to disagree with those that approach most closely to it, the *Garr. cristatus*, for instance, of Mr. Swainson, and the *Garr. Stelleri*, by the absence of the crest; from *Garr. sordidus*, Sw., by the general colouring of the back and breast; and from the *Garr. Floridanus*, lately figured by the Prince of Musignano and Mr. Audubon, by the less brilliancy of the azure colour, the absence of white on the front, and the colour of the breast and abdomen. It was found in abundance at Monterey.

PICA BEECHIEI. *n. s. Zool. Journ. vol. 4. p. 353.*

Pica capite, collo, corporeque infra intensè nigris; dorso, alis, rectricibusque supra dilutè cæruleis; rostro pedibusque rubro-flavis.

Remiges infra, pogonia interiora supra, rectricisque subtus fuscæ. Tectrices alarum inferiores cæruleæ. Cauda sub-cuneata. Longitudo corporis, 14½; rostri, 1½; alæ, a carpo ad apicem remigis quintæ, 6½; caudæ, ad apicem rectricis mediæ, 7½; rectricis externæ, 6; tarsi, 1½.

PLATE VI.

This bird was met with at Montereale. The gallant and enterprising commander of the expedition will, I trust, accept this dedication of a beautiful species, as a tribute of gratitude for his services to science, as well as an offering of friendship.

PICA COLLIEI. *n. s. Zool. Journ. vol. 4. p. 353. pl. 12.*

Pica maculâ subriciali, corporeque supra cæruleis; fronte, cristâ, genis, collo inferiori, pectoreque nigris; corpore subtus rectricumque apicibus albis; caudâ elongatissimâ.

Crista erecta, elongata, antrorsum spectans, facies pectusque intensè nigræ. Supercilia, colli latera, pectusque medium albo notata. Tectrices inferiores albæ. Rectrices quatuor mediæ supra cæruleæ, subtus nigræ. Longitudo corporis, ab apice rostri ad apicem caudæ, 28; rostri, 1½; alæ, a carpo ad apicem remigis quintæ, 8; caudæ, ad apicem rectricis mediæ, 19½, externæ, 6; tarsi, 2.

PLATE VII.

This species seems to have been found in abundance at San Blas and Mazatlan. I have dedicated* it to the able and ingenious surgeon of the expedition, whose exertions contributed much to our knowledge in every branch of science; and whose notes, more particularly on the internal structure of many of the birds in the collection, form the most valuable part of the present observations.

Mr. Collie makes the following observations on this bird:—"The lower *larynx* was simple; the stomach simple, muscular and membranous, and was stuffed with white flattish berries, without any gravel. The *cæca* are small, the left about one-third of an inch long, the right a little longer."

FAM. LOXIADÆ.

COCCOTURAUSTES FERREO-ROSTRIS. *n. s. Zool. Journ. vol. 4. p. 354.*

Jun. ? *Cocc. fusco-brunneus; capite, pectore, abdomineque superiori coccineis; rostro fortissimo, pedibusque plumbeis.*

Sen. ? *Cocc. fusco-brunneus; pectore leviter coccineo tincto.*

Longitudo corporis, 8½; rostri, ad frontem, ¾, ad rictum, 1½; altitudo, ¾; alæ, a carpo ad apicem remigis tertiæ, 4½; caudæ, 3; tarsi, ¾.

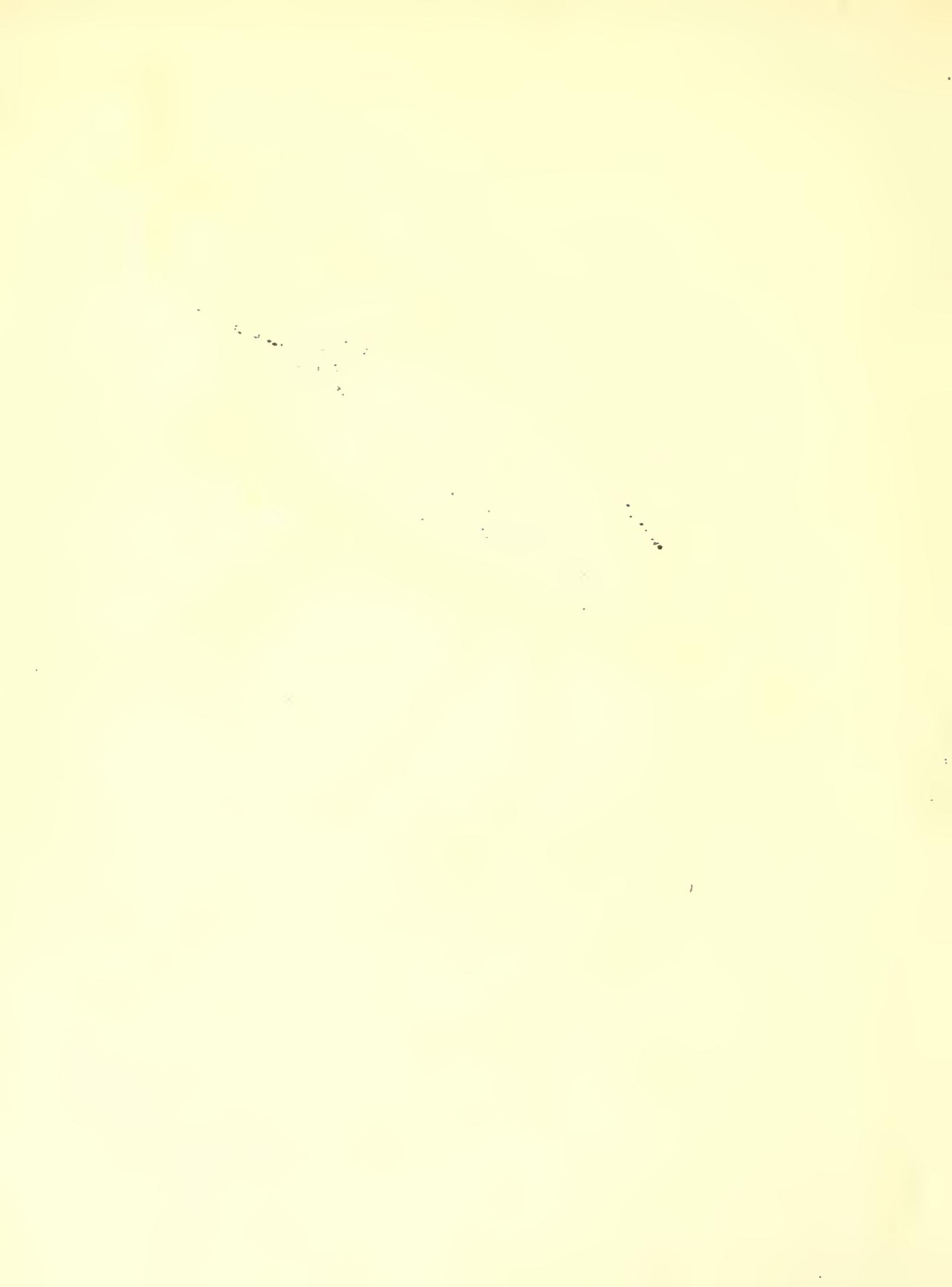
PLATE VIII.

There are two specimens of this species in the collection, differing, as above described, in their colours. Were we to judge from analogy, the more brilliantly plumaged bird would be the young, the more plainly coloured the adult; as is the case in the nearly allied group, the *Pine Grosbeak*, *Corythus nucleator*, Cuv.

* Shortly after the plate of this bird had been completed, and the text printed off for the Zoological Journal, I received a letter from my friend Mr. Children, requesting me to name the species after Dr. Burnet of the Haslar Hospital of Portsmouth, who had presented the British Museum with a fine specimen. I was sorry to have been thus unable not only to comply with the wish of Mr. Children, but to pay a compliment to Dr. Burnet, whose zeal in science well merited it. The editor of the translation of M. Cuvier's "Animal Kingdom," not being aware of these circumstances, subsequently named the bird according to Mr. Children's original desire. By an unfortunate error which simultaneously took place on the part both of the engraver and the printer, the bird is named *Bernet's Magpie* (*Pica Bernetti*) in the plates of that work, and *Bennett's Magpie* in the text. An additional name has within the last month (Dec, 1830) been given to the species, already amply provided with synonyms—that of *Pica ultramarina*.



Alcedo coccyzina





Corvus leucurus

Pl. 1. 1841



Scrubwren, the grass

Tribe SCANSORES.

FAM. PSITTACIDÆ.

MACROCERCUS MILITARIS. *Vieill.*

Psittacus militaris. *Linn., Syst. 1. p. 139. sp. 2.*

Great green Maccaw. *Edw., t. 313.*

FAM. PICIDÆ.

PICUS VILLOSUS, *Linn., Syst. Nat. vol. 1. p. 175. sp. 16.—Wils., Am. Orn. vol. 1. p. 150. pl. 9. f. 3.—Pr. of Musignano, Syn. p. 46. sp. 42.*

Hairy Woodpecker. *Penn., Arct. Zool. vol. 2. p. 273. sp. 164.*

Pic varié mâle de Virginie. *Buff., Pl. Enl. 754.*

This species was found at Monterey.

PICUS RUBER. *Lath., Ind. Orn. p. 228. sp. 10.*

Red-breasted Woodpecker. *Id., Gen. Hist. vol. 3. p. 398. sp. 70.*

Of this species one specimen was brought home by the expedition from Monterey, which accurately accords with Dr. Latham's description of the species, as above quoted from his "Index Ornithologicus," and afterwards from his "General History." M. Vieillot has founded* a new species upon Capt. Cook's description of a bird closely allied to this, which was met with at Nootka Sound. The only apparent difference, however, in the description of the birds consists in Capt. Cook's calling the colour of the *abdomen* yellow, and Dr. Latham stating it to be yellowish-white. It is most probable, from its locality, that our Monterey bird is the same as that met with by Capt. Cook at Nootka Sound; and as it is evidently of the same species as that described by Dr. Latham, the probabilities are that there is but one species.

PICUS SCAPULARIS. n. s. Zool. Journal, vol. 4. p. 354.

Mas. *Pic. niger; strigâ utrinque longitudinali a rictu ad scapulares extendente, abdomineque fulvo-albis, hoc fusco striato; capite cristato, strigâque sub rictu coccineis, rostro eburneo.*

Fam. *sine strigâ rictali.*

Remiges rectricesque infra fasciæ. Tectrices alarum inferiores fulvo-albæ. Longitudo corporis, 11; alæ, a carpo ad apicem remigis tertiæ, 6½; rostri, ad frontem, 1½, ad rictum, 1½; caudæ, 5; tarsi, 1.

This bird was found at San Blas. It bears a great resemblance to the *Pic. albirostris* of M. Spix; as also to the *Pic. lineatus* of Linnæus. From the former bird, however, it appears to be distinguished by its inferior size; by the buff tinge of the longitudinal stripe down the neck, as also of the under wing-coverts and abdomen; and by the stripe not extending over the back, but only to the scapulars. The disposition of the markings on the head and cheeks also appears different. From the *Pic. lineatus* it is at once distinguished by its white bill.

PICUS FORMICIVORUS. Swainson.

Picus melanopogon. Lichtenstein.

Pic à barbe noire. Temm., Pl. Col. 451.

Mas.? *Pic. circolo angusto circa rostrum, genis, pectore, corporeque supra intensè atris; fasciâ frontali, gulâ, uropygio, abdomineque albis, hujus parte superiori lateribusque atro lineatis; capite summo coccineo.*

Fam.? *occipite solo coccineo, vertice atro; pectore minus atro notato.*

Rostrum pedesque nigri. Plumæ pectoris parè coccineo notatæ. Remiges ad basin albo notatæ, expansæ fasciam albam exhibentes. Longitudo corporis, 9; alæ, a carpo ad apicem remigis secundæ, 5½; rostri, 1¾; caudæ, 4; tarsi, 1.

* *Ois. d'Am. Sept. p. 67.*

The bird first described is the only specimen brought by the expedition. It was found at Monterey. It appears so closely to accord with Mr. Swainson's description of *Pic. formicivorus*, that I at once refer it to that bird, expressing my doubts as to the difference of sex. It also accords with M. Temminck's plate, as above quoted. I am not aware which name has the right of priority.

PICUS CHRYSOGENYS. n. s.

Mas. *Pic. corpore supra crissoque albo nigroque subgraciliter fasciatis; pectore abdomineque medio olivaceis, hoc aureo infra notato; capite supra coccineo; fronte, genis, gulâque aureis.*

Fœm.? *capitis vertice aureo.*

Rostrum pedesque nigri. Remiges primariæ nigrae, ferè concolores, secundariæ pogonio interno albo maculato, tertiariæ pogoniis utrinque albo maculatis fasciatisque. Rectrices (tertiis et quartis utrinque exceptis) nigrae, albo fasciatae; his nigris unicoloribus. Longitudo corporis, 7½: alæ, a carpo ad apicem remigis quartæ, 4½; rostri, ad apicem, 1, ad rictum, 1½; caudæ, 3½; tarsi, ¾.

COLAPTES COLLARIS. n. s.

Col. vinaceo-griseus; abdomine dorsoque imo albis; fasciis corporis superni, guttis abdominis, collari semilunari pectorali, remigibus rectoribusque atris, harum ambarum rhachibus rubro-aurantiacis; strigâ utrinque sub rictu coccinâ.

Caput supernè brunnescens, collumque vinaceo-griseum sine fasciis. Remiges ad apicem graciliter albo-fasciatae; subtus ad basin rubro-aurantiacæ. Tectrices inferiores alarum albæ, internè leviter rubro-aurantiaco diffusæ, externè nigro notatæ. Tectrices caudæ supernæ nigrae albo fasciatae; infernæ albæ nigro fasciatae. Rostrum pedesque brunnei. Longitudo corporis, 11; rostri, ad frontem, 1⅓, ad rictum, 1⅓; alæ, a carpo ad apicem remigis tertiaræ, 6⅓; caudæ, 5; tarsi, 1.

PLATE IX.

This species accords in general characters with the description given by Mr. Swainson of his *Colaptes Mexicanus*, in the *Philosophical Mag.*, New Ser. (Vol. I. p. 440, year 1827); but no mention is made in that description of the strongly-marked collar on the breast, that distinguishes our bird; the colour also of the shafts of the quill and tail feathers in the Mexican bird is stated to be bright red, while those of our bird are of an orange or yellow red.

The female wants the red streak on the cheeks. These birds were found at Monterey. Mr. Collie has made the following note on the species:—

“The stomach is double, an upper membranous one, and lower muscular; each contained the legs and other horny parts of insects, and the lower one also gravel.

“Their chief note is a jarring whistle. They live a good deal among bushes, and long grass, and perch most frequently on the branches of decayed trees. They are tolerably numerous among the pine trees between Monterey and Punta de los Pinos. Several of them are seen in company when on the bushes or on the grass; but they are solitary when on the trees.

“The natives make coronets for their heads of the two middle tail-feathers. One of these ornaments sometimes contain upwards of three hundred feathers, so that one hundred and fifty birds must have contributed to its formation.”

COLAPTES CHILENSIS.

Picus Chilensis. Lesson, Zool. de la Coquille, pl. 32.

Col. supra fusco-brunneus, flavescenti-albo fasciatim notatus, gulâ, genis, dorso imo, corporeque subtus flavescenti-albis, hoc brunnescenti-fusco guttato; capite supra cano; tectricibus caudæ supra subtusque flavescenti-albis, fusco fasciatis; remigum rhachibus subauratis.

Rostrum brunneum. Pedes flavescens. Tectrices alarum inferiores remigumque pogonia interna supra et subtus subauratæ. Rectrices atræ, duæ mediæ flavescenti-albo utrinque fasciatae, duarum lateraliûm pogoniis externis apiceque flavescenti-albo guttatis.

Staturâ Col. collari æqualis.

A single skin only of this species was obtained at Concepcion. It probably belonged to a female bird, and the male may be found to possess those scarlet or otherwise highly-coloured markings which generally distinguish that sex in the present family.



Colaptes collaris
Colaptes collaris.

FAM. CERTHIADÆ.

SITTA PYGMÆA. n. s.

Sitta supra plumbeo-grisea, subtus alba, abdomine imo subrufescenti; strigâ a rictu post oculos extendente gracili, remigibus, rectricibusque duabus mediis nigris; rectricibus ceteris basi nigris, medio albo-fasciatis, apice griseis.

Rostrum pedesque nigri. Tectrices alarum inferiores albæ. Longitudo corporis, 4; rostri, $\frac{5}{8}$; alæ, a carpo ad apicem remigis tertiæ, $2\frac{3}{8}$; caudæ, $1\frac{1}{4}$; tarsi, $\frac{5}{8}$.

PLATE IV. F. 2.

Although this delicate little bird has a general resemblance to the European and American *Nuthatches*, yet the inferiority of its size, the uniformity of the colouring on the head and back, and the black of the two middle tail-feathers, afford evident marks of distinction. One specimen was brought from Monterey.

FAM. TROCHILIDÆ.

TROCHILUS MELLIVORUS. *Linn., Syst. Nat. vol. 1. p. 193. sp. 20.*

White-bellied Humming-bird. *Edw., t. 35. f. 1.*

Oiseau-mouche à collier, dit la Jacobine. *Pl. Enl. 640. f. 2.*

"This species," Mr. Collic says, "was very common at Rio Janeiro.

"The *trachea* bifurcates about half-way between the throat and *sternum*, where the inferior *larynx* makes a considerable projection, both externally and internally, between the two divisions.

"On examining the stomach, which is simple and muscular, with internal *plicæ*, I found a large quantity of blackish solid matter, composed of the wings, legs and *antennæ* of flies, without any mixture of fluid. In the intestines there was a fluid greyish pulp.

"This proves that the *Humming-birds* by no means feed exclusively upon the nectarious secretions of plants, but are also carnivorous. And I was almost inclined after this examination, to infer that they visited the flowers only for the sake of catching the insects which live upon them; the humming song serving as a lure to attract them. But I afterwards had a full opportunity of retracting this opinion, by observing these little creatures penetrating the tubular *corollas* of the male flowers of the *Banana tree*, (*Musa sapientum*,) with their long slender bill and projectile tongue, whilst the *spatha* leaf was turned back, as if expressly for uncovering the food. During the time of their feeding, the birds kept entirely on the wing, fluttering and humming as if in an ecstasy of pleasure at obtaining access to the bonied treasure.

"Mr. Lay said he found they had the power of bending back the tongue so as to bring the point into the *fauces*."

A pair of birds, apparently melliphagous, were brought from Pitcairn's Islands. But they unfortunately are so mutilated as to preclude any attempt at description or reference.

ORDER III. RASORES.

FAM. COLUMBIDÆ.

COLUMBA METALLICA. n. s.

Col. capite colloque vinaceo-canis purpureo splendidibus, hoc pallidiore; nuclâ dorsoque imo metallicè purpureis; alis, corpore infra, dorsoque medio metallicè viridibus; remigibus caudâque fuscis.

Rostrum rubescens, apice flavo. Pedes flavi. Tectrices alarum inferiores atræ, metallicè splendentes. Longitudo corporis, 16; alæ, a carpo ad apicem remigis tertiæ, 10; rostri, $1\frac{1}{2}$; caudæ, 8; tarsi, $1\frac{1}{2}$.

This species was met with in the Bonin Islands, in June, 1827.

COLUMBA MONILIS. n. s.

Col. capite supra, pectore, abdomineque medio vinaceo-canis; gulâ, pteromatibus, dorso imo, abdominis lateribus, caudâque canis; dorso summo, ptilis scapularibusque griseis, olivaceo-viridi splendidibus; fasciâ angustâ occipitali crissoque albis; nuchâ viridi-aureo latè splendenti; remigibus fasciâque caudæ mediâ fusco-atris.

Rostrum pedesque flavi, illo apice nigro. Longitudo corporis, 13; alæ, a carpo ad apicem remigis secundæ, 7½; rostri, 1; caudæ, 6; tarsi, ½.

PLATE X.

This bird, which was found at Monterey, approaches very closely to a species lately described by Capt. King, from the Straits of Magellan, the *Columba Fitzroyii*. (Proceedings of Comm. of Science of Zool. Soc. p. 15.) The markings, more particularly on the back of the neck of both birds, and on the tail, bring them closely together, as well as their general size and appearance. But the vinaceous colour, which is found only on the head and lower body of our bird, extends more generally over the body of Capt. King's. The colour of the bill and legs also differs. Our bird is also allied to the *Colombe Denise* of M. Temminck, (*Pl. Col.* 502,) which probably is the same as Capt. King's bird.

FAM. TETRAONIDÆ.

TETRAO ALBUS. *Gmel., Syst. Nat. vol. 1. p. 750. sp. 23.*

Tetrao saliceti. *Temm., Man. d'Ornith. p. 471.*

White Partridge. *Edw., Glean. t. 72.*

White Grouse. *Penn., Arct. Zool. vol. 2. sp. 183.*

Being adverse to any change in a specific name, unless where it is decidedly misapplied, I have retained the old and well-established name of Gmelin and Latham, in preference to the new one, which M. Temminck proposes for this bird. The objection to a specific name, that it is equally applicable to other species in the genus, may attach to any name expressive of a character, according as new species are discovered which partake of that character. All names would be thus subject to continual change. Even the new name of M. Temminck for the bird before us might be cavilled against and expunged, if his objection were allowed to hold good, when other species are found in this very extensive group, to exist in the same locality, and partake of the same food.

TETRAO RUPESTRIS. *Lath., Ind. Orn. p. 640. sp. 11.*

Rock Grouse. *Penn., Arct. Zool. vol. 2. p. 312. sp. 184.*

The birds of this species brought home by the expedition are the same as those to which the above name is generally assigned. I am not satisfied as to the specific differences of those northern species of grouse which assume the white plumage in winter. But we have not materials sufficient to decide the point. It must be left to accurate observation on the living birds, throughout their various changes.

FRANCOLINUS SINENSIS.

Perdix Sinensis. Briss., tom. 1. p. 224. sp. 9. t. 28. f. 1.

Perdix perlata. Lath., Ind. Orn. p. 648. sp. 15.

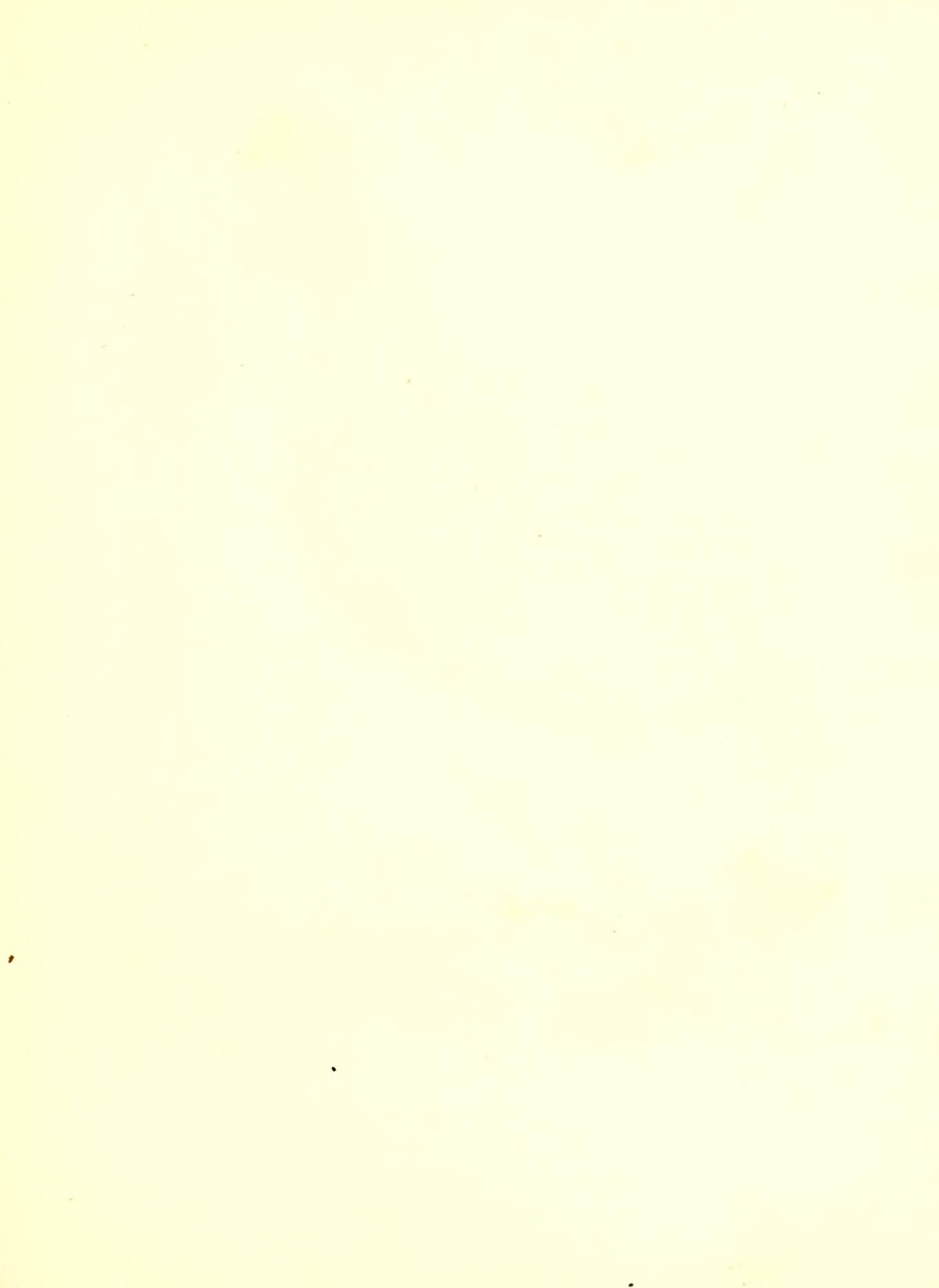
Pearled Partridge. *Id., Ib. Gen. Hist. vol. 8. p. 276. sp. 12.*

Francolin perlé. *Temm., Pig. et Gall. tom. 3. p. 326.*

A skin of this bird was brought from China.



Falco ...





Belya Douglas

ORTYX CALIFORNICA. *Steph., Gen. Zool. vol. 11. p. 384.*

Perdix Californica. Lath., Ind. Orn. Supp. p. 62. sp. 2.

Crested Partridge of New California. *La Perouse, Voy. vol. 1. p. 201.*

Several skins of this species, which had hitherto been of great rarity in European collections, were brought home by the expedition. Some living specimens were also brought to England by Capt. Beechey, two of which (males) presented by him to the Zoological Society, are now in good health in their gardens. All the females unfortunately died on the passage, or there would have been reason to have expected a breed from them, the *Maryland Quail* being known to breed freely in this country.

ORTYX DOUGLASH. *n. s. Zool. Journ. vol. 4. p. 354.—Jardine and Selby's Illust. of Orn. pl. 107.—Linn., Trans. vol. 16. p. 145.*

Ort. plumbeo-brunnea, cristâ erectâ atisque supra saturatè brunneis, his flavo-ferrugineo striatis; capite, genis, nuchâque brunneo et flavo-ferrugineo lineatis; gulâ albâ, brunneo notatâ; abdomine albo guttato.

Capitis plumæ in medio brunneæ, ad latera flavo-ferrugineæ; gulæ albæ, in medio brunneæ. Dorsum rectricumque superiores plumbeo-brunneæ, fusco gracillimè undulatæ, plumis ad apicem pallido-ferrugineo terminatis. Tectrices alarum rectricumque secundariæ interiores saturatè brunneæ, plumis ad latera flavo-ferrugineo ad morem Scolopacum notatis. Remiges primariæ fusco-brunneæ, subtus fuscæ. Tectrices inferiores pallidè fuscæ, albo guttatæ. Cristum flavo-ferrugineum, plumis in medio brunneis. Rostrum pedesque nigri. Longitudo corporis, 9; rostri, ½; alæ, a carpo ad apicem remigis quintæ, 4½; caudæ, 3; tarsi, 1.

PLATE XI.

This species was first discovered in the Rocky Mountains by Mr. Douglas, who did not succeed in bringing home specimens, but accurately described it in his manuscripts.

The species has been with justice dedicated to the enterprising discoverer. A single specimen only was brought home from Monterey.

ORDER IV. GRALLATORES.

FAM. ARDEIDÆ.

ARDEA EXILIS. *Lath., Ind. Orn. p. 683. sp. 29.—Wils., Am. Orn. vol. 8. p. 37. pl. 65. f. 4.—Pr. of Musignano, Syn. sp. 236.*

Minute Heron. *Lath., Gen. Hist. vol. 9. p. 72. sp. 34.*

This species was found at San Francisco. A specimen examined by Mr. Collie "was shot on the margin of a streamlet of water surrounded by low shrubs. The *irides* were yellow: the stomach muscular: the lower *larynx* simple."

NYCTICORAX CRASSIROSTRIS. *n. s.*

Nyct. supra custanco-rufa, subtus plumisque tribus occipitalibus albis; capite supra nigro; rostro crasso, subrecto, mandibulâ inferiori albescenti apice fusco, superiori nigro.

Longitudo corporis, 21; alæ, a carpo ad apicem remigis tertiæ, 10½; rostri, 4½; caudæ, 5; tarsi, 4.

This species agrees in every respect with the *Nyct. Caledonica*, in its colours and the distribution of them; with the exception of the colour of the bill, which is black in the latter bird. It differs essentially, however, in the shape of the bill, which is much more solid and nearly straight, approaching in this respect to the bill of the *Bitterns*. The proportions of the wing also are different, the length, from the carpal joint to the extremity of the largest quill-feather, being an inch less in our bird than in the allied species.

Several of these birds were seen at the Bonin Islands. Mr. Collie remarks that "three white tapering feathers formed a crested plume on these birds, but many were shot without the crest. They frequented the rocks on the sea-shore. They had one *cæcum*."

NUMENIUS RUFIVENTRIS. n. s. Zool. Journ. vol. 4. p. 356.

Num. subpallidè rufus, supra brunneo-notatus; vertice brunneo strigâ medianâ rufâ; uropygio brunnescenti; rostro tubelongato, subcurvato.

*Gula albida. Collum infra graciliter, suprâ fortius, brunneo striatum. Dorsi, scapularium, alarumque plumæ brunneo in medio latius notatæ; uropygium pallidè brunneum, sine notis. Remiges supra brunneæ, exteriores pogoniis internis, interiores pogoniis utrinque, rufo notatis; subtùs pallidè fuscæ, similiter notatæ. Tectrices inferiores brunneo et rufo marmoratæ. Plumæ axillares brunneæ, rufo fasciatæ. Rectrices rufæ, fasciis septem brunneis notatæ. Rostrum rectius quam in *Numeniis* adhuc descriptis, basi infra rufum, suprâ apiceque brunneum. Pedes rufi. Longitudo corporis, 14½; alæ, a carpo ad apicem remigis primæ, 8½; rostri, 3; caudæ, 3½; tarsi, 2.*

This bird may prove to belong to *Num. Hudsonicus*, Lath.; but it differs in so many particulars from the figure and description given by Wilson of that bird, that I venture to keep it separate until an opportunity occurs of more extensive comparison. At present we have no good specimen of Wilson's bird to refer to.

NUMENIUS BOREALIS. Lath.—Pr. of Musignano, Syn. p. 314. sp. 244.

Courlis demi-bec. *Temm., Pl. Col. 381.*

NUMENIUS LONGIROSTRIS. Wils., Am. Orn. vol. 8. p. 23. pl. 64. f. 4.—Pr. of Musignano, Syn. p. 314. sp. 242.

LIMOSA FEDOA. Vieill.—Pr. of Musignano, Syn. p. 328. sp. 266.

Great marbled Godwit. *Wils., Am. Orn. vol. 8. p. 30. pl. 56. f. 4.*

RECURVIROSTRA OCCIDENTALIS. n. s. Zool. Journ. vol. 4. p. 356.

Recurv. dorso medio, corpore infra, fasciisque longitudinuli alarum albis; capite colloque supra, caudâque pallidissimè griseis; scapularibus alisque nigris.

Rostrum, pedesque nigri. Remigum secundariarum apices albæ, fasciam efformantes. Alæ infra, remigibus primariis exceptis, albæ. Longitudo corporis, 16; rostri, 4½; alæ, a carpo ad apicem remigis primæ, 8½; caudæ, 3½; tarsi, 3¼.

PLATE XII.

This bird differs from our European species, which has not yet, I believe, been met with in America, in the absence of the black markings on the head and nape; and from the Indian species, *Recurvirostra orientalis*, by the greyish colouring of the head and upper part of the neck, as well as by the *fascia* on the wings, and the black colour of its legs. It was found abundantly at San Francisco.

PHALAROPUS LOBATUS. Lath., Ind. Orn. p. 776. sp. 2.

Tringa lobata. *Linn., Syst. Nat. vol. 1. p. 249. sp. 8.*

Phalaropus platyrhynchus. *Temm., Man. p. 712.*

Phalaropus fulicarius. *Pr. of Musignano, Syn. p. 241. sp. 277.*

Grey coot-footed Tringa. *Edw., t. 308.*

Red coot-footed Tringa. *Id., t. 142.*



Himantopus mexicanus

TRINGA TEMMINCKII. *Leisler*.—*Pr. of Musignano, Syn. p. 319. sp. 353.*
 Becasseau temmia. *Temm., Pl. Col. 41. f. 1.*

FAM. RALLIDÆ.

GALLINULA CHLOROPUS. *Lath.*—*Pr. of Musignano, Syn. p. 336. sp. 275.*
 Poule d'eau. *Buff., Pl. Enl. 877.*

FULICA AMERICANA. *Gmel.*—*Pr. of Musignano, Syn. p. 338. sp. 276.*
 Common Coot. *Wils., Am. Orn. vol. 9. p. 61. pl. 73. f. 1.*

FAM. CHARADRIADÆ.

HEMATOPUS OSTRALEGUS. *Linn., Syst. Nat. vol. 1. p. 257. sp. 1.*—*Wils., Am. Orn. vol. 8. p. 15. pl. 64. f. 2.*—*Pr. of Musignano, Syn. p. 300. sp. 223.*
 Pied Oyster-catcher. *Penn., Arct. Zool. vol. 2. p. 489. sp. 406.*
 L'Huitrier. *Buff., Pl. Enl. 929.*

STREPSILAS MELANOCEPHALUS. *n. s. Zool. Journ. vol. 4. p. 356.*

Streps. ater; dorso medio, uropygio, fasciis duabus alarum, abdomine, caudâ infrâ, rectricumque apicibus albis.

Caput, collum pectusque brunnescenti-atra. Tectrices superiores interiores, remigesque secundariæ albo notatæ, fascias duas exhibentes. Remigum rhaches, tectrices inferiores, rectricesque omnes basi, duabus mediis exceptis, albæ. Rostrum pedesque atrî. Longitudo corporis, 6½; rostri, 1½; alæ, a carpo ad apicem remigis primæ, 5¾; caudæ, 2½; tarsi, 1.

Two specimens of this bird were among the species brought home by the expedition. They accord with each other accurately in their markings; and differ materially from any varieties which have ever come before me of the European Turnstone. This latter bird exhibits many variations, according to age, but never I believe has the entirely black plumage which covers the head and neck of our bird.

VANELLUS CAYENNENSIS.

Tringa Cayennensis. *Lath., Ind. Orn. p. 727. sp. 5.*
 Parra Cayennensis. *Gmel., Syst. Nat. vol. 1. p. 706. sp. 7.*
 Vanneau armé de Cayenne. *Buff., Pl. Enl. 836.*

CHARADRIUS PLUVIALIS. *Linn., Syst. Nat. vol. 1. p. 254. sp. 7.*—*Wils., Am. Orn. vol. 7. p. 71. pl. 59. f. 5.*—*Pr. of Musignano, Syn. p. 297. sp. 220.*
 Golden Plover. *Penn., Arct. Zool. vol. 2. p. 483. sp. 399.*
 Le Plavier doré. *Buff., Pl. Enl. 904.*

This species was found in great abundance on Chamisso island in Sept. 1826.

CHARADRIUS VOCIFERUS. *Linn., Syst. Nat. vol. 1. p. 253. sp. 3.*—*Wils., Am. Orn. vol. 7. p. 71. pl. 59. f. 5.*—*Pr. of Musignano, Syn. p. 297. sp. 220.*
 Noisy Plover. *Penn., Arct. Zool. vol. 2. p. 484, sp. 400.*
 Chattering Plover, Kildeer. *Catesby, Car. vol. 1. t. 71.*

CHARADRIUS MELODUS. *Ord.—Pr. of Musignano, Syn. p. 296. sp. 217.*

Charadrius hiaticula. *Wils., Am. Orn. vol. 5. p. 30. pl. 37. f. 3.*

Two specimens of this species, killed at San Francisco, November, 1826, accord accurately with Wilson's figure; and exhibit those decisive marks of difference between the American and European species, which are so clearly pointed out by the Prince of Musignano, in his "Observations on the Nomenclature of Wilson's Ornithology" (sp. 223).

ORDER V. NATATORES.

FAM. ANATIDÆ.

ANAS BOSCHAS. *Linn., Syst. Nat. vol. 1. p. 205. sp. 40.—Wils., Am. Orn. vol. 8, p. 120. pl. 71. f. 1.—Pr. of Musignano, Syn. sp. 323.—Penn., Arct. Zool. vol. 2. p. 563. sp. 494.*

Canard sauvage. *Pl. Enl. 776, 777.*

ANAS SPONSA. *Linn., Syst. Nat. vol. 1. p. 207. sp. 43.—Wils., Am. Orn. vol. 8. p. 97. pl. 78. f. 3.—Pr. of Musignano, Syn. sp. 328.*

Summer Duck. *Edw. t. 101.—Penn., Arct. Zool. vol. 2. p. 562. sp. 493.*

Le beau Canard huppé de la Caroline. *Pl. Enl. 980, 981.*

ANAS CAROLINENSIS. *Gmel., Syst. Nat. vol. 1. p. 533. sp. 103.*

Anas Crecca. *Wils., Am. Orn. vol. 8. p. 101. pl. 70. f. 4.—Pr. of Musignano, Syn. sp. 330.*

American Teal. *Penn., Arct. Zool. vol. 2. p. 569. sp. 504.*

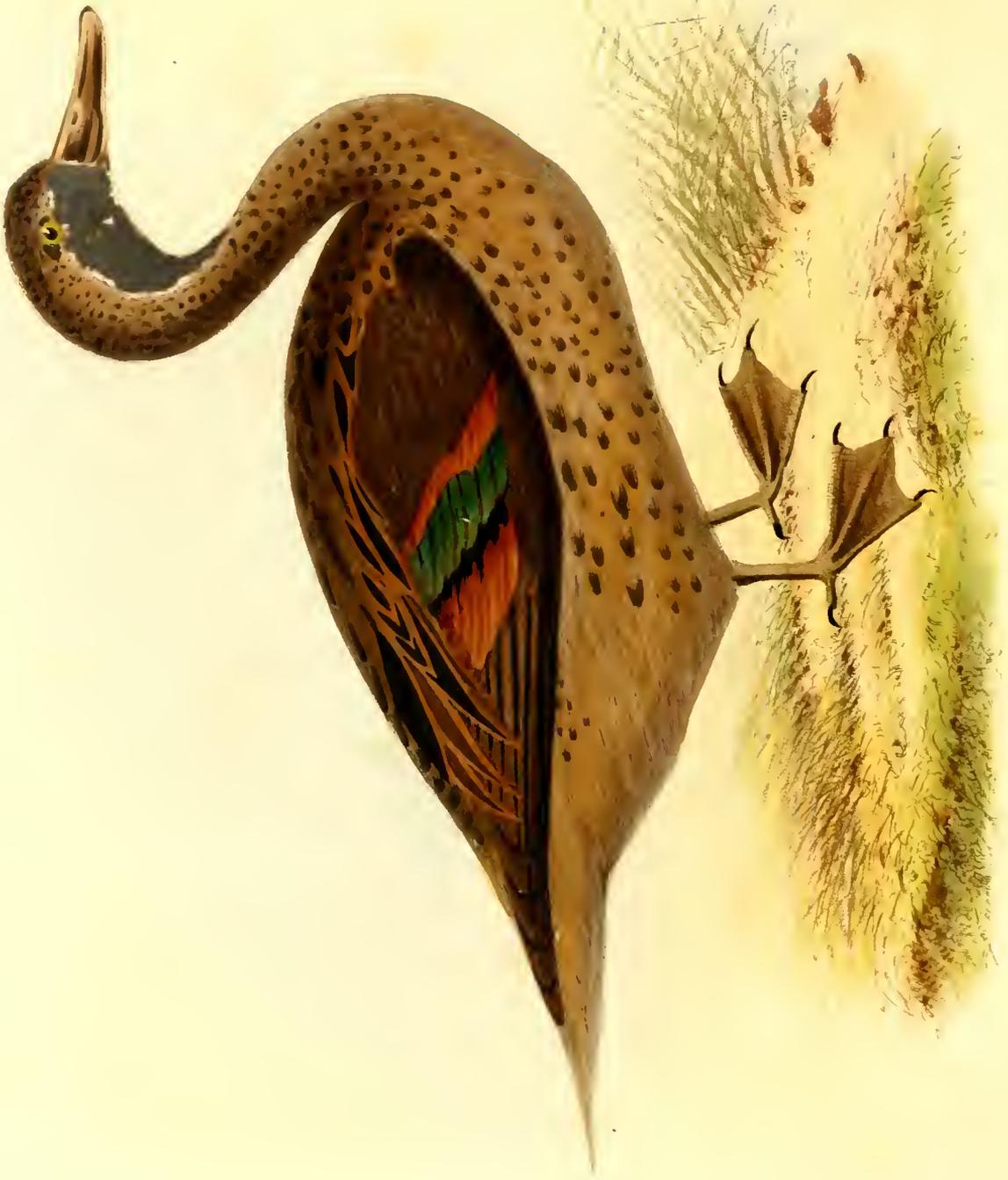
PLATE XIII.

The American *Teal* is generally considered by later naturalists as identical with the European species. I do not wish to set my own judgment on this point in opposition to that of so many writers, some of whom had the opportunity of observing the birds in their native country, but more particularly to that of the Prince of Musignano, who has had the amplest means of comparing the specimens of both continents. I can only state the grounds upon which I venture to retain to the birds in Capt. Beechey's collection the distinct title assigned them by Pennant and Gmelin.

There are several specimens in the collection brought home by the Blossom, and several also in the collection of the Zoological Society, which have been presented by the Hudson's Bay Company, all the adult males of which uniformly agree in the following characters, as distinguished from those of the European bird. The green band that passes from the eye to the nape is more narrow, and has no white stripe above, while the white stripe below is nearly obsolete; the undulating black and white lines that cross the back and sides are less finely pencilled than in the European species; the *fascia* on the wings, formed by the tips of the primary wing-coverts is nearly ferruginous throughout, while in *Anas crecca* it is white, with a scarcely perceptible tinge of ferruginous; the scapulars are marked like the back, without any mixture of those black or white blotches with a ferruginous tinge, found in the birds of our continent; and on the sides of the breast, near the shoulders, is a strongly marked lunulated white *fascia*, that never belongs to the allied species.



Anas sardinesis



Swan nigripes

With such indications of a difference in species, and these uniformly exhibited in a considerable number of specimens, I should not consider myself justified in keeping the birds otherwise than specifically separated; at the same time stating the grounds for their separation.

ANAS AMERICANA. *Gmel., Syst. Nat. vol. 2. p. 526. sp. 97.—Wils., Am. Orn. vol. 8. p. 86. pl. 69. f. 4.—Pr. of Musignano, Syn. p. 384. sp. 326.*

American Widgeon, *Penn., Arct. Zool. vol. 2. p. 567. sp. 502.*

Le Canard jensen de la Louisiane. *Buff., Pl. Enl. 955.*

ANAS ACUTA. *Linn., Syst. Nat. vol. 1. p. 202. sp. 28.—Wils., Am. Orn. vol. 8. p. 72. pl. 63. f. 3.—Pr. of Musignano, Syn. p. 383. sp. 325.*

Pintail. *Penn., Arct. Zool. vol. 2. p. 566. sp. 500.*

Canard à longue queue. *Buff., Pl. Enl. 954.*

ANAS UROPHASIANUS. *n. s. Zool. Journ. vol. 4. p. 357.*

An. capite, corpore, caudâque pallidè rufis, illis brunneo ocellatis; genis, gulâ, colloque infra albis; alis fuscis, speculo fascias quatuor exhibente, primam supra gracilem rufam, secundam latam dilutè caruleam, tertiam gracillimam atram, quartam latam rufam.

Capitis maculæ parvæ, nuchæ pectorisque grandiores, abdominis subgrandes. Scapularcs subfuscæ, rufo marginatæ. Dorsum imum fuscescens. Tectrices alarum inferiores, primæ brunneæ, secundariæ albæ. Plumæ axillares albæ. Longitudo corporis, 21½; rostri, 2; alæ, a corpo ad apicem remigis secundæ, 9½; caudæ, 5¾; tarsi, 1½.

PLATE XIV.

RHYNCHASPIS CLYPEATA. *Leach.*

Anas clypeata. *Linn., Syst. Nat. vol. 1. p. 200. sp. 19.—Wils., Am. Orn. vol. 8. p. 65. pl. 67. f. 7.—Pr. of Musignano, Syn. p. 382. sp. 322.*

Shoveler. *Penn., Arct. Zool. vol. 2. p. 557. sp. 485.*

Souchet. *Buff., Pl. Enl. 971, 972.*

FULIGULA MARILA. *Leach.*

Anas Marila. *Linn., Syst. Nat. vol. 1. p. 196. sp. 8.—Wils., Am. Orn. vol. 8. p. 84. pl. 69. f. 8.—Pr. of Musignano, Syn. p. 392. sp. 340.*

Scaup Duck. *Penn., Arct. Zool. vol. 2. p. 565. sp. 498.*

Le Millouinan. *Buff., Pl. Enl. 1002.*

Several specimens of a bird nearly allied to this species, if not the same, were brought home by the expedition. They uniformly differ from the typical *Ful. Marila* in their smaller size, in the black colour on the breast being less intense and defined, in the undulating white markings being less diffused over the scapulars and back, and being wanting almost entirely on the wing-coverts. Dr. Richardson, whose judgment on these points, and whose experience respecting the birds of the Arctic regions entitles him to every confidence, is inclined to consider these birds but as a variety of the European species. Following his opinion, I refrain from describing them as separate. It is however to be observed, that the true *Fuligula Marila* is found in North America, and there is therefore less reason to believe the birds alluded to above to be varieties resulting from climate or locality. Should the species prove to be distinct, the specific name of *Mariloides*, which has been suggested by Dr. Richardson, would be appropriate.

CLANGULA ALBEOLA. *Leach.*

Anas albeola. *Linn., Syst. Nat. vol. 1. p. 199. sp. 18.—Wils., Am. Orn. vol. 8. p. 51. pl. 67. ff. 2, 3.*

Fuligula albeola. *Pr. of Musignano, Syn. p. 394. sp. 343.*

Spirit Duck, and Buffel-headed Duck. *Penn., Arct. Zool. vol. 2. p. 558, 559. sp. 487, 489.*

Sarcelle de la Louisiane, ditte la Religieuse. *Buff., Pl. Enl. 948.*

This species was found at San Francisco.

CLANGULA HISTRIONICA. *Leach.*

Anas histrionica. *Linn., Syst. Nat. vol. 1. p. 204. sp. 35.—Wils., Am. Orn. vol. 8. p. 139. pl. 72. f. 4.*

Fuligula histrionica. *Pr. of Musignano, Syn. p. 394. sp. 345.*

Harlequin Duck. *Penn., Arct. Zool. vol. 2. p. 560. sp. 490.*

Le Canard à collier de Terre neuve. *Buff., Pl. Enl. 798, 799.*

FAM. ALCADÆ.

URIA BREVIROSTRIS. *n. s.? Zool. Journ. vol. 4. p. 357.*

Uria supra griseo-fusca, capite dorsoque albo notatis; subtus alba, fusco undulatum maculata; reatricibus albis, duabus mediis fusco notatis; rostro brevi, gracili.

Alæ supra et infra, tectricesque inferiores fusca. Rostrum nigrum. Pedes flavi, membranis unguibusque brunneis. Longitudo corporis, 9; rostri, ad frontem, $\frac{1}{2}$, ad rictum, $1\frac{1}{2}$; alæ, a carpo ad apicem remigis primæ, $5\frac{1}{4}$; caudæ, 1; tarsi, $\frac{1}{2}$.

I have been able to make no further observations on this bird since I first referred to it in the Zoological Journal. Its bill presents an interesting modification of form.

MERGULUS CIRRHOCEPHALUS. *n. s.*

Merg. capite supra, nuchâ, collo anteriori, abdominis lateribus, ptilisque nigris; dorso, alis, caudâque plumbeo-griseis; colli lateribus, pectore, abdomine, plumis sublongatis decompositis capitis cirrum longitudinalem efformantibus a vertice ad nucham utrinque extendentem, paucisque nuchæ laterum, albis.

Rostrum pedesque albescens, illius culmine hujusque membranâ interdigitali unguibusque nigris. Tectrices alarum albæ. Longitudo corporis, $10\frac{1}{2}$; alæ, $4\frac{1}{2}$; rostri, ad frontem, $\frac{9}{16}$, ad rictum, $1\frac{1}{2}$; tarsi, 1; caudæ, $1\frac{1}{2}$.

I have hitherto met with no description that in any respect refers to the present bird, of which several specimens were brought home by the expedition, all agreeing in character with each other. Not merely in specific characters do these birds differ from the allied birds of the family, but in those characters which usually serve as marks of generic distinction. In the shape of the bill they accord neither with *Uria* nor with *Mergulus*; that member being much shorter and more curved than in the former genus, and much more compressed and more feeble than in the latter. I refer the bird, however, for the present to *Mergulus*, the preponderance of character perhaps uniting it more closely to that form than to the *Guillemots*; in like manner as, on the other hand, the preceding species appears to incline more to these latter birds than to *Mergulus*. Both species form a beautiful series of connecting links between the two genera. I speak, however, with great diffidence respecting all these water-birds. They alter so materially in the different stages of their growth, that it is difficult to determine their characters accurately, except by constant and lengthened observation on the spot.

My suggestions on the subject may be erroneous; but they will, I hope, lead future navigators, when they have the opportunity, to pay that attention to the species, which alone can lead to any decisive conclusions.

FRATERCULA CIRRHATA.

Alca cirrhata. *Pall., Spic. fasc. 5. p. 7. t. 1.*

Tufted Auk. *Penn., Arct. Zool. vol. 2. p. 513. sp. 432.*

Macareux de Kamtschatka. *Buff., Pl. Enl. 761.*

This species was found in great abundance at Avatscha Bay, July, 1826, and more sparingly afterwards at Chamisso Island. One specimen was brought home with a carinated bill, apparently a young bird.

FRATERCULA GLACIALIS.

Mormon glacialis. *Leach?—Pr. of Musignano, Syn. p. 429. sp. 379.*

I refer this bird to Dr. Leach's species with doubt, as I am not aware of the work in which he published the characters of the species. All our birds, of which there are numerous specimens, agree with the European *Puffin* in their general characters, but uniformly vary from it in size. The species was seen in abundance, according to Mr. Collie, "on the rocky ledges of Chamisso Island, at Cape Mulgrave and Cape Lisburne, the young leaving the rocks the first days of September."

PHALERIS CRISTATELLA. *Temm.*

Alca cristatella. *Pall., Spic. fasc. 5. p. 18. t. 3.*

Crested Auk. *Penn., Arct. Zool. vol. 2. p. 515. sp. 434.*

Starique cristatelle. *Temm., Pl. Col. 200.*

This species was found at St. Lawrence Island in Avatscha Bay, in July, 1826, whence dead specimens were brought off in great numbers by the natives. Mr. Collie has made the following remarks on some specimens which he examined:

"The point of the bill was livid; the rest of it, and the broad reflected margin of the lower mandible, as well as the semicordate fleshy portion at the angle of the mouth, of an ochry-red colour, differing in intensity in different individuals. Behind each eye were a few white setaceous feathers. The outer toe has five joints; the others diminishing by one joint as they are placed internally. The female is the same as the male; or if any difference can be traced, it is in the more slaty colour underneath, and the longer crest of the former.

"The *testes* were of different sizes in the different specimens. In one the left was oval and seven lines in length, the right smaller and rounded. The *vasa deferentia* were very distinct, arising from the posterior and lower part of the *testes*, and becoming very much convoluted towards the vent. In all the others which I examined (three or four), the *testes* were much smaller. The *ova* were all small. The stomach was simply muscular and thin; with very thin internal membrane. The *caca* were short. The *sternum*, or rather the cartilaginous termination, extended to the vent; and the angle of the cartilages of the ribs to the *ilium*."

CERORHINCA OCCIDENTALIS? *Pr. of Musignano, Syn. p. 428. sp. 377.*

I refer to this species of the Prince of Musignano with some doubt. The birds under consideration, of which many specimens were brought home by the expedition, possess the horny process on the ridge of the upper mandible, that forms the distinguishing characteristic of the genus *Cerorhinca*,

and they equally agree with the general description of the species above quoted. They also accord with the description of the *flat-billed Auk*, or *Alca pygmaea* of Dr. Latham, who probably refers to the horny process on the upper mandible, when he speaks of the tip of it being "ridged."* This latter bird M. Temminck asserts to be the young of the *Phaleris cristatella*. This may be the case; but the point is one which can only be determined in the native country of the birds, and by constant attention to them. When there occur so many changes according to age, not merely in the plumage, but in the structure of the bill of the birds of the present family, and of other analogous groups, such, for instance, as the *Hornbills*, it is impossible for the home naturalist to come to any conclusion, as to species, upon the mere examination of a skin. Relying, however, upon the known accuracy of the Prince of Musignano, I refer our specimens to his species as above quoted, expressing at the same time the doubts I feel on the subject.

Specimens of these birds were brought off from St. Lawrence Island in great abundance, in company with the species last referred to. It is to be observed, that no intermediate specimens are to be found in the collection between these two alleged species. A specimen examined by Mr. Collie had "an egg taken out of it, which was ovate, and two inches long;" a circumstance which indicates the adult state of the bird.

FAM. PELECANIDÆ.

PHALACROCORAX CIRRIGER. King, *Zool. Journ.* vol. 4. p. 103.

A young specimen apparently of the above species, exhibiting the first rudiments of the longitudinal tuft of feathers down the sides of the neck, is in the collection.

SULA FUSCA. Brisson.

Pelecanus sula. Linn., *Syst. Nat.* vol. 1. p. 218. sp. 7.

Booby. Catesby, *Car.* 1. pl. 87.

Mr. Collie, speaking of this species says, "these birds roost on the rocks in the sea, and particularly on the Piedra Blanca de la Tierra in the bay of San Blas. When fishing, they come down obliquely to the surface of the water, dip under it, and shoot along, the head and part of the body being covered; and then they either settle on the surface, or fly up again."

The common *white Pelican*, *Pelecanus onocrotalus*, Linn., is frequently referred to in Mr. Collie's notes, as being met with, and some observations appear of its anatomy. No specimen, however, is in the collection.

The following observations, although not strictly belonging to our subject, as referring to a bird not in the collection, are yet of so much interest as to authorise their being extracted from Mr. Collie's notes. At the same time I must express my doubts of the bird, whose anatomy is described by Mr. Collie, being the true *Pel. onocrotalus*. "The *os hyoides* was imbedded in the membrane of the pouch, a little anteriorly to the *larynx*, and if connected by ligaments and muscles, they are so slight as to escape a superficial inspection. The *larynx* and *trachea* are closely applied to the middle line of the pouch, and the *rima glottidis* lies obliquely downwards and backwards. The *epiglottis* (or tongue, for there is no other similar substance,) is a small eminence about an inch anterior to the *rima*, and may be brought to cover it by muscular action. There are no fleshy teeth. From the head the pouch gradually contracts to the middle of the neck, and there terminates in the *oesophagus*, the pouch being properly the distended *fauces*. A small longitudinal chink in the palate denotes the posterior *nares*. The cavity of the *larynx* is divided into two equal parts by a longitudinal *lamina* projecting from the anterior part backwards, and touching, but not attached to, the posterior part. The *oesophagus* dilated

* *Gen. Hist.* vol. 10. p. 72. sp. 13. His description seems to have been taken from the Arctic Zoology.

into an oblong bag, tapering to the inferior extremity, having a thin external muscular coat, and a thick bed of glands intervening between it and the membranous. These glands appear to be distinct from each other. They resemble short fleshy cylinders arranged vertically to the long *axis* of the cavity. They are longest at the middle of the bag, and diminish towards each extremity, until they finally disappear. This cavity is the stomach, and its inferior extremity communicates by an opening in the right side with the *duodenum*, by the narrowed *pyloric* orifice. The intestinal convolutions are numerous. The *cæca* are two, about one inch and three-quarters long, bulging towards the upper extremity, and lying upon each side of the *rectum*."

TACHYPETES AQUILUS. *Vieill.*

Pelecanus Aquilus. *Linn., Syst. Nat. vol. 1. p. 216. sp. 2.—Lath., Ind. Orn. p. 885. sp. 10.*

Frigate bird. *Albin, vol. 3. t. 80.*

La Fregate. *Buff., Pl. Enl. 961.*

"The pouch beneath the throat of this bird," says Mr. Collie, "is of a yellowish red colour, and when distended, the feathers on its upper and posterior sides are separated to some distance from each other, and exhibit very distinctly the quincuncial order in which they are implanted. On first looking at this pouch, I was a little surprised at finding it did not communicate with the mouth or *fauces* in any way that I could perceive. I succeeded in inflating it only by long and forcible blowing into the *trachea*. I desired the man who had the skinning of the specimens brought on board to inflate the pouch before commencing the skinning, and to let me know when he had advanced to the shoulders. He, however, dislocated the shoulder-joint first, when the distended pouch immediately collapsed. The *trachea* had been tied. As soon as I was informed of this, I had little doubt that the pouch had been inflated from the lungs; and on observing two wide openings, one anterior to the humeral articulating face of the *scapula*, the other the usual opening of the joint, I hesitated not to infer that it was through the first of these the air had passed in, and that the dislocating of the joint, by which its capsular ligament was torn, had allowed the air to escape at the opening which corresponds to that on the head of the *humerus*, and which immediately leads, as well as the other just mentioned, into the centre of the *scapula*. I now opened the *trachea* immediately before the *sternum*, and again attempted inflation from that part, but in vain. I tried it also, but with no better success, from the *larynx*. I now examined with the blowpipe near the opening of the *scapula*, in the cellular substance under the skin, and soon detected a small opening that conducted the air to the pouch, which was readily inflated by blowing through the opening, and so long as it was shut, the pouch continued distended. That this opening was not artificial—the effect of the rupture of the fine membrane lining the air-bladder, was evident from its not opening directly into it, but only after a passage of some length, gradually enlarging. That this was the sole opening into the pouch appears proved from the fact, that after detaching the *sac* from all the parts beneath, *i. e.* all the parts excepting from the skin, it did not permit the gas to escape except by this opening, and that it continued to be capable of inflation from it. I was satisfied in discovering it on one side; and of course inferred that it was similar in the other, the opening of the *scapula* being similar.

"Mr. Wolfe, who saw this bird in great numbers on the island of Isabella, near San Blas, informed me that the nest, on which many were sitting, consisted of a few small sticks placed horizontally upon the branches of shrubs or low trees, in some sheltered places, raised a foot or two above the ground, never close upon the earth. There was only one egg on, rather than in, it; and the bird that was upon the nest did not seem to have the reddish pouch* under the throat. The birds with this pouch

* The females do not possess the pouch. See *Linn. Trans. vol. 13. p. 2, 3.*

were sitting on the branches near those just mentioned, and had it universally distended. These often did not attempt to fly away till our people were so near them as to be able to knock them down with a stick; and when they endeavoured to get on the wing, they frequently entangled themselves in such a manner among the branches that they fell to the ground, from which they could not raise themselves, and were caught. Those which flew away were observed to continue the distension of the pouch, and those which were caught did not alter it. It subsided only when they were dead.

“The eggs are white.”

The species was observed at Pitcairn's Island, at San Blas and Mazatlan.

TACHYPETES LEUCOCEPHALUS. *Vieill.*

Pelecanus leucocephalus. *Gmel., Syst. Nat. vol. 1. p. 572. sp. 17.*

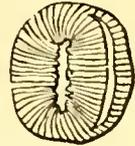
White-headed Frigate Pelican. *Lath., Gen. Hist. vol. 10. p. 413. sp. 15.*

The following extracts, giving the details of the examination of a specimen of this bird, are taken from the same manuscript as the preceding:

“The extent between the tips of the wings is six feet five inches. The *irides* are black; the pupil a dull milk-white; the bill and legs a leaden grey.

“The space between the folds of the *peritoneum* was filled with adipose substance, which in the fissure of the liver was nearly two lines thick. The right extremity of the thick muscular stomach, which is not sufficiently different in texture, or separated by so defined a boundary, as to entitle it to the name of *gizzard*, contained nevertheless a collection of small portions of *lava*, and two hemispherical pearly bodies, along with some triturated fish muscle, and claws of crustaceous animals. In the proper cavity of the stomach were the remains of the long spines of the bones of some fish, and a considerable number of *vermes*, which lived in fresh water sixteen hours after having been taken out of the stomach.

“The liver, in texture and colour, differed not from the human. The gall-bladder hung loosely under the lowest part of the right lobe, and its *duct* entered the *duodenum*, after it had made a long convolution. There were but faint traces of the *pancreas*. The two *caca* were very short, and about an inch and a half from the *anus*; the *cloaca* a little on the left side of the *rectum*, close to the *anus*. Its internal structure appeared to be made up of small vesicular particles joined together, of unequal thickness, with deep clefts or cells in various parts. The upper part of the ureters was filled with the white substance which no doubt colours the *faeces*; the lower part entered the *rectum* close to the anus. Where the *trachea* divides into the two *bronchia*, a thick prominent cartilage defends the cavity of each, and the rest of the bronchial cartilages are thicker than those of the *trachea*, but do not extend round the posterior part of the tube, which was plain and filled up by a transparent membrane. The anterior ventricle of the heart might be said to be only a sort of pouch, placed upon the anterior part of the posterior one, in this manner. Its valves were fleshy, with a small tendinous margin. Its cavity did not extend so low as that of the left. The valves of the pulmonary artery resembled the semi-lunar ones of the *aorta*, which were accurately shut, and seemed well adapted to prevent the least reflux of blood. The *corpora sesamoidea* were very distinct. The cells between the valves and the root of the artery were very deep, and there was a contraction of the diameter of the aortic immediately above, whilst the thick *columna carneæ* of the ventricle formed a solid support to the base and lower surface of the valves. The left *arteria innominata* went off from the *aorta* at its origin; the right one extending about a quarter of an inch above; both extending outwards, and dividing into three nearly equal branches, the carotid, cervical, and subclavian. The two vertebral were seen going off from the *aorta* where it makes its curvature. Portions of one or more *Teniae* were found in the intestinal canal.



“These birds came within arm’s length of the men on deck.”

The specimens examined were shot off Salas Island. They were observed off Bow Island, and also off Ducie’s Island, but “soaring at a considerable height, and not approaching the ship.”

FAM. LARIDÆ.

PHAËTON ÆTHEREUS. *Linn., Syst. Nat. vol. 1. p. 219. sp. 1.*

Phaëton phænicurus. *Lath., Ind. Orn. p. 894. sp. 3.*

Common Tropic Bird. *Id., Gen. Hist. vol. 10. p. 443. sp. 1.*

Red-tailed Tropic Bird. *Id., Ib. p. 447. sp. 3. pl. 183.*

Grand Paille-en-queue. *Buff., Pl. Enl. 998.*

Paille-en-queue de l’Isle de France. *Id., Ib. 979.*

This species, of which several specimens were brought home, was met with abundantly at Bow Island, according to Mr. Lay, who has made the following observations on them:—

“The chief object which interested us here was the number of *Tropic Birds* which were found either fostering their young ones, or brooding upon their eggs. These are about two inches long, and one in diameter; sprinkled and mottled with a reddish-brown. They are laid in a hollow of the sand, under the covert of a shrub of the *Tournefortia* or *Pemphis*. The birds generally betray the place of their concealment by loud angry cries, defending their eggs or young with great obstinacy, and inflicting no despicable wounds with their bills.

“The young ones, when full fledged, are handsomely spotted with black, with black bills. When attempted to be captured, they gave proofs of having inherited the fierce disposition of their parents.”

They were also met with at Matilda Island, as noted in Mr. Collie’s Journal of the date of February 4, 1826, from which the following details are extracted:—

“We were surprised in passing through or near the coppices, to hear at our feet the screeching of birds, and on turning round to see them with wide opened bills, ready to inflict a sharp and no trifling wound with their inverted serratures upon the hand that would dare to seize them. They were in the act of incubation, and could not be made to quit their egg, for each had only one, unless pushed off by force. Their nest was nothing more than a slight excavation in the sand. The eggs are of the same form as those of the *domestic Hen*, but larger than those of a *Duck*. They are of a brownish marbled appearance, some being lighter than others. The birds which were sitting appeared to have a deeper tinge of red in their white plumage than the others which were flying around us. These did not soar to so great a height as we had previously seen others at sea, but approached within gunshot.

“The *irides* are black, and a black space surrounds the eye. The beak of the adult bird is reddish, the legs lead colour, and the toes and webs black. The breadth is 3 feet 9½ inches: length, from tip of bill to the extremity of the tail (the two middle feathers, which extend a foot further, excepted), 1 foot 8 inches. The feathers of the young, in their first plumage, are white striped with black. At this period the bill is of a greyish black, the feet of a leaden colour. One young one measured in breadth only three feet, and did not seem capable of flying. The unfledged young were covered with a light greyish-brown, and had the black bill of the feathered ones.

“On dissecting the bird, I found the liver large and clay-coloured. The stomach is a cylindrical muscular sac, extending into the *pelvis*, and held in its situation by a muscular connexion proceeding from the left side of the *sac*, where it is lost among the fibres of the stomach itself, to the branch of the *pubis* of the same side. The *pancreas* lies over and in the space formed by the descend-

ing and ascending portions of the *duodenum*. The hepatic, pancreatic and gall ducts enter the ascending portion of this intestine, and join as they enter; the intestine being still continued upwards behind the liver. The intestinal canal altogether formed, first five parallel convolutions up and down, and then a few irregular turnings, until, ending in the *rectum*, (from each side of which, about $\frac{2}{3}$ of an inch from the *anus*, a short *cæcum* was sent back, the longest being on the left side,) it terminated; completing, when laid out, a line of 42 inches. The body measured, from the front of the head to the tip of the fleshy part of the tail, 1 foot 2 inches; the canal was thus above three times the length of it.

“There was only one *ovarium* upon the anterior part of the vertebral column, near the *porta* of the *liver*, containing a number of *ova* of different sizes. One *oviduct* extended, in somewhat of a serpentine course, from the *ovarium* along the anterior part of the vertebral column to the vent, where it appeared to open externally without joining the *rectum*. The cavity was sufficient to admit the extremity of a small little finger, and the inside presented a reticulated appearance.”

The *red-tailed Tropic Bird* of former naturalists is now generally considered to be the adult of the common species. I have adopted this general opinion, although no evidence has proceeded from the present voyage to decide the fact. Specimens of both alleged species are in the collection; those with the red tail-feathers being the most numerous.

STERNA ALBA. *Sparm., Mus. Carls. fasc. 1. t. 11.*

White Tern. *Lath., Gen. Hist. vol. 10. p. 109. sp. 13.*

This species was found abundantly at Pitcairn's Island. “The *irides*,” we are told by Mr. Lay, “are deep blue. The females lay one egg, (which is whitish, stained with purple, and blotched with brown, about the size of a Ring-Dove's,) in the natural holes of the *Mangle Trees*, about the spreading branches of which they hover in great numbers while rearing their young, making a noise like that of the rubbing together of two stones.” They were also observed in company with the *Noddy* in Gambier's Island.

STERNA STOLIDA. *Linn., Syst. Nat. vol. 1. p. 227. sp. 1.*

Noddy. *Penn., Arct. Zool. 2. p. 523. sp. 446.*

La Mouette brune. *Buff., Pl. Enl. 997.*

This species was observed at various places during the voyage—at Salas Island, Nov. 16th, 1825; at Ducie's Island; at Pitcairn's Island, Dec. 1825; at Matilda Island, Feb. 4th, 1826; at Bow Island, Feb. 20th, 1826, &c. &c., according to Mr. Collic's notes.

STERNA PANAYENSIS. *Gmel., Syst. Nat. vol. 1. p. 607. sp. 16.*

Panayan Tern. *Lath., Gen. Hist. vol. 5. p. 119. sp. 28.*

Some doubts may be entertained as to the species originally described by Sonnerat under the name of *L'hirondelle de Mer de l'Isle Panay*, (*Vol. 3. p. 126. pl. 84.*) his figure being that apparently of a young bird. Our species, which was found at Ducie's Island, is the same as is generally referred to that species. M. Temminck has figured a bird (*Pl. Col. 202.*) very similar to ours, and probably the same; but which he says is different from the true *Sterna Panayensis*. This latter bird he promises to figure; and thus our doubts will be resolved. Mr. Collic examined one of these birds, and “found the stomach totally void, the gizzard externally undistinguished from the craw, or rather the *ventricule succenturié* being in the same line with it; but internally known by its peculiar horny membrane, which was tinged yellow, and by the *rugæ* being constricted at the commencement of it, and turned a little out of their regular direction. Two short *cæca* arose about three-quarters of an inch from the *anus*. No arteries went off from the arch of the *aorta*, as in the *Pelecanus leucocephalus*.”

LARUS BELCHERI. *n. s.* *Zool. Journ. vol. 4. p. 358.*

Lar. fuscescenti-plumbeus, subtus pallidior; remigibus primariis reatricibusque nigris; uropygio, remigum reatricumque apicibus albis; rostro rubro, apice nigro.

Longitudo corporis, 21; rostri, 2; alæ, a carpo ad apicem remigis primæ, 11; caudæ, 6; tarsi, 2.

This new species has been dedicated to Capt. Edward Belcher, R. N., the first Lieutenant of the Blossom, to whose science and enterprize zoology is indebted for many important acquisitions in various departments.

LARUS ARGENTATUS. *Lath., Ind. Orn. p. 814.*

Lesser black-backed Gull. *Montagu, Orn. Dict.*

Grande Mouette cendrée. *Buff., Pl. En. 977.*

The *Larus Sabini* is stated in Mr. Collie's notes to have been seen off the coast of California, and at Behring's Straits. Several other Gulls are in the collection, but, being either young and imperfectly plumaged birds, or in bad condition, are passed over as not available for accurate description.

The *Lestris parasiticus* is also stated by Mr. Collie "to have been seen at a distance in Behring's Straits, the two long tail-feathers appearing as knobbed. Three or four of these birds were observed at a time pursuing the other Gulls, Puffins, &c., as they fished in a body, or collected other prey, and making them drop the food they caught, which they seized when falling."

PROCELLARIA CAPENSIS. *Linn., Syst. Nat. vol. 1. p. 213. sp. 5.*

White and black spotted Peteril. *Edw., t. 90.*

Le Pétrel tacheté, ou le Damier. *Buff., Pl. Enl. 964.*

"Flocks of this bird," says Mr. Collie, "attended us all along the coast of South America, sometimes at more than five hundred miles from land, but they did not enter the harbour of Rio Janeiro."

DIOMEDEA EXULANS. *Linn., Syst. Nat. vol. 1. p. 568. sp. 1.*

Wandering Albatross. *Penn., Arct. Zool. vol. 2. p. 506. sp. 423.*

L'Albatros, du Cap de bonne Esperance. *Buff., Pl. Enl. 237.*

DIOMEDEA FULIGINOSA. *Lath., Ind. Orn. p. 790. sp. 4.*

Sooty Albatross. *Forst., Voy. 1. p. 91.*

Mr. Collie informs us that "a good many of these birds flew about the ship when off the coast of South America, from two hundred to five hundred miles from land, between the 40th and 50th degrees of south latitude. A specimen, from which the following description was taken, being hung by the bill before it was dead, had a small drop of tears collected in each eye.

"The bill was black, with a greenish-blue linear membrane separating, longitudinally, the lateral part of the lower mandible, and extending from the base to the articulation of the extreme piece. The eye was black, the iris dark brown. A segment of a circle of white feathers surrounded three-fourths of the eye, placed superiorly and posteriorly on the margin of the eyelids. The web of the foot was finely dentated at the margin between the toes. The external sides of the two external toes were furnished with a coriaceous membrane thicker than the web, about one-eighth of an inch wide, its margin being entire.

"The mass of the pectoral muscles was very large, about one-fifth of the bulk of the whole body.

“The *rima glottidis* was surrounded posteriorly by a plane covered with numerous fleshy teeth pointed downwards. The stomach was simple and fleshy, and formed a long pouch, with longitudinal internal folds. The *pyloric* orifice was smooth, resembling that in man. The duodenum was larger than the other intestines, which form convolutions, turning at acute angles upon one another, and connected two and two by the mesentery. The whole canal was void of *valvula conniventes*, and had but few villousities. The contents of the stomach were small in quantity, and of a homogeneous nature, dark colour, and somewhat solid consistence. The intestines were filled with a greyish pulpy matter. The liver was large and red, filling at least one half of the abdomen; divided by a deep fissure into two lobes, the right being considerably larger than the left. The heart was partly lodged between them. The gall-bladder was large and full. About two feet of a slender *Tænia* was taken out of the small intestines, where it appeared to be continued, tapering to a fine filament.

“The cutaneous muscle of the neck and back was very thick.

“One of the ship's company, in cleaning one of these birds to have it cooked, said he found a bill resembling that of the *Procellaria*, sticking in its gullet.”

The same species was observed in great numbers in Monterey Bay; and was seen also at sea almost every day of the passage from the Aleutian Islands to California.

A specimen shot at Monterey, and examined by Mr. Collie, “extended,” according to his notes, “seven feet eight inches.—The base and edges of the tongue were aculeated.—A long tapering gall-bladder lay by the side of a convolution of intestine. There were two *cæca* of unequal length, but very short and very small. Portions of flesh, cartilage and fish, were found in the stomach.”

FISHES;

BY

G. T. LAY, Esq., AND E. T. BENNETT, Esq., F. L. S., &c.

OF the various departments of zoological science, that which relates to Fishes has been perhaps the most generally neglected. It would be misplaced to attempt here to explain the causes of this neglect, though we have to express our regret at one of its consequences, in the imperfect state of the notes made during the voyage by the naturalists who accompanied it—notes which in many cases are calculated to lead to conjecture alone. Among the numerous fishes observed were doubtless many new species, and probably several new forms; and it would have been a gratifying task to have recorded these as so many positive additions to science. We could not, however, avoid entertaining frequent doubts, that species had been erroneously referred to genera of which they constituted no part; and it was also observable, that in some cases the characters recorded were insufficient to determine the genus, and occasionally even the family, to which the species belonged. It was therefore feared, that by attempting to give to the imperfect descriptions placed in our hands a technical form, and affixing to them names as of known and well-ascertained things, an injury might be done to science, rather than a benefit conferred upon it. On the other hand, it seemed just to the gentlemen who had observed

much during the voyage, and had noted their observations, that the extent of these should be made known : it must also be advantageous to future voyagers, as indicating at least that there existed in certain localities species apparently novel, and as pointing out to them the more striking characters of some subjects deserving of their inquiry. It is on this principle that an enumeration has been given, in the order of the voyage, of very nearly the whole of the fishes mentioned in the notes of Mr. Collic and Mr. Lay.* In enumerating them, it has been attempted to render the notes referred to as intelligible to the ichthyologist as their nature would permit. Here some portion of conjecture was unavoidable : but in no instance has a name been given to a species, although apparently new, on the authority of the notes alone. Some specimens of fishes have been preserved, and of these we speak with confidence. Of others we have drawings taken from the recent fishes ; and these, although probably not free from trifling errors in the details, may yet be relied on for general accuracy and effect.

Such are the materials placed in our hands, and such their relative value. In employing them, we propose to give, in the first place, lists of the species observed at each station visited during the voyage ; and in the second place, characters and descriptions of such novelties as rest on the authority of specimens or of figures ; distinguishing in all cases the materials from which our information is derived.

We commence with the enumeration of the several species observed.

* Mr. Lay regrets, that, influenced by opinion, he fell into the vulgar error of labouring to cultivate an acquaintance with the more obvious productions of the earth, in the room of pursuing the more curious and retired cantons of animated nature ; and laments that instead of investigating the rationes habendi of vegetable structures, he did not occupy his time in etching out the internal configurations, and in defining the habitudes, of the various "sæcla animantum" (Lucret.) that people the ocean.

FISHES.

AMONG the fishes which earliest attract the observation of a voyager passing from the north towards the equator, are the *Exocæti*, popularly known as Flying-fishes, and peculiarly interesting on account of their singular power of elevating themselves above the surface of the water in a manner somewhat resembling flight. Should they fail to excite attention by their excursions above the waves, they will occasionally intrude themselves upon the notice of the voyager by even throwing themselves from the sea upon the deck of the vessel in which he sails. Some of these, of the species termed by Linnaeus *Exocætus volitans*, were seen the day after quitting Teneriffe, and others were observed during many of the following days. They were carefully examined as to their anatomy, and other particulars, and especially as to their specific gravity, an interesting point as connected with their power of raising and supporting themselves in the air. "In the present state of our knowledge," Mr. Lay observes, "it is needless to remark that the Flying-fishes possess no claim whatever to be regarded as the connecting link between fishes and birds, classes widely separated in a natural arrangement of vertebrated animals: their large pectoral fins have nothing in their structure in common with the wings of birds, and are unfurnished with muscles capable of communicating to them the rapid motions of alternate elevation and depression, which give to wings the power of supporting and conveying their bodies through the air, during almost an indefinite time. The flight of an *Exocætus* appears generally to be a single effort; a smart stroke is given by the expanded pectoral fins to the water; the impulse thus given raises the body of the fish above the surface, where, rendered buoyant by its large air-bladder, and the parachute-like form of its extended fins, it is supported during a short time; but it soon falls into the water, and, like other projectiles, declines more quickly when the angle at which it has risen has been greater than 40°: it falls by the laws of gravitation, and by no means stoops into the water, either for the purpose of wetting its wings, or for that of aërating the blood in its branchiæ."—L.*

Mr. Lay further remarks, that he never observed a Flying-fish to rise and sink in its flight as birds do, nor does he think that it possesses any such power: but from this statement that of Mr. Collie differs. In his notes Mr. Collie remarks, "After repeatedly observing the Flying-fish when skipping over the tops of the waves, I have no hesitation in asserting as a fact, that these fishes have the power of descending a little and rising up again in the air without touching any part of the surface of the sea; that they have the power of changing the direction of their course to either side without touching the water, but generally pursue their flight in a right line; that they fly in all

* The letter L. succeeding a passage between inverted commas, implies that such passage is quoted from the notes of Mr. Lay. To the quotations from Mr. Collie's notes a C. is affixed.

directions, against, with, and at different angles with, the waves and wind, but most frequently against both. I could never perceive them communicating an up-and-down motion to their pectoral fins, nor ever to go along without having them extended at nearly right angles with the body. When already on the wing, they seldom change entirely their original course, and their rising higher is never effected rapidly, but gradually, and to a small height."—C.

Subsequent observations induced Mr. Lay to make the following remarks on the same subject:—"Perhaps it would be more consistent with the analogy of the well-known method of progression imparted to fishes, to assume that the momentum with which the *Exocoetus* emerges from the water is adequate to effect its demonstration of force, without recurring to the supposed impulse which it may receive by the reacting of the water against its pectoral fins. I always observed them to be most numerous when the sea was chafed by a brisk gale: for by rising upon the pitch of a wave, they were enabled to spring as it were from an eminence, and when proceeding in the direction of the wind, they were doubtless assisted by a sort of *vis a tergo*, derived from the motion of the sea. The rising and dipping of the Flying-fish, when it is not influenced by the ridging of the sea, are effected by a kind of diagonal force, compounded of the action of the wind, and the tendency of gravitation, variously modified by the acquired velocity of the fish, and its efforts to elevate and depress its head.

"I have often seen it, when moving nearly against the wind, exercise a power of accommodation, and, if I may use the term on this occasion, a certain faculty of humouring and applying the antagonist forces resulting from its own weight and the sweep of the atmospheric current.

"These observations will always be made intelligible by accounting for the motion of a ship when sailing within six points of the wind, and by remembering that if, by a slight obliquity, an umbrella when held against the wind is allowed to fill, the first effort that it makes to obey the force impressed upon it, is to escape in the very direction in which the wind is blowing. This we know is owing to its concave form, which by retaining the wind receives an impulse diffused over the whole of its inferior surface. The fins of the Flying-fish, when expanded, are not exactly parallel to the horizon, but, in virtue of their sloping position, share somewhat in the nature of the umbrella and the bellying sail."—L.

"From the small number of insects over the water in the Atlantic Ocean, I should not think it probable," Mr. Collie remarks, "that these fishes seek their food out of the water; nor does it appear likely that they are gifted with their so extraordinary power solely to enable them to escape from the rapacious Bonito."—C.

The rapacious Bonito itself, *Scomber Pelamys*, L., was observed shortly after the appearance of its favourite prey. An individual, which did not die for some minutes after it had been brought on board, exhibited "very brilliant colours, and changed their tints a little from time to time; but these seemed to be more various and more frequently changed than they really were, on account of the spectator viewing its surface from different positions, whence every varying angle of the incident and reflected rays of light occasioned a varied tint of the bright colouring. About five minutes after it

had been taken out of the water, an incision was made through the parietes of the *abdomen*, and into the ventricle of the heart, where the bulb of a thermometer was inserted, and the belly closed up: the temperature was 86°. The thermometer being placed among the *viscera* of the *abdomen*, indicated the same temperature; placed deep in an incision made into the muscular part of the back, the quicksilver rose to 88°; in another part it stood at 87°. The mean temperature of the surface of the sea on the same day was 82°.—C. The anatomy of this species was carefully examined, especially as regarded the structure of its intestinal canal.

In nearly the same latitude, 6° N., a specimen of the Sucking-fish was obtained. The form of the individual, as represented in a drawing by Mr. Smyth, is evidently that of the *Echeneis Remora*, L., and we do not hesitate to refer it to that species, although the number of pairs of *laminae* in its sucker are figured as only ten. But on such a point, in a figure by a young artist, we do not venture to propose a new species: he probably was not aware of the importance of precision as to numbers, and may have contented himself with the production of effect: the number of the rays represented in the dorsal and anal fins, (fifteen in the former, and thirteen in the latter,) are also probably deficient; and that of the rays of the pectoral, only eight, is certainly so. But there is no mistaking the comparatively shortened form of the fish, and its general characters of fin, including the forking of the caudal. Its colours, as represented in the drawing, are dull dusky brown above and below, separated longitudinally on the sides and cheeks by light blue; the fins are yellowish at the base, terminated by dusky brown.

In the harbour of Rio Janeiro we find mention of the occurrence of a species of *Trigla*. A single specimen of the *Hemirhamphus Brasiliensis*, Cuv., was obtained from the gullet of a booby (*Pelecanus Sula*, L.), and another, unnamed, was observed in the Cabinet of Natural History. A species of *Diodon*, L., and one of *Tetrodon*, L., were also seen. On the latter Mr. Collie remarks, "The air with which this last genus distends its belly not only erects the spines of its under surface, but also overturns the fish itself. If so, the armed region is in many species turned away from such fishes as might attack them, for the quantity of air must make them float on the surface with their comparatively smooth back downwards; while at the same time the belly attracts by its whiteness, and is exposed to the headlong darting down of the *Pelecanus Sula*, several species of *Larus*, *Sterna*, &c."—C.

The journals of the navigators contain no further mention of fishes observed until the arrival of the vessel at the Bay of Concepcion, where a *Callorhynchus* occurred, which differs, according to a drawing of it preserved by Mr. Smyth, from the species previously known. At Gambier Islands, several fishes were observed, designated by Mr. Collie as the *Perca* (*Chatodon*) *vittata?*, *Perca maculata?*, another *Perca*, and a *Labrus*. On the fishes thus designated, the loss of the drawings, and the insufficiency of the notes, prevent us from offering any remarks. Mr. Lay was especially delighted with the beauty of the fishes seen in this locality. He remarks in his journal, "The bottom of a large volcanic hollow, which forms a kind of bay in the middle of this group, afforded through the translucent water a spectacle of passing beauty: for besides divers kinds of playful

Medusæ, gemmed with various dies of refracted light, one might behold submarine groves of madreporæ, peopled with fish of a most lovely choice and brilliancy of colour, which in waving morrice were seen disporting among their branches."—L.

At Bow Island a large species of *Scomber* was obtained, of which we have no drawing or description. Here the *Echeneis Neucrates*, L., was figured by Mr. Smyth, who gives to it a dusky blue colour above, dusky white beneath, the sides with a rather broad light blue streak, above and below which is a narrow brownish streak.

At Tabiti the *Holacanthus Imperator*, Lacép., is noticed as having occurred; and a specimen of the *Aulostoma Chinensis*, Lacép., from the same locality, was preserved by Lieut. Belcher. At Oahu, however, many species were observed. Mr. Collie here continued his experiments on the *Exocæti*, and extended his anatomical observations to a fish which "is kept and reared in the Taro ponds, and esteemed very highly by the natives, especially the belly part, soaked in salt and water, and eaten raw." Its native name is Ava, and it seems to be nearly allied to, if not identical with, the *Butirius glosodonta*, Cuv. Mr. Lay's list at this place is very extensive. Among the fishes included in it are three species of Mullet, named by the natives Moano, Wickeæ, and Tumu: the former is evidently the *Upeneus tri-fasciatus*, Cuv. and Val., of which the only particulars mentioned in addition to those previously known are, that "the pectoral fins are yellow, and the iris vermilion"—L.: the Wickeæ appears to differ from all those described by M. Cuvier, but the notes before us are not sufficiently detailed to enable us to do more than indicate it as a new species of *Upeneus*, with "the back reddish green, a yellow longitudinal stripe, and the belly reddish-white; the iris is gilded, and the membrane red"—L.: the Tumu apparently resembles the last; "its colour is vermilion, lighter beneath, and its lateral line is flagelliform."—L. A species of *Polynemus*, L., probably the *Pol. plebeius*, Brouss., is known to the natives by the name of Moi, a name singularly resembling that of Emoi, by which the species is distinguished, according to Sir Joseph Banks, at Tahiti. A *Gasterosteus*, designated as Ūrua, is almost unquestionably new to science: "in front of its dorsal fin are four separate spines, the anterior of which is the largest, and placed at a greater distance than the others from the succeeding one; the tail is carinated laterally; the caudal fin is large and forked; the pectoral fins are long; there are two spines in front of the anal fin; the anterior rays of the dorsal fin are more than three times the height of the succeeding ones; the back is ash-coloured, and the belly white."—L. A *Chrysophris?*, Cuv., known to the natives by the name of Reni, is mentioned. A species of *Chatodon*, perhaps the *Chat. Meyeri*, Bl., is described under the native name of Titatapu; and two fishes are doubtfully referred, by the names of Araihi and Uü, to the genus *Pomacanthus*, Lacép.; while an allied (?) species is spoken of as the Aroiroi. The Ahorehola is probably a species of *Pimelepterus*, Lacép. There are no less than five species of *Acanthurus*, Bl., mentioned. Of these the Torekorea and the Pirani resemble by their colours the *Ac. nigricans*, Bl.; the Nainai, probably a new species, is described as "brownish black, with a margined oblong spot running parallel with the back from the eye."—L. The Pakukui, also apparently a new species, is "black, with a red and blue line at the base of the dorsal and anal fins;

the caudal spot including the spine, red, and the caudal fin crossed by bars of red, white and black."—L. The fifth is evidently the *Ac. triostegus*, Schn.; it is described as having "the head of an ash-brown colour, the sides ash, the back light-green, the belly white, as are also the breast and chin; it is crossed by four transverse curved bands of brown, and has an oblique stroke of the same colour on each side of the head."—L. Among the species of the Linnean genus *Labrus* which are mentioned, we find several that appear to be new. Of these two are probably referable to the genus *Labrus* as restricted by M. Cuvier. These are *Lipoa*, "red brown, with curved lines of clouded blue spots, and the head marked with marbled lines of blue; tail forked"—L.; and the *Upureraori*, "with the head between the eyes green, its sides with undulating lines of blue; the body brownish red, with wavy transverse lines of blue; the caudal fin yellowish towards the end."—L. To *Julis*, Cuv., the following may be referred with some degree of certainty: *Hinaleluwahine*, of a "dilute blue, with wavy transverse lines of red (a wave in each scale); head dilute red"—L.; *Akidolo*, "purple, with margined longitudinal lines of marbled red"—L.; an unnamed species allied to *Julis Gaimard*, Quoy and Gaim., by the "length of the first ray of its dorsal fin, which is twice as great as that of the succeeding rays;" but differing remarkably in its colours, "the body being olive-green, chequered with red-brown lines, and dabbled with spots of greenish white; the chin is marked with large white spots; and its head is elevated in the same manner as that of the *Coris Ayyula*, Lacép."—L.; *Uhumaoli*, which appears to be the *Julis arillaris*, Q. and G., described as having "the head depressed between the eyes; the belly red, and the back of a darker colour; a bright yellow spot above each pectoral fin; and blue ocelli near the tail"—L.; and the *Palemo*, apparently allied to the *Julis balteatus*, Q. and G., in which "the head is green, with marbled lines of blue, depressed between the eyes; back dark purple, belly lighter; a broad orange *vitta* margined with blue on each side of the body, commencing at the pectoral fin; a bridle of purple under the chin; caudal fin, orange; a sharp tooth at each corner of the mouth."—L. Of the *Lanihi*, *Julis bifer*, n., a specimen was preserved, which is described and figured in a succeeding part of the volume. There was also observed a *Gomphosus*, apparently the *Gomph. caruleus*, Lacép. Of two species of *Scarus*, L., one, known to the natives by the name of *Oaaa*, has "the back and upper parts purple, and the under parts red"—L.; the second, *Aoawela*, has "the crown of the head blue, and its sides and under part marked with undulating lines of the same colour; the *operculum* is red; and the body and fins are blue, each scale having a lunate spot of brown;" the connate teeth, or tessellated bony jaws, are said to have "two projecting teeth on the upper, and one on the lower"—L.; thus offering apparently an approach to the still more decomposed form in which these singular teeth occur in the genus *Calliodon*, Cuv. The only other Acanthopterygian fish mentioned in Mr. Lay's notes is the *Nunu*, a species of *Fistularia*, L., about two feet in length. The Malacopterygian fishes are much inferior in number. They include only five species. One of these is a *Hemirhamphus*, Cuv., from a portion of which, preserved by Mr. Lay, sufficient characters have been obtained to indicate it as a distinct race. The others are all referable to the family

of Eels; but they are too indistinctly described to admit of their accurate determination: two of them are *Anguilla*, Thunb., that termed Pohioha, being pale ash-coloured, and the Oilo, being of a dark ash: of the remaining two, which are referable to the genus *Muraena*, Thunb., one has "the snout depressed, and the crown of the head elevated; the body variegated with brown; the anterior teeth acute, and the posterior rounded"—L.; the other, named Puhinanaë, is said, "when pursued, to conceal its tail in a crevice of the coral rocks, where it defends itself with great fierceness, inflicting severe wounds with its sharp recurved teeth."—L. Of the anatomy of a species of *Tetrodon*, L., which was "brown, spotted with white, and fenced with small bony obtuse spines"—L., the following particulars are given: "The kidneys are large, resembling lungs in their situation, and liver in their structure; they are plentifully supplied with blood, by large branches from arteries which pass through them and unite just below. On dissecting off the sound, which is placed upon the kidneys, a number of vesicles were observed attaching the sound to these organs. The connecting vesicles resemble the lungs of birds, and were probably the parts which led Dr. Garden into the mistake of ascribing to these parts the function of lungs, and into the consequent error of referring the fishes in which they were detected to the Linnean order *Nantes*. Analogy suggests that the office to which they are applied in the animal economy, is the secretion of air from the blood. The liver has one principal lobe, of an oblong form, large, of a yellow colour above, and deep green beneath; the hepatic ducts unite near the centre into one, by which the bile is conveyed to the intestine; and at the point of union of the ducts is suspended, by a tube one-third of an inch in length, the globular gall-bladder: in other words, the hepatic duct divides into two branches, one of which terminates in the alimentary canal, and the other in the gall-bladder. The intestines are large."—L. Two species of *Monacanthus*, Cuv., were observed, one of which, the Oiicho, was "gilded brown, with pale-brown fins, the edge alone of the caudal fin being pale-brown: it was furnished with a swimming bladder; had large male organs of generation; and a long intestinal canal, in which the stomach appeared merely as an enlargement of the intestine."—L. The other *Monacanthus*, designated as Owioi, is a new species, of which a specimen was brought home: it is described on a subsequent page, and a figure accompanies the description. There were also brought home, from the same locality, the head, fins, and tail of the *Zygæna Tudes*, Val.

On leaving Oahu, the course of the vessel was northwards; and while sailing, but few fishes were met with. Among them was a small *Exocetus*, regarded by Mr. Collie as distinct from those of the Atlantic Ocean, principally on account of a broad translucent band in its pectoral fins; but it is probable that it was merely the young of the *Ex. mesogaster*, Bl. At the time when this fish was found on board, an extensive shoal of small Bonitos were around the ship. A few days subsequently was obtained a fish designated as an Albicore, the falciform pectoral fins of which extended to opposite the anal fin; on this account it may very probably be referred to the genus *Orcynus*, Cuv. "The upper edge of this fin, which is about a line in thickness, corresponds, when it is lying along the side, to a similar rise above it in the side of the fish, so that there is a

uniform surface without any interruption. Its air-bladder tapered towards the *anus*, and enlarged towards the *thorax*, terminating anteriorly in a rounded bifid extremity, rising up on each side of the vertebral column, and reaching to within $2\frac{3}{4}$ inches of the back. No other part of the air-bladder was within 3 inches of the back. The anterior part of the air-bladder, opposite to the ventral fins, was 3 inches distant from the lower part of the belly. The air-bladder contained about seven cubic inches of air. The depth of the fish at the ventral fins was 8 inches."—C.

At Avatscha Bay, in Kamtschatka, many species of fishes were obtained, for the notes respecting which we are chiefly indebted to Mr. Collie. They included several new species of the Acanthopterygian family à joues cuirassées of M. Cuvier, of which specimens were preserved; these were the *Cottus ventralis* and the *Cott. claviger*, Cuv. and Val., the *Aspidophorus 4-cornis*, Eor., and the *Peropus bilobus*, (*Blepsias bilobus*, Cuv. and Val.) Specimens were also preserved of the *Cottus diceraus*, Pall., and of the *Gasterosteus obolaris*, Cuv. and Val. Mr. Collie's notes refer to two other fishes of this family, which we have not possessed an opportunity of examining. One of these is apparently a *Cottus*: "its head was flat and broad, with a wide groove along the middle; it had two spines before the eyes, directed upwards; the eyes were nearly perpendicular; there were two spines on the (margin of the?) *præoperculum*, and two on the *operculum*, interiorly and posteriorly. D. 8, 15. A. 12, with three transverse black bands. V. 3, placed under the pectorals, and not extending to the vent. Pectoral fins large, extending as far back as the *anus*, and to opposite the fourth or fifth ray of the second dorsal. *Abdomen* ventricose. Colours, grey and black marbled: *iris* silvery, crossed by a longitudinal band. Mouth large. Stomach a large bag, in which was contained a small fish. *Caca* seven. Intestinal tube of three convolutions. Liver of a clay colour, tinged with yellow. No air-bladder."—C. The other may have been an *Aspidophorus*: "Snout long; *operculum* posteriorly acutely angled, without teeth; teeth on the lower mandible and intermaxillaries (*vomer* smooth?). Scales small. Lateral lines, two on each side, tuberculated. Dorsal fin in the middle, short. Ventrals under the pectorals, reaching half-way to the *anus*. Pectorals reaching about half-way between the extremity of the ventrals and the *anus*. Caudal fin rounded, of twelve rays, separated by some interval from the dorsal and anal. Colour brownish, with pale spots. No air-bladder. Stomach a bag. *Caca* eleven. Intestines of three convolutions."—C. Both of these were caught in the seine, and were of small size.

The remaining fishes observed at Avatscha Bay were Malacopterygian. Of these four are species of the genus *Salmo*, L., two of which are indicated as the *Salmo Eperlanus*, and *Salmo Trutta*, but which it would of course be impossible to identify with those species, unless on a careful comparison of specimens: the other two, unnamed, are thus briefly described: "*Salmo*, above bluish, beneath whitish, without spots; teeth in the upper jaw short and distant, none on the palate, a few on the tongue. A thick-bellied fish, from one to two feet long, and rather pale." "*Salmo*, above dark blue, whitish beneath, spotted with grey; teeth numerous. Varying in length from nine inches to two feet."—C. The latter was the most abundant in the bay, and several hundred pounds' weight of them were

caught during the short stay of the Blossom: the former was also numerous. A species of *Clupea*, of small size, with the *abdomen* ventricose, was also pretty abundant: it is noticed as the *Clup. Harengus?* Many individuals were also caught in the nets, of a species of "*Gadus*, L., resembling the Whiting, and having a pale smooth lateral line extending from the posterior part of the gills, and passing half-way between the pectoral and dorsal fins to a little beyond the anterior part of the second dorsal."—C. The anatomy of this fish, so far as it was examined by Mr. Collie, resembled that of the common Cod; its stomach contained shrimps. Four species of *Pleuronectes*, L., were also caught: the *Pl. Hippoglossus?*, of which only one young individual was seen; a second, apparently allied to the *Pleur. Platessa*, L., having "a spinous line extending from the posterior part of the eyes to the hinder and upper part of the operculum, the remainder of the head being smooth"—C.: a third, noticed as a variety of the last, but having the "head covered with rough slightly projecting tubercles"—C.; of these a considerable number were caught in a small bay at the inner part of the entrance of Avatscha Bay: and the *Platessa stellata*, Cuv., (*Pleur. stellatus*, Pall.) the scattered scales of which are described as "subpentagonal, set round with short blunt small teeth"—C.: the only particular in which Mr. Collie's short description differs from that of Tilesius, is in the statement that "the stomach is thin and membranous; it contained small fishes in a half-digested state"—C.; large quantities of it were caught at the inner part of the entrance of the bay; the natives threw them away when taken in their nets, but the voyagers found them tolerably good eating.

A specimen of the *Balistes rectangulus*, Schn., (*Baliste écharpe*, Lacép.,) brought home by the expedition, is ticketed, but probably erroneously, as having been obtained in Avatscha Bay.

Off St. Lawrence Island was caught in the dredge a fish apparently allied to the genus *Liparis*, Art. It had the "ventral fins placed before the pectorals, but united and continuous with them; a flat, raised, and rough tubercle, of nearly the diameter of an English sixpence, was seated forwards between the pectorals, its anterior part reaching as far as the ventrals; this may be of use in copulation: its *cæca* were pretty numerous."—C. The roughness of this tubercle renders it difficult to refer the fish to any known species; but it is probably nearly related to the *Cyclopterus gelatinosus*, Pall., a *Liparis* which is known to inhabit the seas in which this was obtained. The existence of *cæca* removes it from *Lepadogaster*, Gouan.

Kotzebue Sound afforded a specimen of a new species of *Ophidium*, L., the *Oph. Stigma*.

On the coast of California, a little to the northwards of the harbour of San Francisco, an *Orthogoriscus* was met with, apparently the *Orth. Mola*, Bl. They swam about the ship with the dorsal fin frequently elevated above the surface.

At Macao a species of *Tetrodon*, L., evidently new to science, was described both by Mr. Collie and by Mr. Lay:—"The middle of the lateral surface, the head, and towards the tail, are smooth: the back and belly are spinous, the spines of the latter part being longer than those of the back, but slender: the dorsal spines are confined to

the space circumscribed by the nostrils, eyes, upper part of the pectoral, and anterior part of the dorsal fins. Its under surface is white. It is marked across the back by broad brown stripes, ('the anterior directed towards the head, some forked, ending in a blot, the last in front of the dorsal fin passing to the base of the caudal'—L.) the two posterior bent and continued laterally to the tail: there is one black *macula* under the extremity of the pectoral fin as it lies quiescent by the side. The *iris* is silvery, with a reddish gold line above and below, at its junction with the sclerotic coat. The lips and head are beautifully vascular, and the numerous *anastomoses* are distinctly seen. ('The dorsal and caudal fins are also tinged with blood'—L.) There is a loose and flabby bridge across each nostril, ('the nasal apertures are contiguous, and form an obtuse angle with the eye and the corner of the mouth.'—L.) A straw-green tinge exists on the posterior part of the back. It was caught in the seine in the Typa, on a muddy bottom." The following anatomical remarks were made:—"A strong circular muscle lies at the posterior part of the *fauces*, and its centre opens immediately behind into the large air cavity which is filled when the fish blows itself up. At the posterior part of this cavity is situated the entrance to the *æso-phagus*; above it (the fish being regarded as resting on its belly) is placed the heart, immediately behind the circular muscle or *sphincter*; superior and posterior to it are the abdominal *viscera*. The membrane which forms the cavity and contains the air is very fine. The gills are close to the anterior part of the *sphincter*, and the air expelled from the abdominal cavity and issuing out at the gills, occasions the peculiar sound which these fishes are often heard to emit. On the air contained in the air-bladder, lime-water had no action; phosphorus absorbed 0.0625; and the remainder was not in the least inflamed on bringing a lighted taper to its surface, nor did it support combustion: 10,000 parts consequently contained 625 of oxygen, and 9,375 of nitrogen."—C.

In the same locality were obtained two fishes, apparently of the Sciænoïd family. "The air-bladder was conical, pearly, the pearly substance placed between the membrane forming the *peritoneum* and that forming the air-bladder. Its sides were fringed with beautiful pearly branching processes, which lie upon the *parietes*, and are raised attached to the lining *peritoneum* when it is separated from the muscles at that part." The fish, the air-bladder of which is thus described, was probably the *Umbrina Russelii*, Cuv.; its "snout was obtuse; the upper intermaxillary extensile and pendent; a solitary fleshy *cirrus* hung down from the chin; its *cæca* were pretty numerous:" the dorsal fin, it is true, is said to have been single, but that organ is in reality not so deeply divided as to form distinctly two fins. The other species, the air-bladder of which resembled precisely that just described, had "a single dorsal fin; a rounded caudal; a strong spine in front of the anal; the upper maxillary less extensile; and was marked by a line of light brown spots at the root of the dorsal fin."—C. There were also obtained two species of *Pleuronectidæ*; one a *Plagusia*, Cuv., "dark clay-coloured, with tuberculated lines on the head"—C., "and three lateral lines"—L.: the second was perhaps the *Rhombus maculosus*, Cuv.

During the stay of the Blossom among the Loo-Choo Islands, about twenty species of

fishes were observed. Among these were a species of *Lates*, Cuv.?²; two species of *Serranus*, Cuv.; the Moe-buen, allied to *Serr. Merra*, Cuv. and Val., "spotted with dark brown, rounded, or slightly angular patches, and having the interstices white;" and the Akasha, evidently nearly related to the *Serr. marginalis* and *oceanicus*, Cuv. and Val.; its colour is described as "reddish-brown, the upper part being marked with lighter bands; the tip of the dorsal spines is white, and the membrane margined with black; the membrane of the ventral fins is attached to the *abdomen*; the orbit is margined with a black circle, and the upper eyelid can cover one-half of the eye"—C.; "the *operculum* and *præoperculum* are greenish brown"—L. Mr. Collie remarks, that "the air-bladder is obtuse, bilobed, not reaching so far back as the vent; the *cæca* are numerous; the intestine convoluted; and the stomach firm."—C. A *Holocentrum*, Cuv., apparently the *Hol. orientale*, Cuv. and Val., was also observed; it was "coloured with numerous crimson bands passing longitudinally, with smaller whitish bands between them, each passing gradually into the other."—C. A species of *Glyphisodon*, Lacép., which it is impossible to distinguish among the closely approximating races found in the Indian seas, by the brief description preserved of it, was of "a light green, with three broad transverse bands of a very dark greenish brown on the body, and one on the tail: its air-bladder was of moderate size."—C. There was also obtained a *Lethrinus*, Cuv., "of a silvery colour, with darker greenish yellow longitudinal bands along the junction of the rows of scales towards the back." Both the species of *Scombridae* seen appear to be new; one of them, termed Sara, is a well-marked *Cybium*, Cuv., distinguished by its elongated form, and the lowness and length of its first dorsal fin; the second, Kattoo, may perhaps be the type of a new genus: it has "teeth small, round, and pointed. It is a compressed fish, 20 inches in length, and six in height from belly to back; the spread of its forked tail is five inches. The skin resembles that of the Sara as regards its scaliness, but is of a lighter colour. There are fourteen spines in the first dorsal fin; eight distinct pinnules behind the second dorsal, and seven behind the anal fin. There are small teeth on the palate and on the *vomer*?, as in the Sara."—C.

A fish which particularly attracted the notice of the voyagers on account of its exceeding beauty, and to which they, for want of better information, applied the name of *Chromis*, appears to have been the *Macropodus viridi-auratus*, Lacép. It agrees well with so many of the characters of that fish as are given by M. Lacépède, although the slight sketch of it preserved by Mr. Collie bears little resemblance to that published in the *Histoire Naturelle des Poissons*: the latter, however, seems to have been taken from a Chinese drawing, and may very possibly be erroneous as to the length and height of its dorsal and anal fins, and other particulars. It was "compressed, and scaly over the whole of the head and body. All the fins, except the pectoral, terminated in a filament; the ventral fins were connected at their inner margin with the *abdomen*, and consisted of five rays, the second of which was filiform and jointed; the caudal fin was forked, each fork terminated by a long filament, the membrane yellowish-brown, and the rays crossed with dark brown and white. The intermaxillaries were extensile and tubular, and each was furnished with a row of fine teeth. The *operculum* was jointed;

its upper and posterior portions were united over the gills to the side for a more than usual extent: the posterior jointed part is marked with a bluish spot, and its margin is tipped with reddish yellow. The scales are greenish and gold; and the body is marked with bluish transverse bands. Its length from the snout to the root of the caudal fin was two inches; from the root of the caudal fin to the tip of its filament, one inch and three quarters; the depth of the fish three quarters of an inch. It possessed an air-bladder, and had two(?) *caca*."—C. Mr. Lay describes the colours differently, perhaps from a dead specimen: "blackish brown, with transverse bands of dilute black: gill-lid with a black spot, margin red: tail brown, joints of the rays black."—L.

A specimen of a species of *Salarias*, Cuv.?, "was found in a dead shell without water, where, from the state of the tide, it must have been dry for three or four hours. It was, however, quite lively, and jumped about. Even after it was brought on board, it frequently leaped out of the basin in which it was kept in water, on being touched or disturbed"—C.; an activity which strongly recalls that of a probably allied species, the *Sal. saliens*, Cuv., described by Lacépède after Commerson. Of a fish constituting a new species of a genus not far removed from the preceding, *Eleotris*, Cuv., Mr. Collie has preserved a sketch, and notes, which will hereafter be referred to.

Of the Labroid family several fishes were observed. One of these was a true *Labrus*, Cuv.; six were referable to the genus *Julis*, Cuv.; and one to *Gomphosus*, Lacép. Drawings of two of the *Julides* were preserved; both of these appear to be new, and we have accordingly described them as the *Julis lutescens*, and the *Julis pœcila*. Of the other *Julides*, one is described as having the "general ground-colour green; a black stripe passes along the back, with cross bands of black down to the lateral line, which is a light crimson stripe; broad stripes of red, and narrower of green, converge irregularly to the orbit; spines of the dorsal fin eight"—C.: this may perhaps be identical with the *Sparus Hardwicke* of Mr. J. W. Bennett's Fishes of Ceylon: the second has the "body above dark olive, with a few irregular bands of apple-green; the dark olive is succeeded, in passing downwards towards the belly, by yellowish green; beneath, cinereous; ventral fins, greenish gold; dorsal fin, dark and yellowish green, with eight spines; the iris is greenish, margined with reddish gold"—C.: the third species is marked with "longitudinal bands of green and purple; the dorsal and anal fins are banded first with a purple, then an orange, and then two crimson bands, a bluish line separating each band; the caudal fin is slightly rounded, with a reddish band parallel to and near the hinder margin, with others proceeding from it and going irregularly forwards to the base"—C.: the fourth *Julis?* has the general characters and anatomy of the *Labridæ*, and is without scales on the head; but it is "a long rounded fish, and has fine teeth paved behind the incisors; the dorsal fin is uniform, beginning a little posterior to the pectorals, which are on the same vertical plane with the ventrals; the anal fin is uniform; the caudal rounded; the body is dark olive green above, with lighter greenish spots, and greenish-rufous beneath, with whey-white squares; the lower part of the head is zigzagged white and rufous; and the *irides* are reddish golden: the teeth of the lower jaw are unequal"—C. The *Gomphosus* is an elegant and apparently a new species: "the lower part of the snout,

face, breast, and belly to the anal fin, are of a deep carnation colour; posteriorly the body is coloured with light green and vertically oblong spots of brown; still more posteriorly, and above, it is dark olive green; a broad band vertically margins the straight caudal fin, on the base of which scales encroach; and lines converge to the margin of the orbit beneath."—C.

The other fishes observed at Loo-Choo were a new species of *Scarus*, L., a variety? of the *Exocætus volitans*, L., in which the pectoral fins, brown and dirty yellow spotted, did not reach the caudal; this was taken in nets by the natives, and most probably used only as bait for Dolphins: a *Tetrodon*, L., "white beneath, with the back of a light slate ground, tinged with green and yellow, with darker patches, and spotted irregularly and variously with white; iris silvery, above and below golden, abdominal spines obsolete"—C.: and the *Balistes aculeatus*, L.

At the Bonin Islands but few fishes were observed: they included a *Dentex*, Cuv., a *Glyphisodon*, Cuv., a *Pimelepterus*, Lacép., a *Xirichthys*, Cuv.?, and a fish referred to the *Gymnodontes*, Cuv. The latter presents a remarkable form. It is "a somewhat triangular fish, the pelvic bones projecting backwards, and keeping the lateral parts of the abdomen extended; about two feet in length, and having the dorsal (the second if two) and the anal fins falciform; the spines are short: above it is dark grey, spotted with a very dark brown, lighter on each side of the dorsal fin, and whitish beneath; a lateral silvery white band, somewhat irregular on its edges, extends on a level with the pectoral fins from the mouth to the tail: the air-bladder is strong and simple; there are two large milts, and portions of crustaceous animals were found in the stomach."—C. The *Dentex* possessed "four hooked teeth in the upper jaw, and two in the lower, the latter so placed as to be on the outside of the four upper when the jaws are closed, and having two smaller intermediate teeth: the colour is greyish silvery, with somewhat indistinct yellowish silvery longitudinal bands below the lateral line: all the fins are inclined to red; the dorsal has ten, and the anal three, spines: the upper jaw is extensile: the stomach is en cul de sac; there are three short *cæca*; the *testes* are unequal, obtuse and joined before the *anus*, of a reddish colour; the air-bladder is large and simple; there are two eminences set with pharyngeal teeth, their crowns being flattish and rounded; the lower pharyngeal teeth are indistinct."—C.

On the coast of California, at Monterey, Mr. Collie's notes mention the occurrence of a species of *Sparus*, of two *Scombri*, and of a *Clupea*. The first of the *Scombridæ* is apparently a *Scomber*, Cuv.; it was "smaller than the Mackarel; it was marked on the back with cross waved narrow bands of black and greenish blue; its first dorsal fin had nine spines, and there were four small pinnules behind the second dorsal and the anal: it had a simple air-bladder of moderate size, and an immense number of *cæca*, with a stomach extending the whole length of the abdomen, narrow, tapering to the posterior part, and covered throughout nearly its whole length with the milt.? Its internal membrane forms longitudinal folds; the intestines have three convolutions."—C. This fish occurred in shoals. The second species was met with but once. It is a *Caranx*, Cuv., of which "the teeth in the upper maxillary are scarcely to be felt: the pectorals reach nearly to

opposite the *anus*: a double narrow stripe of deeper blue than the general surface runs backwards on each side of the first dorsal fin to opposite its termination, the two parts being separated by a broad line of dirty white, which has a narrow dark-coloured line along its middle: there are no distinct divisions in the anal and second dorsal fins: the air-bladder is simple, and small, and extends from the *fauces* to the *anus*; the stomach is much shorter than in the preceding species; the *cæca*, although numerous, are less so than in it; and the intestine is folded in the same manner."—C. From the nature of the colouring of this fish as described by Mr. Collie, there can be little doubt of its constituting a distinct species. Along with the first species of *Scomber*, there occurred in shoals a small species of *Clupea*, L., "without teeth; with the dorsal fin a little before the ventral; and with the back dark greenish blue, and having one line and part of another of rounded black spots on each side nearly on a level with the eye: the gill membranes contain six rays, and overlap each other at their lower part; the stomach resembles that of the first *Scomber*; it has also numerous *cæca*; the air-bladder is small and tapering."—C. The other fishes observed at Monterey were a new species of *Chimæra*, Cuv., differing essentially from the *Chimæra* of the Atlantic, and approaching somewhat in the position of its second dorsal fin to the *Callorhynchus*, Cuv.; a species of *Torpedo*, Dum.; and a *Raia*.

At San Blas and Mazatlan several fishes were observed. The first of these is a species of *Serranus*, allied to the *Serr. guttatus*, Cuv. and Val., but apparently constituting a new species: it was "of a dull greyish green beneath, and brownish green above, thickly spotted with dark brown and rounded spots about a line and a line and a half in diameter: it had several *cæca*: the air-bladder was strong anteriorly, and bound down by tendinous attachments to the sides of the *abdomen*, without prolongations forwards, or any appearance of an aperture; posteriorly, the cavity was bifid."—C. There was also observed a species of *Lutjanus*?, "above greenish silvery brown, with darker cross bands; beneath white, with a tinge of gold towards the sides: fins golden, except the anterior part of the dorsal, which is inclined to brown: *cæca* five: air-bladder simple and capacious."—C. There was also seen a *Polynemus*, L., which appears from Mr. Collie's notes, and from a sketch preserved by him, to represent a new species, to which we have given the name of *Pol. approximans*. A *Dentex* was also seen; as were two species of *Caranx*, Cuv. In one of these the colour was "a uniform obscure yellowish green above, and somewhat silvery beneath"—C.: in the second, the "body was silvery, with a bluish colour towards the back, and banded on the upper part with a darker hue; the fins were all more or less golden, as was also the lateral line: both species possessed simple air-bladders."—C. Other fishes are mentioned, as a *Mugil*, a *Labrus*?, and an *Exocetus*, apparently allied to the *Ex. exiliens*, L., but having the "pectorals with large round brown spots. This appears to be the same species as is found at Oahu."—C. The "*Elops Saurus* was common at Mazatlan, but not of very agreeable taste"—C.: as was also "a large, long and roundish fish, bearing much resemblance in the general outline to the *Elops*, but about ten times as large. As in that fish, the maxillaries alone form the lateral parts of the upper jaw. There are no teeth

any where. The branchial rays are four, flattened. The dorsal fin is immediately anterior to the ventral: the pectorals are placed low: the caudal is deeply divided. All the fins are small in proportion to the size of the fish. It is peculiar in having four penniform appendages, two on each side, at the base of the caudal fin, one above, the other below, the lateral line, about an inch and a half asunder. These appendages do not stand out as a fin does when erected, but are closely applied to the surface of the fish, and are imbued with a quantity of mucus. The head is without scales. The scales of the body are very large. The *oesophagus* is longitudinally folded; externally smooth, and very red; internally, at the anterior part, the membrane forms spiral convolutions, bearing fleshy teeth; at the posterior part, the internal surface is formed into longitudinal ridges. The stomach is a dilatation of the general tube. The *cæca* are numerous. The intestinal tube is very long and variously convoluted, and is chiefly contained in a large cavity immediately behind the heart and before the air-bladder. The air-bladder is situated in the posterior part of the *abdomen*, and terminates abruptly anteriorly. The flesh of this fish is said to be well tasted."—C. The other fishes observed were a *Bagrus*, Cuv., which was "very common in the bay of San Blas, but seldom eaten:" a *Pleuronectes*, *Pleur. Rhombus?*, and a *Raia*, apparently the *Myliobatis Narinari*, Cuv.

At Acapulco only four species of fishes are mentioned by Mr. Collie. These are, a *Lutjanus*, a *Upeneus*, a *Pimelepterus*, and an *Orcynus*! The general colour of the *Lutjanus* is "pink; beneath, however, it is white and yellow. Beneath the lateral line, and parallel with it, are five stripes of yellow, alternating with five approaching to white but changeable. Above it similar but smaller stripes pass from it obliquely upwards and backwards."—C. The *Upeneus*, which was common, is apparently distinct from those previously described; its "*iris* is above and below silvery, and yellow in the middle, this being the commencement of a similarly coloured stripe that runs to the tail, being situated anteriorly below the lateral line, posteriorly crossing it obliquely, and on the tail being altogether above it: the general colour above this stripe is reddish, beneath it silvery white: the scales are finely serrated."—C. The *Pimelepterus* was also common: its general colour was "a uniform and dull silvery blue."—C. The *Orcynus*? had "falciform pectoral fins reaching opposite the anterior third of the anal: its length was sixteen inches and a half, and its depth seven: its general colour was greyish silvery, banded with a darker colour above, the fins and under parts being yellowish silvery. It was common, and afforded good eating."—C.

With the Bay of Coquimbo, on the coast of Chili, Mr. Collie's notes terminate, by referring to two fishes, one of which was a *Raia*, Cuv., the other a *Chimara* (*Callo-rhynchus?*). Some anatomical details respecting the latter are appended to the account given, in a subsequent page, of the *Chimara Colliei*.

ORDER ACANTHOPTERYGII.

FAM. POLYNEMIDÆ.

POLYNEMUS APPROXIMANS.

Polyn. griseus: radiis pectoralibus liberis sex; pinnis dorsalibus subapproximatis.

Hab. apud San Blas et Mazatlan.

A very slight sketch by Mr. Collie, and a brief description from his pen, furnish the only materials for the history of the present species. He states that "The general colour is greyish. The pectoral filaments are six in number, placed anteriorly to and beneath the pectoral fins. The first spine of the anterior dorsal fin is very short; that of the second dorsal longer: a moderate-sized one forms part of each ventral fin; and the anal is supported by three spines gradually surpassing each other in length, the anterior being very short." No mention is made of the number of fin-rays; nor of the comparative length of the free pectoral rays. From the sketch it appears that the two dorsal fins are more nearly approximated than is usual in the genus. The caudal fin is deeply forked.

Its length was about seven inches; its breadth, one.

The following anatomical observations were made by Mr. Collie: "Stomach, a sac. *Caca* numerous and small. Intestinal canal little more than a straight tube from the *pylorus* to the *anus*. Air-bladder wanting."

In the absence of an air-bladder the *Polyn. approximans* differs from every species of the genus observed by M. Cuvier, except the *Polyn. longifilis*, Cuv. (*Polyn. paradiseus* and *quinquarius*, Linn.) This deficiency, the number of free pectoral rays, the approximation of the dorsal fins, its comparatively sombre colour, and its habitat, furnish sufficient grounds for distinguishing it from every species hitherto described.

FAM. COTTIDÆ.

COTTUS DICERAUS. *Pall.*

Cott. corpore anticè lato; lineâ laterali incurvâ muricatâ; præoperculi spinâ elongatâ internè 6-8-spinosâ.
D. 7, 14. A. 11. C. 11. P. 17. V. $\frac{1}{3}$.

PLATE XV. FIG. 2.

Cottus diceraus. Pall., Nov. Act. Petrop. tom. 1. p. 354. tab. 10. fig. 7.

Cottus Stelleri. Schn., Blochii Syst. Ichth. p. 63.

Synanceia Cervus. Tilesius, Mém. de l'Acad. Imp. de Petersb. tom. 3. p. 278.
tab. 13. figg. 1-7.

Of this singular fish three original descriptions have already appeared; the earliest was by Pallas, the second by Tilesius, the third by MM. Cuvier and Valenciennes, the latter being given in the fourth volume of their "Histoire Naturelle des Poissons," page 191. After the figures which accompany the two former of these descriptions, (although these figures are somewhat distorted,) it would have been unnecessary again to represent it, had we not possessed the opportunity of giving it with its natural colours, as observed in a recent state. These agree well with the remark of Tilesius, "coloribus egregiè exornatus, scilicet brunneo, flavo, olivaceo et violaceo variegatus, et flavo alboque marmoratus est." Such, very nearly, are the colours preserved in Mr. Beechey's drawing. They are, however, much more brilliant than in a copy of Tilesius' plate, presented by him to the Linnean Society, which "anctor ipse ad naturam pinxit"—the colours there given being a slight clayey brown, marbled with yellowish white; the fins pale blue, with black spots, and mostly tipped with brownish red. Mr. Collie also, in whose notes a lengthened description of the fish is preserved, states its "colour above a dusky brown; beneath, a yellowish clay."—C.

In a specimen preserved in spirit, the blue and orange have entirely disappeared, and the yellow remains only on the fins, where it is indistinct. The colours are pale brown and black, with a patch of white in front of the dorsal fin. The ground colour is pale brown. The middle of the sides and the back are thickly marked with black spots of various sizes, which are occasionally so closely set as to give an appearance of bands crossing the sides: one of these occurs under the first dorsal; two under the second; and one near the caudal. The spots of the under parts of the sides are larger and more irregular in form, and somewhat clouded. The fins are spotted on the rays with fuscous, the anal more numerous than the dorsal; the caudal is darker at the tip, and has a darker band passing through the middle of its membrane; the pectoral is almost black at its base, transparent in the succeeding membrane, and darker towards the tip; it is spotted along the rays. The naked skin above and below the posterior suborbital bone is black.

Our figure is taken from a specimen brought home by Captain Belcher, R. N., and presented by him to the Museum of the Zoological Society: it is coloured from a drawing preserved by Mr. Beechey.

COTTUS CLAVIGER. *Cuv. & Val.*

Cott. corpore anticè lato; lineâ laterali incurvâ muricatâ; præoperculi spinâ elongatâ internè bispinosâ.
D. 7, 14. A. 11. C. 11. P. 16. V. 3.

PLATE XVI. FIGG. 1, 2.

Cottus claviger. *Cuv. & Val., Hist. Nat. des Poiss. tom. 4. p. 195. pl. 79. f. 2.*

Hab. in Avatscha Bay, Kamtschatka.

A specimen brought home by the expedition, and subsequently deposited in the British Museum, furnished to M. Valenciennes the materials for the description and figure published in the work above referred to. The description, except perhaps as regards the number of the fin-rays, is as correct as the bad state of the specimen would permit: but the figure is insufficient to give a satisfactory idea of the fish, which requires also to be represented as seen from above. When thus seen, it bears so great a resemblance to the *Cottus diceraus*, Pall., that we at first regarded it as the young of that species, from which it scarcely differs except in the somewhat greater distance interposed between the dorsal fins, and the existence of only two spines on the inner side of the long spine of the *præoperculum*. The former of these differences, owing to the imperfect condition of the specimen, may perhaps appear greater than it really is in nature; the second, however, is probably specific, since it is unlikely that with advancing age the number of spines on a bony process should increase from two to six or eight.

The body is throughout hispid; and the three whitish cutaneous flakes above the anal fin, which are noticed by M. Valenciennes, scarcely exceed in size the other hispidities of the skin.

There is no mention of this species in the notes of Mr. Collie.

COTTUS VENTRALIS. *Cuv. & Val.*

Cott. corpore gracili subæquali; lineâ laterali glabrâ; pinnis ventralibus elongatis.
D. 9, 13. A. 17. C. 11. P. 18. V. 3.

Cottus ventralis. *Cuv. & Val., Hist. Nat. des Poiss. tom. 4. p. 194. pl. 79. fig. 1.*

Hab. in Avatscha Bay, Kamtschatka.

This species was also described originally by M. Valenciennes, from a specimen brought home by the expedition, and now preserved in the British Museum. Mr. Collie's notes inform us that the "pectoral fins have four somewhat zig-zag brownish bands from oval spots upon the rays: the dorsal and caudal are spotted brown in rather irregular lines: the anal is uniform: the ventrals reach beyond the vent, and are each composed of three rays spotted with white. The spots are all oblong. There is a fleshy lappet behind the anus."—C.

These are the only particulars noticed by Mr. Collie, beyond those already recorded by MM. Cuvier and Valenciennes. It is stated that "two specimens were caught in the seine."—C.



1. *Sottus clausii* Cuv. & Val.
3. *Croptus luteus*.



1. *B. spidephorus quadrivertus*, Cuv & Val
2. *Tethus ducrosus*, Pall.

ASPIDOPHORUS QUADRICORNIS. *Cuv. & Val.*

Asp. corpore abbreviato, compresso, lineis tuberculorum utrinque quatuor; capite quadricorni; pinnis dorsalibus duabus distantibus, priore secundâ longiore.

PLATE XV. FIG. 1.

Asp. quadricornis. *Cuv. & Val., Hist. Nat. des Poiss. tom. 4. p. 221. pl. 80.*

Hab. in Avatscha Bay, Kamtschatka.

This species was described by M. Valenciennes, from a single specimen brought home by the expedition, and now deposited in the British Museum. His description, referred to above, is so satisfactory that it is unnecessary again to describe it. The bad state of the individual, however, especially about the head, has made it desirable to engrave a representation of the fish, made while it was recent, by Mr. Beechey. This has also the advantage of showing its natural colours, which are entirely lost in the specimen preserved in spirit.

Mr. Collie's notes on this species afford no particulars in addition to those which may be ascertained from the specimen and the drawing, except that "it is not numerous."—C.

GENUS PEROPUS.*

BLEPSIAS. *Cuv. & Val.*

Dentes velutini apud maxillas, vomerem, et ossa palatina. Radii membranæ branchiostegæ sex. Pinna dorsalis unica, profundè biloba. Corpus nudum, hispidum. Caput compressum.

The necessity for removing the species on which the present genus is founded from *Blepsias*, *Cuv. & Val.*, rests on the number of the rays of the branchiostegous membrane, which are here six instead of five; and on the bilobed, and not trilobed, form of the dorsal fin. Except in these particulars, the genera coincide almost perfectly. In both the form of the body is rather compressed and elongated; the head cavernous, and furnished with *cirri*, pendent from either jaw; the vertical fins much expanded; the ventrals very small; the surface devoid of scales, and covered either wholly or throughout its greater part with short, rather rigid, bristles; and the lateral line rough. Both inhabit the same locality, the extreme north of the Pacific Ocean.

PEROPUS BILOBUS.

Per. corpore toto hispido; pinnâ dorsali bilobâ.
B. 6. D. 7. A. 19. C. 13. P. 14. V. 1/2.

PLATE XVI. FIG. 3.

Blepsias bilobus. *Cuv. & Val., Hist. Nat. des Poiss. tom. 4. p. 379.*

Hab. in Avatscha Bay, Kamtschatka.

The *teeth* are small, and numerous on both jaws, on the *vomer*, and on the palatine bones. None are to be found on the tongue; but the branchial arches are furnished with them: in this latter situation they are short, angular, and flat. There are also pharyngeal teeth.

"The intermaxillary bones are shortly pedicelled."—C.

The *head* is compressed. There is a short spine over each nostril. The eyes are directed laterally; the upper part of the orbits rises above the level of the head; and the space between them is concave. From the upper part of each orbit passes backwards an irregular ridge, composed of

* Α πηρὸς mutilus, ποῦς pes.

three strong, disjoined tubercles. An almost parallel ridge, composed also of three tubercles, which are smaller and united together, passes backwards from the lower part of the orbit, and is succeeded by a tubercle on the shoulder, which commences the slightly tubercular lateral line. The *cirri*, vestiges of which remain in the specimen, are "fleshy, six pendent from the lower mandible, two upon the upper."—C. The *operculum* has two ridges, one of which passes to its angle; the other to the point beneath the angle of the *præoperculum*.

The body in height exceeds one-fourth of its length. "The belly is very ventricose."—C. It is covered throughout by a hispid skin, which is rough to the touch, and has no smooth space whatever.

The pectoral *fins* are large. The ventrals, attached under the commencement of the pectorals, are exceedingly short, but reach as far as the vent, which is placed very forward, under the middle of the anterior lobe of the dorsal fin. The dorsal fin is considerably expanded, and is so deeply divided as to give it almost the appearance of two distinct fins. The anal fin is somewhat more expanded than the dorsal; it commences considerably behind the vent. The caudal is large, and apparently nearly square at its extremity.

In the specimen preserved in spirit, the ground colour exhibits a tinge of red. Slight traces of brownish clouds appear on the side. The dorsal and anal fins are irregularly blotched with darker brown, the latter chiefly towards its margin, where the bands are somewhat oblique. The pectoral fin is so deeply coloured as to appear almost black, with a few paler spaces, and a bluish cast in the middle.

Of its colours when recent, no notice occurs in the notes of Mr. Collic, except that its "*iris* is bronzed."—C. The notes of that gentleman furnish, however, the following anatomical particulars:

"Air-bladder wanting.

"Stomach, a large membranous sac.

"*Cæca* several, ventricose.

"Liver of a light clay-colour.

"Intestinal canal short."

Mr. Collic also informs us that they were "not numerous." They were "caught in the seine."—C.

Only one specimen was preserved, which is now in the British Museum. Its length is nearly six inches. On this individual, which, although in spirit, is not in very good condition, was founded the *Blepsias bilobus* of MM. Cuvier and Valenciennes, by the latter of whom it was described on his visit to London in the spring of 1829. Our description and figure rest on the same specimen.

From the *Blepsias trilobus* the *Peropus bilobus* is readily distinguishable, not merely by its generic marks, but also by its greater breadth, and the universal roughness of its skin.

FAM. CHÆTODONTIDÆ.

CHÆTODON STRIGANGULUS. Sol. MSS.

Chæt. cærulescens; fasciâ oculari nigrâ flavo marginatâ; strigis corporis numerosis, transversis, in medio antrorsum angulatis.

D. $\frac{14}{15}$. *A.* $\frac{4}{15}$. *C.* 16. *P.* 16. *V.* $\frac{1}{2}$.

PLATE XVII. FIG. 2.

Hab. in Oceano Pacifico Australi et Mari Indico.

Our knowledge of this species, as collected by the present expedition, is limited to a drawing of it preserved by Mr. Smyth, which is stated to be two-thirds of the natural size. On comparing this drawing with a drawing made for Sir Joseph Banks by the draughtsman who accompanied him in Captain Cook's first voyage of discovery, it is evident that, notwithstanding some trifling discrepancies, both are intended to represent the same fish. We have consequently preserved the manuscript name applied to it by Dr. Solander, whose notes inform us that it is termed by the natives of Taiti, *Palahah*, *Parahah*, and *Parhahatharka*. Dr. Solander's description, which we have been allowed to copy from his MSS. (forming part of the Banksian Collection now in the British Museum), is as follows:

“*Corpus* glaucum (infernè albidum), strigis numerosis (circiter 20) transversis obliquis in mediis lateribus angulum antrosum spectantibus.

“*Fascia* transversa nigra ab occipite per oculos ad gulam, limitibus flavis.

“*Pinna dorsalis* aurantiaca, marginibus posticis nigricantibus, ipso margine albedo.

“*Pinna ani* simillima, sed pallidior.

“*Pinna pectoralis* pellucida.

“*Pinna ventralis* albida, apice flavescente.

“*Pinna caudalis* nigra, marginibus lateralibus flavis; posticè flava, margine nigro, apicibus membranæ pellucidis.

“*Iris* argentea. *Pupilla* nigra.

“*Caput* cinerascens, rivulis luteis.

“*Gula* immaculata.”—*Sol. MSS.*

Sir Joseph Banks' drawing was made at Taiti: that of Mr. Smyth was from a fish obtained at Byam Martin Island: the Zoological Society possesses specimens from the Mauritius.

CHÆTODON VITTATUS. *Schn.*

Chæt. flavus; vittis corporis numerosis fuscis; fasciâ oculari alterâque oris nigris; fasciâ nigrâ flavo marginatâ in pinnâ dorsali, anali, caudalique, illâ insuper nigro bilineatâ.

D. $\frac{13}{23}$. *A.* $\frac{3}{19}$. *C.* 17. *P.* 14. *V.* $\frac{1}{5}$.

PLATE XVII. FIG. 3.

Chæt. trifasciatus. *Park, in Linn. Trans. vol. 3. p. 34.*

Chæt. vittatus. *Schn., Blochii Syst. Ichth. p. 227.*

Chæt. bellus. *Sol. MSS.*

Icon. Seba, Thes. vol. 3. tab. 29. f. 18.

Hab. in Oceano Pacifico et Mari Indico.

Like the last species, this also is known to us, as connected with the expedition, by Mr. Smyth's drawing alone. Like the last also, it was observed by Sir Joseph Banks and Dr. Solander, on their memorable voyage, and a drawing of it was preserved by them, although no description of it exists among the MSS. of the latter. It has, however, been since described by Mr. Mungo Park, in a paper inserted in the third volume of the Linnean Transactions; and has been adopted from him by Schneider. With Mr. Park's specimen, preserved in the collection of the Linnean Society, our drawing agrees in general form; and the markings coincide in every respect, except in the absence from the drawing of a third black *fascia* behind the eye, running parallel with that which crosses the eye. This third *fascia* is also apparently wanting in the figure given by Seba: it is, however, marked in the Banksian drawing, and in the Zoological Society's specimens.

Notwithstanding this remarkable difference, we have preferred regarding our fish from the Pacific as identical with that of Mr. Park from Sumatra, and the Banksian species, being desirous of avoiding the risk of unnecessarily multiplying species, a risk which must be incurred wherever specimens do not exist for comparison. We have, however, employed the trivial name given by Schneider in preference to that of Mr. Park, *trifasciatus* being obviously inapplicable to a fish which appears to have, occasionally at least, but two *fasciæ* on the head.

The figure published by Seba furnishes so good a representation of the species, that it would have been unnecessary to figure it again, had it not appeared desirable to avail ourselves of the opportunity of exhibiting it in its natural colours.

Mr. Smyth's drawing was made from a specimen obtained, with the last species, at Byam Martin Island: Mr. Park's specimen was from Sumatra: the Zoological Society possesses individuals from the Mauritius.

CHÆTODON VINCTUS.

Chæt. flavus; fasciâ oculari brunneâ, maculâque ad latus nigrâ, cœruleo marginatis; vittis duabus obliquis, pinnam pectoralem anticè cingentibus, cœrulescentibus.

PLATE XVII. FIG. 1.

Hab. in Oceano Pacifico, apud Byam Martin Island.

Of the present species, obtained in the same locality as the two preceding, our only knowledge is derived from Mr. Smyth's drawing. The markings of the fish, as there represented, are such as to leave no doubt of its constituting a new species, bearing some relation to the *Chæt. unimaculatus*, Bloch, but differing from the representation given in his Ichthyology (pl. 201, f. 1), by its much smaller comparative depth; its bright yellow colour; the white termination of its even caudal fin; the absence of a dark margin to the soft parts of the dorsal and anal fins; the pale blue borders to the fascia that crosses the eye; the blue iris surrounding the large black pupil on the side; and lastly, by the very peculiar marking connected with the pectoral fin, and lower part of the sides. This consists of two blue vittæ, commencing apparently just above the angle of the operculum: the upper passes backwards, in an oblique curve, above the base of the pectoral fin, and terminates at the base of the anal fin, at about the middle of its soft part; the lower, forming at first a right angle with the commencement of the upper, descends directly downwards to the base of the pectoral fin, round which it passes on the under side, and then proceeds obliquely, and parallel with the upper vitta, to the base of the spinous portion of the anal fin.

The marking just described has suggested the idea of a ligature surrounding and restraining the anterior limbs, which is alluded to in the trivial name which we have given to the species.

The figure, like that of the other species represented in the same plate, is stated to be two-thirds of the natural size.

HENIOCHUS CHRYSOSTOMUS.

Hen. cœrulescenti-albidus, fasciis tribus latis saturatè fuscis, primâ post-oculâri, secundâ mediâ, tertiâ basin posticam pinnæ dorsalis includente; ore fulvo.

PLATE XVIII. FIG. 1.

Chætodon chrysostomus. Sol. MSS.

“Pe-ue, vel Peuwe.” Tatehi.

“Tatahe. Peooe.” Sol. MSS.

Hab. apud Tahiti.

This fish is known to us, as connected with the expedition, only by a drawing made by Mr. Beechey; a drawing which we communicated to M. Cuvier, with the manuscript name of *Hen. permutatus*. On consulting, however, the collection of figures preserved by Sir Joseph Banks, we find one of this species, fully confirming, as to general effect, the drawing before us. In Dr. Solander's MSS. the name of *Chætodon chrysostomus* is assigned to it; and it is thus described:

“Piscis rhombicus albus fasciis tribus latis (tam latæ sunt ut dimidium corporis tegunt), obliquis nigricantibus; prima per occiput, pone oculos, per basin pinnarum pectoralium, ad pectus ducta; secunda, cæteris latior, paulo pone medium piscis; tertia, in parte posticâ dorsi secundum basin posteriorem pinnæ dorsalis.

“Os fulvum.

“Iris argenteo-flavicans. Pupilla nigra.

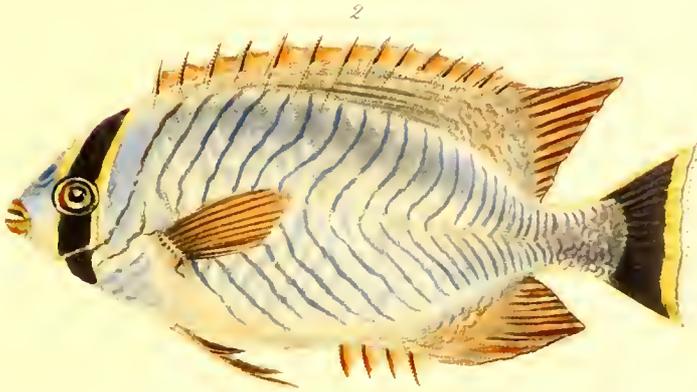
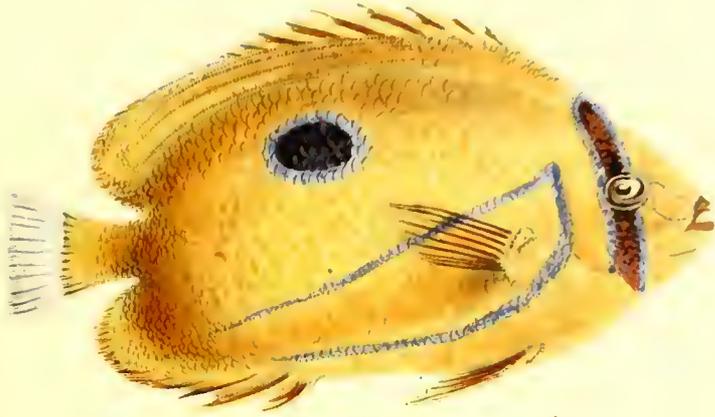
“In Pinnâ dorsali fascia media anticè extenditur; pars postica lutescens.

“Pinnæ pectorales lutescentes.

“Pinnæ ventrales nigerrimæ.

“In pinnâ ani fascia media extenditur ut illa tantummodo anticè et posticè albidâ

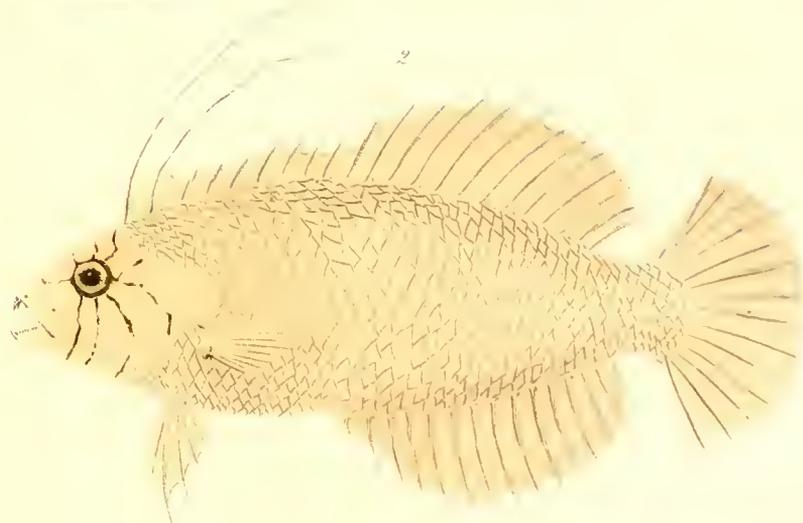
“Pinna caudalis lutescens.



1. *Thalassoma lineatum*

2. *Thalassoma strigatum*, Sol MSS

3. *Thalassoma vittatum*, Schu.



1. *Zenicichthys chrysestemus*
2. *Zelus bifidus*

FAM. GOBIIDÆ.

ELEOTRIS LONGIPINNIS.

El. pinnâ caudali lanceolatâ; pinnis dorsali analique posticè elongato-acuminatis.

PLATE XX. FIG. 3.

Hab. apud Loo-Choo.

Mr. Collie has preserved a sketch of this species, and both his notes and those of Mr. Lay contain descriptions of it. It is "a rounded fish, with the head depressed and the cheeks swelling. The scales are fine, and those of the head are scarcely perceptible. The mouth is large and slightly extensile: the teeth are small and slender"—C.: "they are sharp, in a single row above and below."—L. "The *præoperculum* is separated from the *operculum* by a slight *fossa*. The ventral fins are longest at the interior margin; the pectorals longest in the middle"—C.: "the first rays of the dorsal are terminated by filaments: the caudal is long and pointed."—L.

"The general colour is a straw-green below, and a light grass-green above, with two rather indistinct longitudinal bands of crimson. There are three crimson bands margined with blue and white on the cheeks, extending to the origin of the pectoral fins. On the upper and posterior half of the body are three partial cross bands of crimson edged with light green; these are broadest at their lower part, which is near the lateral line: behind them is a small band, or perhaps merely a rhomboidal patch. The first dorsal fin has six spines; it is banded irregularly with crimson: the second is without bands, and is spotted milk-white. The ventrals are white at the root; then a crimson longitudinal band; then a narrow whey-white one; and the rest to the margin yellow. The caudal has rufous patches, and light blue spots."—C. The colours are thus described by Mr. Lay: "Head lined with marbled red and blue: body yellow, with longitudinal lines of red: four hasp-like transverse spots margined with blue: dorsal fin, the first division has wavy lines of red, the second is spotted with blue."—L.

"The air-bladder reaches from opposite the origin of the pectoral fins to the *anus*. The alimentary canal is half as long again as the body, measured from the snout to the origin of the caudal fin. The stomach is not distinguishable from the general canal. There are no *cæca*. There are a few pharyngeal teeth above. The inside of the mouth is entirely black."—C. "The tongue and *pharynx* are purple; and there is a flat yellow membrane between the tongue and the lower row of teeth."—L.

FAM. LABRIDÆ.

JULIS BIFER.

Julis caudâ rotundatâ; pinnæ dorsalis radiis duobus anterioribus filamento præ-longo auctis: corpore viridi, castaneo-tessellato; genis radiatim brunneo-lineatis; pinnis saturatè brunneis.

D. $\frac{9}{12}$. *V.* $\frac{1}{5}$. *P.* 12. *A.* $\frac{3}{12}$. *C.* 14.

PLATE XVIII. FIG. 2.

Lanihi of the Natives of Oahu.

Hab. in Oceano Pacifico apud Oahu.

A specimen of this fish, preserved in spirit, was presented by Mr. Lay to the Museum of the Royal College of Surgeons. From this individual, by the permission of the Board of Curators, our figure was taken. The colours mentioned in the specific character are derived from the notes of Mr. Lay. In its present state, almost deprived of scales, it still exhibits vestiges of the darker colours which ornamented it while recent. The margin of the dorsal and caudal fins, and the whole of the ventral and anal, are brown: the pectoral is free from colour. There are traces of reddish-brown lines passing downwards and backwards from the back, and upwards and backwards from the belly; but they are generally so much obliterated as to produce only in a few places the appearance of diamonding. The brown lines of the head are distinctly marked: they take their origin from the orbit: one of them passes forwards from the anterior part of the orbit, crosses the hinder lip, and

returns backwards to the front of the opposite orbit; a second passes from the upper part of the orbit directly across the head to the other orbit; behind this are two others passing also across the head to the opposite orbit, but having a more backward direction; these are succeeded by a very short line passing almost directly backwards; another follows, curving downwards from the back part of the orbit to the lower part of the *operculum*: the succeeding one goes from the back of the lower part of the orbit to the angle of the *præoperculum*, where it is interrupted, though a line in the same direction crosses the throat; and from the lower part of the orbit pass two other lines downwards under the chin, returning upwards to the opposite orbit, the first of them crossing the anterior angle of the *præoperculum*: in addition to these lines there is one crossing the lower jaw. There are also two points on the inner lip near the front; and two on the hinder lip near the commissure.

In form, the *Julis bifer* is less elongated and more oval than many species of the genus: its fins spread also to a comparatively greater extent. The first two rays of the dorsal fin are terminated by long filaments, about an inch and a quarter in length, the rays themselves not much exceeding a quarter of an inch; the succeeding spinous rays, seven in number, rise slowly to about four lines in length: behind these commence the soft rays, the whole of which, with the exception of the last, are twice the length of the spinous rays. The anal fin is about the same height as the dorsal: its first three rays are spinous, gradually increasing in length; nearly the whole of the succeeding soft rays are twice the length of the longest of the spinous rays.

The two anterior teeth of the lower jaw are strong and projecting: they are received between two equally projecting ones in the front of the upper jaw.

The *Julis bifer* is the only species with which we are acquainted, that has the first two rays of the dorsal fin prolonged by filaments. The first ray alone is so prolonged in the *Julis Gaimurd*, Quoy and Gaim., *Julis formosus*, J. W. Benn., and *Julis Aygula*, *Coris Aygula*, Lacép.; all of which are from the Indian Seas. This filamentous elongation is analogous to that observed in the *Lachnolaimus*, Cuv.

JULIS LUTESCENS.

Julis viridi-lutescens transversè rubicundo lineolata; capite, pectore, pinnæ dorsalis analisque basi, caudalisque marginibus, rubicundis; pinnæ pectoralis maculâ magnâ apicem attingente nigrâ: pinnâ caudali sublunatâ, flavâ.

D. $\frac{9}{13}$. A. $\frac{2}{11}$. C. 14. P. 15. V. $\frac{1}{5}$.

PLATE XIX. FIG. 2.

Labrus lutescens. Sol., MSS.

Hab. in Oceano Pacifico apud Loo-Choo: necnon prope "Taiti," Sol.

A drawing of this species, preserved by Mr. Smyth, is the only evidence of its existence afforded by the expedition: but it is amply confirmed by a drawing made on Sir Joseph Banks' voyage, which agrees in every respect with ours, except that the dorsal fin is represented by Mr. Smyth as rising and declining gradually, instead of abruptly, (an error occasioned probably by the fin not being sufficiently stretched,) and its upper edge is coloured the same as the middle part of the caudal fin. Connected with the Banksian drawings are sketches illustrating the size of the scales, direction of the lateral line, &c. which are wanting in Mr. Smyth's; the latter is on this account less adapted for conveying correct notions of the details of the fish. We have therefore requested permission to use for our engraving the figure taken by the draughtsman employed by Sir Joseph Banks: and that permission has been kindly granted.

The description given by Dr. Solander is as follows:

"*Piscis lutescens, strigis numerosis rubicundis transversalibus.*

"*Caput viridi-lutescens, arcis pluribus latis rubicundis.*

"*Abdomen virescens, vittis duabus luteis.*

"*Pinna dorsalis e viridi-lutescens, vittâ paulo infra medium croceâ, limite superiore cæruleo.*

"*Pinnæ pectorales lutescentes, apicibus nigris.*

"*Pinnæ ventrales lutescentes.*

"*Pinna ani viridi-lutescens, basi croceâ, limite cæruleo.*

“ *Pinna caudæ* e flavo lutea, vittis marginalibus croceis.

“ *Iris* argenteo virescens. *Pupilla* nigra.”—*Sol. MSS.*

Dr. Solander states that its native name at Taiti is *e Pao-parharhoute*.

The Zoological Society has recently received specimens from the Mauritius.

JULIS PÆCILA.

Julis virescens, purpureo subfasciatim vario; genis rubro vittatis; pinnis dorsali analique rubris, rivulis guttis strigisque flavo-virescentibus conspersis, illâ insuper maculâ purpurascenti-nigrâ notatâ: pinnâ caudali rotundatâ, subflavâ, rubro fasciatim lineatâ.

PLATE XIX. FIG. 1.

Hab. prope Loo-Choo.

A drawing of this very distinct and pretty species, of the natural size, was preserved by Mr. Smyth. It inhabits the same locality with the preceding. No mention of it is made in the notes of the expedition, and our information respecting it is consequently limited to the figure alone.

SCARUS? QUINQUE-VITTATUS.

Scar. viridis; dorsi utrinque vittis duabus, vittâque pinnæ dorsalis, coccineis; capite coccineo-subradiatim-fasciato: pinnæ dorsalis rudiis spinosis brevioribus.

PLATE XIX. FIG. 3.

Hab. apud Loo-Choo.

This fish is known to us only by a drawing preserved by Mr. Beechey. Its great resemblance in form and markings to the *Scarus Georgii*, J. W. Bennett, has induced us to place it provisionally in the same genus, although in habit it approaches *Labrus*. Except in the abbreviation of the spinous rays of the dorsal fin, a character in which it agrees with the *Scar. Georgii*, it resembles almost completely a fish observed at Taiti by Sir Joseph Banks, the *Labrus formosus*, Sol. MSS. The vittæ, in the drawing of the latter, are, however, more pronounced than in ours.

No mention of this fish occurs in the notes either of Mr. Collie or of Mr. Lay.

ORDER MALACOPTERYGII.

FAM: ESOCIDÆ.

HEMIRHAMPHUS DEPAUPERATUS.

Hem. pinnâ dorsali anali sub-duplo longiore; pectorali angulum oris attingente; maxillâ superiore orbitæ dimidium longitudine superante.

D. 15. *A.* 13.

Hab. in Oceano Pacifico apud Oahu.

The anterior and posterior portions of this fish (the middle of the body being cut away) were preserved by Mr. Lay, and are now deposited in the Museum of the Royal College of Surgeons. These remains are, however, sufficient to indicate a new species, distinguished by the small number of rays in the dorsal and anal fins; by their relative proportions, the former being nearly twice the length of the latter; and by their form, which is elevated in front. The first ray of the dorsal is short; the second much longer; the third is the longest of the series; the fourth, fifth, and sixth, slope suddenly downwards; the seventh and the succeeding rays are about equal in height to the first; the terminal ray is somewhat longer. The anterior rays of the anal fin are the highest, the succeeding ones gradually sloping backwards.

The length of the prolonged lower jaw is three inches; that of the pectoral fin nearly two.

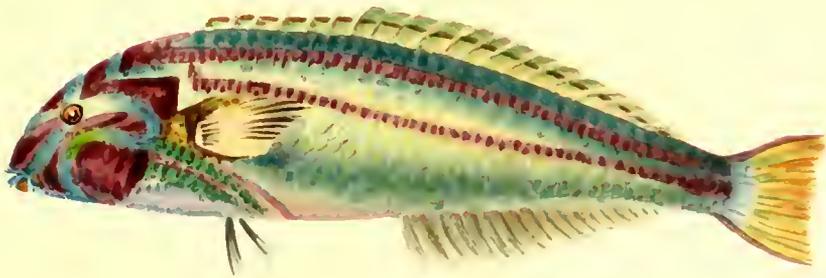
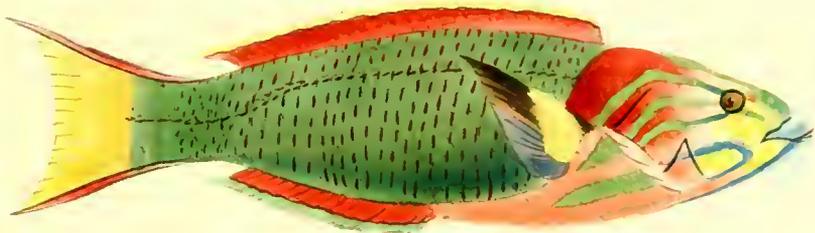
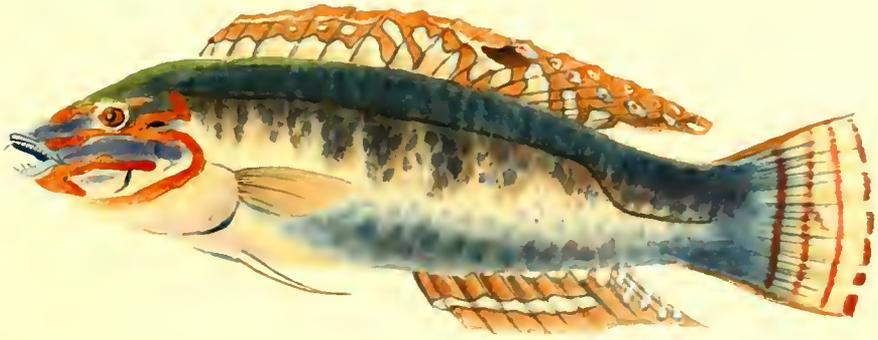
FAM. MURÆNIDÆ.

OPHISURUS SEMICINCTUS.

Ophis. maxillâ superiore elongatâ; pinnis pectoralibus minimis: corpore maculis latis brunneo-nigris 21 fasciatim subcincto.

PLATE XX. FIG. 4.

Hab. apud Oahu?



1. *Gobius pacifica*
2. *lutescens*
3. *varius? quinque-cellatus.*



1. *Pholoea*. *liquor*
2. *Syllium*. *vir*

3. *Electus*. *longipinnis*
4. *Phosoria*. *semi*. *cinclus*

A specimen of this fish, presented by Mr. Lay to the Museum of the Royal College of Surgeons, is the only individual of the species which we have seen. From it was taken, with the permission of the Board of Curators, the accompanying figure.

The *Ophis. semicinctus* is nearly related, both by the evanescence of its pectoral fins and by its markings, to the *Ophis. colubrinus*, (*Muraena colubrina*, Bodd., *Mur. annulata*, Thunb.) It differs chiefly in the number and incompleteness of its fascia-like patches of dark-brown, which do not surround the body, but are interrupted on the under surface; leaving the whole of the belly of the same pale colour as that which intervenes between the dark markings on the back and sides. In the specimen preserved in spirit, this paler colour is a light brown. The number of brown fasciæ, all of which form rings in the *Mur. colubrina*, is in that species thirty-one: in ours, in which the rings are incomplete, they are only twenty-one; without including three which cross the upper part of the head, one at the *occiput*, another immediately behind, and the third immediately before, the eyes.

The lateral line is strongly marked.

All the fins are exceedingly indistinct. The dorsal and anal appear merely like slight folds of skin, and are lodged, except near their caudal extremity, in grooves of great comparative depth, beyond the edges of which they do not seem capable of being extended. The former commences over the minute pectorals, and is continued to within three-eighths of an inch of the tip of the tail, forming towards its hinder part a slight projecting ridge, and adding, with the corresponding form of the anal, to the flattened appearance of the tail. The anal commences immediately behind the vent, at about half the length of the body: it terminates opposite to the termination of the dorsal.

The branchial rays are about twenty-five. The total length is fourteen inches; the circumference at the thickest part about three-quarters of an inch.

It may be remarked that the *Muraenophis colubrina*, Lacép., can scarcely be identical with the *Muraena colubrina*, Bodd., the number of the dark rings in the former being only fifteen: in fact, if Lacépède's figure can be relied on, his species is not even an *Ophisurus*.

OPHIDIUM STIGMA.

Oph. (imberbe?) pallidè brunneum, fasciis maculisque plurimis; maculâ magnâ purpureâ ad ortum pinne dorsalis.

PLATE XX. FIG. 1.

Hab. in Kotzebue Sound.

This new species of *Ophidium* is briefly noticed both by Mr. Collie and by Mr. Lay, but the only specimen which occurred was not preserved. Of the genus to which it should be referred no doubt can be entertained: it had "no trace of ventral fins;" its "dorsal, caudal, and anal fins were united into a transparent ridge;" and although Mr. Lay adds that the "*operculum* was wanting or obsolete, or rather identical with the branchiostegous membrane," Mr. Collie states that the "rays of the branchial covering were distinct." Its "scales were very small."

It is described as "dilute brown, with void swathes and spots," "and a purplish spot near the beginning of the dorsal fin:" its "snout obtuse: chin with a large gibbosity: teeth small."—L.

Its length was "about five inches."

The accompanying figure is engraved from a slight sketch preserved by Mr. Lay. It is apparently of the natural size.

Had the trivial name of *ocellatum*, applied to it doubtfully by the naturalists of the voyage, not been preoccupied, it would have been very appropriate. The *Oph. ocellatum*, described and figured by Tilesius, from the sea of Kamtschatka, certainly bears, as M. Cuvier has remarked, a near relation to the *Centronoti*, Schn.; it approaches, indeed, closely to the *Cent. Gunnellus*, Schn. That Schneider possessed some information as to such a fish may fairly, I think, be presumed from his character of the *Oph. Chinense* (Blochii Syst. Ichth., p. 486), where he has evidently confounded two species: one the *Oph. imberbe*, Linn., an inhabitant of the European portion of the Northern Atlantic; the other, "ocellis nigris iridibus albis pinne dorsis," (from the name prefixed, probably obtained from China,) which may very possibly be the *Oph. ocellatum* of Tilesius.

FAM. SYNGNATHIDÆ.

SYNGNATHUS PERLATUS.

Syng. corpore heptagono, caudâ quadratâ: lateribus infra albido-punctatis: pinnâ anali nullâ.
D. 24.? P. 10.? C. 13.

PLATE XXI. FIG. 1.

Hab. apud Loo-Choo.

A specimen of this pretty species was preserved by Capt. Belcher, R. N., and presented by him to the Museum of the Zoological Society. Its total length is four inches and eight lines: its greatest breadth three lines. The plates of the body are sixteen in each row; those of the tail are thirty-six. The eye is small, and is placed midway between the tip of the snout and the edge of the operculum. The tip of the snout is slightly turned up. The line of profile is continued straight along the snout to the forepart of the orbit; from whence it rises in a gentle curve to the back, the greatest elevation of which is about midway between the pectoral fins and the anus; in this situation the height of the body is about three lines: the height at the anus is little more than two lines: from the anus the tail tapers regularly and gradually to its tip, where it is less than one line in height. The breadth of the back over the anus is about one line and a half; at the tip of the tail half a line. The snout before the eyes is much compressed; behind them the sides of the head and opercula are broader, and nearly equal the breadth of the body. The dorsal fin commences behind the point opposed to the anus. From the tip of the snout to the eye the distance is three lines: the diameter of the orbit is one line: from the orbit to the edge of the operculum, three lines: hence to the anus the distance is one inch and four lines. The dorsal commences two inches behind the tip of the snout: its length is less than five lines.

The general colour of the specimen is dusky. The lower part of the sides of the body is paler, and is marked with three series of small rounded white spots, disposed in a quincuncial order; each scale having three spots, one at its upper, another at its lower, and a third at its middle height in front. The belly is livid white. The throat and lower part of the opercula is milk-white, through which passes a black interrupted line, which extends forwards from the commencement of the lateral keel bounding the belly, to the lower part of the orbit.

ORDER BRANCHIOSTEGI.

FAM. BALISTIDÆ.

BALISTES WILLUGHBEII.

Bal. oblongo-ovalis, infra confertim albido guttatus: squamis lateralibus posticisque sub-spinosis: pinnis dorsali secundâ analique elevatis, triangularibus; caudali trilobâ.
D. 3, 20. P. 14. V. —. A. 17. C. 12.

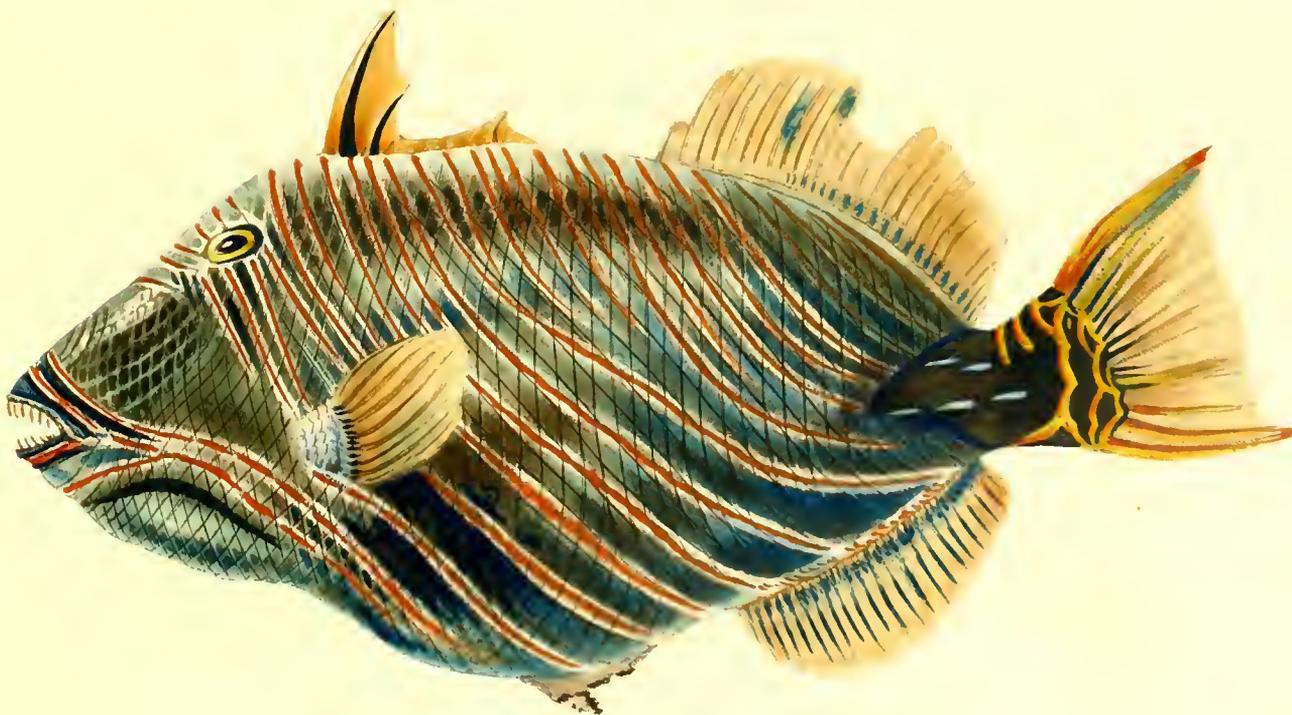
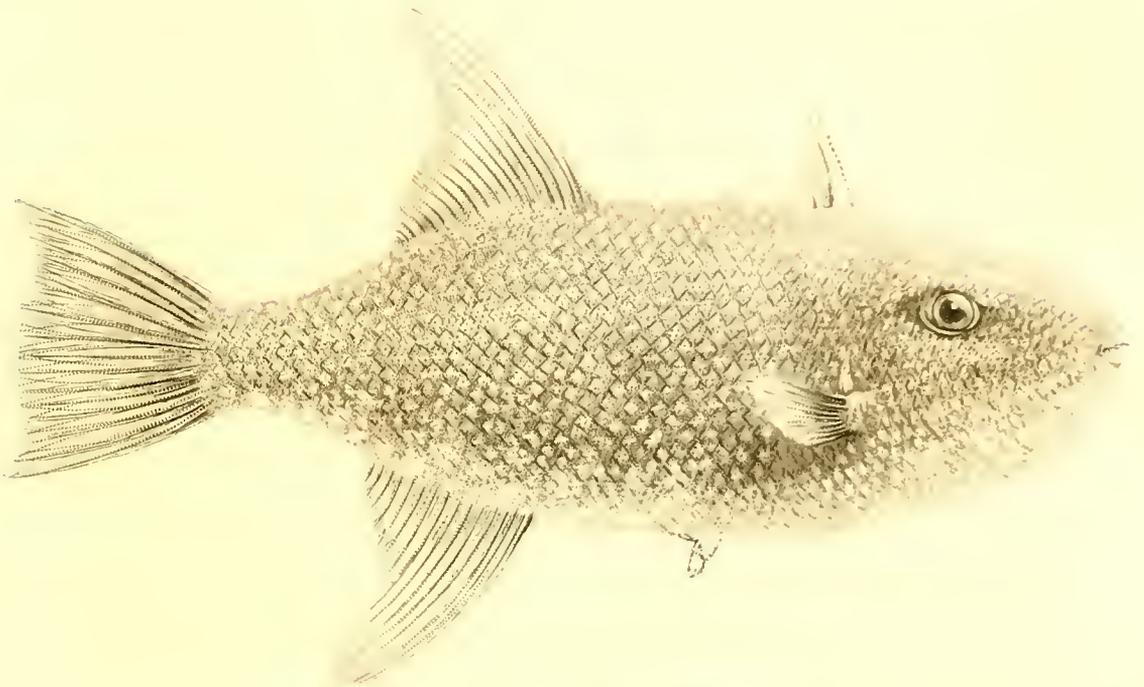
PLATE XXI. FIG. 2.

Guaperva longa, &c. *Will., Ichth. App. p. 21. tab. 1. 20.*—*Ray, Syn. Pisc. p. 48.*

Prickle or longest File-fish. *Grew, Rar. p. 113. tab. 7.*

Hab. in Oceano Pacifico prope Acapulco.

A specimen of this fish was preserved by Capt. Belcher, R. N., and presented by him to the Museum of the Zoological Society. Its form is more elongated than is usual among its congeners, its height being less than one-third of its total length. Its surface, as in the other species of *Balistes*, is divided into compartments, of which those behind the gill-openings on each side are not evidently larger than the adjoining ones, their distinction in this part being very faintly marked: each of the compartments posterior to the pectoral fins, excepting those of the back and belly, is furnished towards its anterior part with a short whitish somewhat spinous tubercle directed backwards. On the tail these tubercles form nine rows, but none of them are sufficiently strong to deserve the name of spines; and they can only be regarded as representing the strong armature of this part in some other species.



1. *Myxanthus pectatus*
2. *Calotes Huttoni*
3. *Myxanthus senegalensis*

The total length is eleven inches, of which the caudal fin occupies two inches. From the tip of the nose to the anterior part of the orbit, the distance is one inch and five-eighths: the diameter of the orbit, three-eighths of an inch: the anterior ray of the first dorsal fin, one inch in length, is placed one inch behind the orbit: length of the first dorsal, one inch: between it and the second dorsal, one inch and a half: length of the second dorsal, two inches, that of its fourth ray being two inches and a quarter: from its termination to the base of the caudal, one inch and three-quarters: length of the outer ray of the caudal, two inches, of the middle rays, one and three-quarters: from the base of the caudal to the anal fin, one inch and three-quarters: base of the anal fin, one inch and three-quarters, its fourth ray being two inches in length: hence to the ventral, which is one quarter of an inch in length, an inch and three-quarters. The pectoral fins are moderate, an inch in length, by seven-eighths in their greatest breadth. The greatest height is above the ventral fin; it is here three inches and a quarter: the depth across the tail is one inch.

The only distinct mention of this fish with which we have met, is contained in the works of Willughby, Ray, and Grew; whose several figures and descriptions rest all apparently on a single specimen existing, in their time, in the Museum of the Royal Society. Of the identity of our species with theirs it is almost impossible to entertain a doubt. The synonyms quoted from them are referred by Bloch and succeeding writers to the *Balistes maculatus*, Bloch, a species differing in various respects, and particularly by its greater comparative breadth, its longer dorsal and anal fins, and the larger number of rays in those fins.

BALISTES SESQUILINEATUS.

Bal. olivaceo-virescens, lineis numerosis obliquis (quarum plurimæ dimidiatæ) rubris: caudâ, pectore, lineisque circumambientibus supramaxillari mentalique longâ, cæruleis: pinnis flavescensibus: caudâ aculeatâ.

PLATE XXI. FIG. 3.

Hab. in Oceano Pacifico, prope Taiti.

This addition to the genus *Balistes* is known to us only by a drawing made by R. B. Beechey, Esq. It is readily distinguished from the other lined species of the group, by the numerous abbreviated lines which occur on its upper surface, between the complete lines which cross the whole of the body; a disposition of marking which does not exist either in the *Bal. lineatus*, Schn., the *Bal. Lamouroux*, Quoy and Gaim., or the *Bal. Zeylanicus* (*Bal. aculeatus* B. *viridis*, J. W. Bennett). It is also a much deeper fish than any of those just named.

These four species constitute in the genus to which they belong a little group, which is rendered very remarkable by the lined markings of the fishes which compose it. It would appear, from an observation made by Mr. J. W. Bennett (Fishes of Ceylon, No. 10), that the colours cannot be regarded as furnishing permanent distinctive characters. The form, however, can scarcely mislead us; and the nature of the lineation, it is probable, is also nearly constant. The form at once distinguishes the elongated *Bal. Lamouroux*, from the broadly ovate *Bal. sesquilineatus*: in the former too there are no abbreviated lines, and the hinder ones, (forming the greater number,) after passing downwards and backwards, are recurved upwards and forwards to the base of the dorsal fin. The *Bal. lineatus*, and the *Bal. Zeylanicus* nearly agree in their ovate form, but the former has the caudal fin almost square, while in the latter that part is rounded: the former has also but five lines between the eye and the mouth, while in the latter there are nine. Such at least appear to be distinguishing features in the figures given of each—to which, and to the descriptions, our knowledge is limited, as we have not had an opportunity of observing any one of them in nature.

BALISTES ACULEATUS, L.

PLATE XXII. FIG. 2.

A drawing, evidently of this species, was made by Mr. Beechey from a specimen obtained at Loo-Choo. It differs considerably in colouring from the various figures that have already been given, especially in the absence of the dark band between the eyes, and of those between the eyes and the

pectoral fins: the deep blue blotch enclosing the caudal armature is also remarkable; and the whole fish is more varied than as represented by Bloch and Rüppel. On this account it is figured in the accompanying plate.

The only anatomical notice respecting it occurs in Mr. Collie's notes. He states that "the air-bladder is very strong on the sides, so formed as to appear like white cords."

MONACANTHUS SPILOSOMA.

Mon. corpore posticè caudâque hispidis: lineis genarum, corporisque maculis parvis confertis seriatis, fuscis.

D. 1, 38. A. 33. C. 10. P. 15.

PLATE XXII. FIG. 1.

Hab. apud Oahu.

A specimen of this fish was preserved by Mr. Lay, and presented by him to the Museum of the Royal College of Surgeons: from this specimen, with the permission of the Board of Curators, our figure and description are taken.

It is nearly smooth in front, becomes more hispid backwards, and is covered with numerous bristles on the tail, the hinder bristles being hooked and directed forwards.

The head is hollowed in its profile from the mouth to the base of the spine, which is placed over the back part of the orbit. Behind the spine the back is nearly straight as far as the commencement of the dorsal fin, along which it slopes to near the caudal. The bone representing the ventrals corresponds to nearly the middle of the space between the spine and the dorsal fin: the anal commences a little behind the point corresponding to the beginning of the dorsal. The caudal fin is rounded.

The colour is pale, slightly reddish brown above, and nearly white beneath. The cheeks and jaws are crossed by six lines of dark brown following the direction of the outline of the lower jaw, and breaking after passing it into interrupted bands composed of spots of the same colour: a short line occurs in front of these near the mouth, and two short lines behind them under the eye. The markings of the body consist of numerous series of dark-brown rounded spots, so closely set as to occupy nearly an equal share of the surface with the ground colour. The spots towards the back are smaller than those of the sides, and form somewhat wavy lines: those of the sides form lines nearly straight: while the lines formed by the lower series of spots bend downwards, following the outline of the ventral surface of the fish, and making near the ventral bone an almost right angle with the lines descending from the head. The edge of the thin portion succeeding the ventral, is deep brown, slightly margined with brownish white.

The pectoral fin is white and transparent: it appears to have been acute at its upper part.

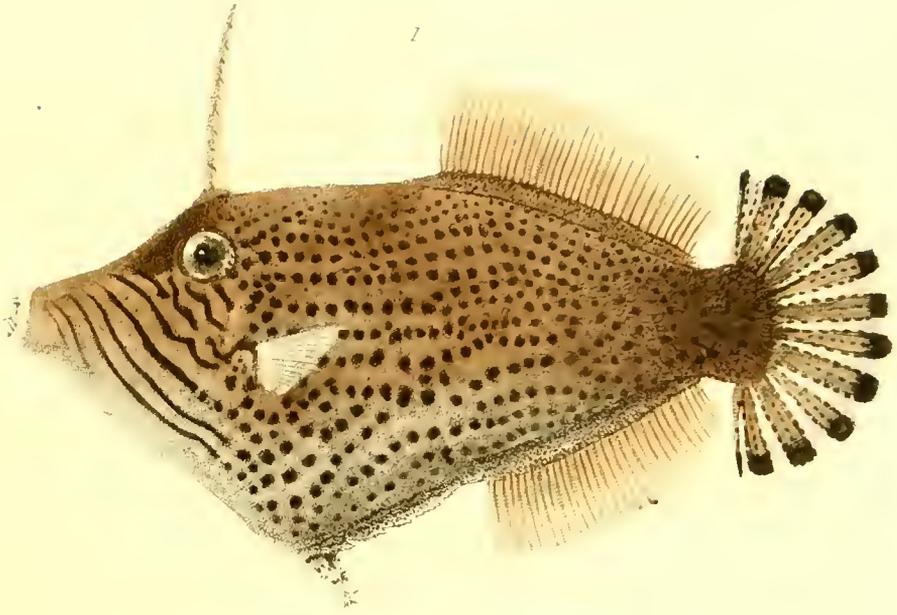
The dorsal and anal fins are pale, almost white, and are thickly spotted with small spots of pale brown; these are most strongly marked on the dorsal. Along the base of the anal there exists an indication of a white line. Some of the anterior rays of the mutilated dorsal and anal fins are twice the length of the posterior; and both fins would appear to have sloped gradually backwards. The caudal fin is rounded: it is margined with deep brown: its rays are pale brown, becoming browner towards the tips: the membrane is milk-white, and is fringed along the edge of the rays with brown spots somewhat more intense than the parts of the rays to which they adjoin.

The dorsal spine has nine acute teeth on each side, directed downwards.

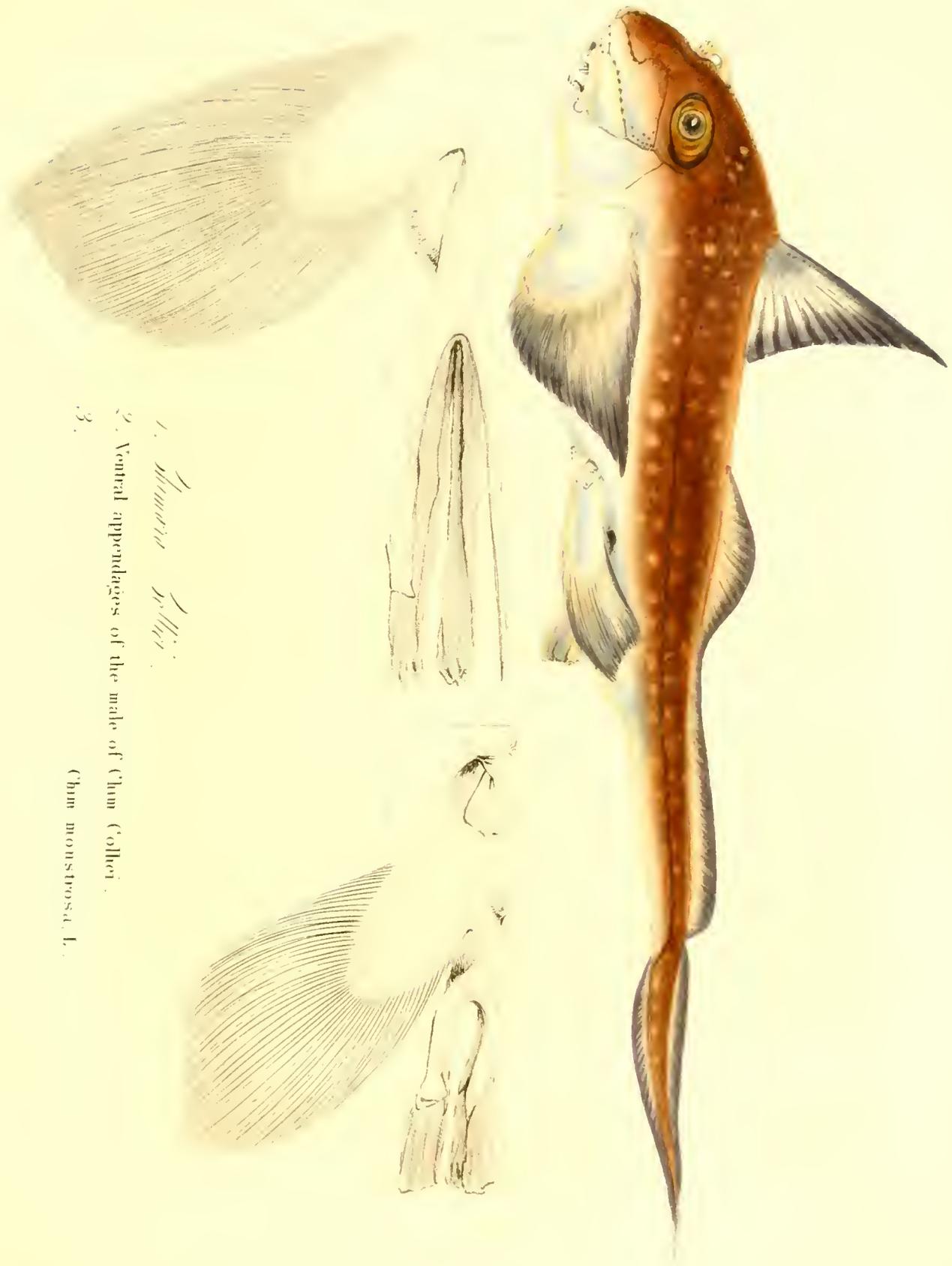
The length is four inches and a half, including the caudal fin, which is seven lines long. The breadth at the ventral fin is two inches; at the commencement of the dorsal, one inch and a half: behind the dorsal, six lines: length of the spine, one inch: from the nose to the spine, one inch one line: from the spine to the commencement of the dorsal, one inch three lines.

The teeth are ovate at their tips, which are yellowish brown.

We know no species of *Monacanthus* approaching the present in marking. M. Cuvier has indicated one under the name of *guttatus*, but has not described it; and we are consequently unable to determine what relation it may bear to the one before us.



1 *Muraenichthys pinnatus*
2 *Cochlostes unicolor* v.
3 *Callichthys lepto*



1. *Shamora pinnis*.

2. Ventral appendages of the male of *Chim Collet*.

3.

Chim monstrosa, L.



ORDER CHONDROPTERYGII.

FAM. CHIMÆRIDÆ.

CHIMÆRA COLLIEI.

Chim. pinnâ dorsali primâ a secundâ disjunctâ, secundâ per medium latè emarginatâ, tertiâ caudæ extremitatem appropinquante; anali pone pinnæ dorsalis tertiæ initium incipiente.

PLATE XXIII. FIG. 1.

Hab. in Oceano Pacifico, apud Monterey Californiæ.

In general form this species closely resembles the *Chim. monstrosa*, L. Like that fish of the Atlantic Ocean, this of the Pacific has a fleshy snout projecting forwards over the mouth, marked on its under surface by three lines of punctures on each side, which lie parallel to each other, and unite in the middle to form as many angles pointed forwards; the upper part of the head between the eyes is furnished in the male with a short curved cartilaginous peduncle, enlarging into a rounded extremity covered with spines, and received during inaction into a cavity formed for it in front of its base; there are three dorsal fins, the anterior supported in front by a strong spine, and the posterior two almost continuous with each other, and terminating before arriving at the extremity of the tail; an anal fin extending from nearly opposite the commencement of the third dorsal to the tip of the tail; ample pectoral and ventral fins, supported on fleshy pedicles of a shield-like appearance; each ventral fin furnished in the males, with two sets of appendages, one in advance of it, spinous on its inner edge, and included when at rest in a groove of the integuments; the other behind the fin, arising as a single stem, which is afterwards forked; and a lateral line passing along near the back, and suddenly deflected obliquely just beyond the end of the second dorsal fin, where it descends to the ventral edge of the tail, along which it is continued to be gradually lost about the middle of the anal fin. In these particulars both the species of *Chimara* agree, but they differ essentially in the position and form of some of the fins, and in the form of the male appendages to the ventrals.

The *Chimara Colliei* is silvery on the back and sides; it is brownish above, and dull white below; on the back and sides it is marked with numerous dull white rounded spots, varying in size from one to three or four lines in diameter. The vertical fins are white at their base and throughout the greater part of their extent, but become blackish towards their margins; the pectoral and ventral fins are also white; the former having a blackish line along their outer margin, and the latter being slightly dusky towards their outer edge. The lateral line is white, slightly margined on each side with a brown line. The projecting part of the nose is brown above, and the interocular process is white.

The anterior dorsal fin is supported in front by a long and strong spine, which is prickly on its hinder surface; the membrane attached to this spine slopes almost directly downwards; it contains about six rays: when it has very nearly reached the back, it is continued backwards in the form of a slight fold of the skin, for about one-half of the space between it and the commencement of the second dorsal. The space intervening between the first and second dorsal fins, nearly equals the length of the former measured along the back.

The second dorsal commences nearly opposite to the base of the ventrals. It rises rather rapidly to its highest part, which is near its front; then descends considerably, and afterwards rises gradually until it is suddenly rounded off to the back. It is immediately succeeded by the third dorsal, which rises for about one-fourth of its length, and then slopes off gradually to be lost a short distance before the end of the tail, which tapers to a point, but can scarcely be said to end in a filament.

The anal fin commences a short distance behind the origin of the third dorsal: it rises for about one-third of its length, and then slopes off gradually, to be lost almost at the extremity of the tail.

The upper edge of the pectoral fins is straight to near its end, where it is slightly rounded off towards the point; from the point it slopes sharply forwards, and is rounded at its lower side.

The outer and inner margins of the ventral fins are nearly parallel; each is however slightly rounded, the latter being rather more so than the former, which it somewhat exceeds in length: these fins are truncated at the end, and are even slightly emarginate. They extend beyond the posterior extremities of the appendages which are attached to them in the male. (Plate 23. Fig. 2.)

The anterior appendages of the ventral fins are flattened and oblong; they are furnished with two sharp short spines on their inner margin.

The posterior appendages are short and robust as compared with those of the *Chim. monstrosa*. Each is supported on its proper pedicle, which is jointed at about one-eighth of its length from its origin: at about one-third of its length, it divides into two branches of equal length and thickness; these are each supported by cartilage which extends on the external side for more than half their length; beyond this external cartilage they are covered by thick plaited folds of skin, thickly beset by prickles, directed towards the abdomen, and extending downwards between the branches, nearly to the point of their union. At this point they are moveable, being capable of separation from each other, though not to any great extent. The firm central cylinder of each of these divisions admits a bristle through a canal that presents its orifice at the extremity.

The teeth in the upper jaw consist of a cutting edge, hollowed out in front, and apparently composed of about ten flattened teeth united at their sides: those of the lower jaw extend farther along the sides of the mouth, are elevated in front, then notched out, and afterwards rise into a sharp triangular elevation on each side. The greater part of the roof of the mouth is occupied by two large, very rough, bony processes.

Some of the distinguishing marks between the *Chim. Colliei* and the *Chim. monstrosa*, will be readily seized by comparing the specific phrase given above for the former species, and the subjoined character of the latter, a character rendered necessary by its no longer remaining alone as the representative of the genus *Chimæra* as limited by M. Cuvier.

CHIMÆRA MONSTROSA. L.

Chim. pinnâ dorsali primâ ad secundam approximâtâ, secundâ æquali, tertiâ caudam supernè apterygiam longitudine æquante; anali ante pinnæ dorsalis tertiæ initium incipiente.

The approximation of the first to the second dorsal fin, with which it is nearly continuous at the base; the straight edge of the second dorsal fin, which is of the same height throughout; and the termination of the third dorsal fin at a distance equal to its whole length from the end of the tail, which is thus left naked on its upper surface for a considerable space; all these marks strongly distinguish the *Chim. monstrosa* from the *Chim. Colliei*, in which the first dorsal fin is separated from the second by an interval equal to the breadth of the former; the upper edge of the second dorsal fin exhibits a deep and broad curve downwards; and the third dorsal fin is continued nearly to the end of the tail. To these marks are added the commencement of the anal fin in the *Chim. monstrosa* at a point anterior to that opposed to the origin of the third dorsal; while in the *Chim. Colliei* it originates at a point posterior to that just indicated. The following comparative measurements of the specimen of *Chim. Colliei* brought home by Capt. Beechey, and of a specimen of *Chim. monstrosa* preserved in the British Museum, will further illustrate the differences existing between the species:—

	CHIM. MONSTROSA.	CHIM. COLLIEI.
	<i>Inches.</i>	<i>Inches.</i>
Total length.....	25½	18
To the base of the first dorsal fin.....	4½	3¼
Length of its spine.....	3	3
Length of the first dorsal.....	2½	2
From the end of the first dorsal to the end of the second.....	11½	8
Length of the third dorsal.....	3½	3½
From the end of the third dorsal to the tip of the tail.....	3½	0¾
Commencement of the anal fin in advance of the third dorsal....	1	Behind the third dorsal.. 0½
Length of the pectoral fin.....	6	4
ventral.....	3½	2¼
posterior appendages to the ventral fin.....	4	2
anterior appendages.....	1	0¾

In addition to the differences existing between the species in the form and position of the fins, others are furnished by the appendages to the ventrals, which are met with in the males alone. These appendages have been described above as to their external form in the *Chim. Colliei*. Those of the *Chim. monstrosa* (PLATE 23. Fig. 3) differ remarkably in form and proportion. The anterior appendages are oval, somewhat club-shaped, and flattened, and have on their inner margin a row of about six or eight sharp short spines, the points of which are directed towards the base of the appendage. The posterior appendages are slenderer and much longer than in the *Chim. Colliei*: each is supported on a pedicle, one-eighth of its total length; and divides at about one-third of its length into three parts, all of equal length; the outer of these divisions is externally cartilaginous, and is covered along its inner side and round its tip with a plaited skin which is thickly and strongly spinous; the posterior division resembles the preceding, and is supported by an external cartilage extending about half-way up its hinder side; it is grooved along the whole length of its inner side, or that side which is directed towards the median line of the belly of the fish, to receive the third division, which consists of a slender cartilage without any covering of spinous skin. The division of this appendage into three parts is mentioned by M. Cuvier among the characters of the genus *Chimara*, L.; but from the description above given of this part in the *Chim. Colliei*, it will be evident that the trifurcation does not extend to the whole genus.

In the comparatively backward position of the commencement of the second dorsal fin, an approach is made to the form of the genus *Callorhynchus*, Cuv.; but it would still require many other links before it would be safe to blend together again this group and *Chimara*.

From Mr. Collie's notes we learn, that

"The intestinal canal is a wide sac, without external mark of division from the *oesophagus* to the *anus*.

"The liver is large, and of a clay colour.

"The spleen is purplish.

"The *testes* are very large, nearly half the size of the same parts in man; they lie behind the heart, and are each furnished with an *epididymus* placed above and behind them; hence descend the *vasa deferentia* passing over two cylindrical bodies (*vesicula seminales?*), and going on each side of the vent."—C.

A sketch of the latter parts was made by Mr. Collie, and they are preserved in the only specimen of the fish brought home by the expedition. It is deposited in the Museum of the Royal College of Surgeons, London, and from it were taken, with the permission of the Board of Curators, the drawings whence our engraving was made. The figure of the male appendages of the *Chim. monstrosa* was obtained from a specimen in the British Museum.

At a later period of the voyage, when in the Bay of Coquimbo on the coast of Chili, Mr. Collie was enabled to prosecute still farther his anatomical examination of the organs of generation in the genus *Chimara*, L. It is impossible to determine, in the absence of a specimen or of sufficient notes, the species on which he operated, and which he terms *Chimara callorhynchus?* "Its length was twenty inches; that of the snout two inches; its tail was tapering and filamentous, and its general colour a silvery grey. The male possessed the stipitate moveable knob on the upper and anterior part of the head, set with small teeth or spines on its under surface, and received into or raised out of a cavity on the head, but not influenced by the movements of the lower jaw, as was the case with the one seen at Monterey.

"The liver is dark-coloured; the gall-bladder pale, and the *pancreas* similarly coloured. The spleen is dark purplish, and invests the extremity of the *pancreas*. The pancreatic and biliary ducts open separately into what appears to be the beginning of the stomach, but there is only one gradual contraction of the intestinal canal from the *oesophagus* to the *anus*, and the tube is continued in a direct line from the mouth to the vent. Portions of shells, and other gritty substances, were contained between the somewhat obliquely longitudinal folds on the inside of the intestinal cavity.

"There is an ample cavity around the *anus*, and the *rectum*, as it may be called, readily protrudes. In the posterior part of this cavity there is a smooth raised body (*clitoris?*).

“ In the male the external appendages are the two cylindrical cartilages between the two ventral fins ; with a considerable nearly longitudinal opening or slit anterior to the roots of the ventrals towards the outer side. In a cavity immediately under the skin, to which these slits directly lead, lies a cartilaginous appendage as long as the first-mentioned, but jointed in the middle, and having an expanded and rounded extremity. The joint is in the middle, and bends forwards, allowing the appendage to fold so as to be received through the longitudinal slit, and lodged in the subcutaneous cavity : the mechanism of this joint is so arranged, that when the appendage is extended, it is at the same time raised out of the cavity and pointed forwards ; and when it is bent, it slips at once within the cavity. The extremity of the appendage is composed, first, of an open tube near its centre ; secondly, of narrow folds of smooth cartilage ; and lastly of a subsemiorbicular knob, covered with small eminences, and toothed round the edges, the teeth being directed backwards when the joint is extended.

“ Neither of these appendages is to be seen in the female, there being only a very small hollow line in the place of the longitudinal slit that receives them in the male.

“ The *testes* are two smooth oblong and rounded bodies, (two inches and a quarter in length, and one-eighth in breadth,) lying in the anterior part of the abdomen. Their granular glandular texture is everywhere closely invested by a fine smooth membrane of a dull reddish colour. One side (that towards the spine ?) is somewhat concave, and is marked in the middle with a cicatrix-like spot. Very delicate fibres (vessels ?) loosely connect the body of the *testis* with the *epididymis*, which commences at the upper and near the anterior part of the body, between it and the *vertebra*, and is continued backwards along the side of the spine to the anterior part of the kidneys, a little in front of the *anus* ; its foremost portion being covered by the *testis*, and its hinder by the *vesicula seminalis*, as it is seen *in situ*, the fish being laid on its back. It is a soft substance, marked with transverse *sulci* formed by processes of the *peritoneum*, which fills them up and connects their sides. From the anterior part of the *epididymis*, the *vas efferens* is continued backwards in numerous convolutions, along its inner side behind the anterior extremity of the *vesicula seminalis*, to meet which the *vas deferens* that is now formed turns forwards, and becoming straight and enlarged at the same time, gradually expands into the *vesicula seminalis*. The *vesicula seminalis* is in the form of a hollow tube, of uniform diameter from the one end to the other, tapering slightly at each extremity ; it terminates posteriorly in an orifice that opens into the cavity surrounding the vent, and immediately behind it. This orifice, the *vesicula seminalis*, and the ultimate portion of the *vas deferens*, contained a gelatinous substance of a greenish colour, thickly intermixed with globular bodies of greater consistence, about the size of mustard-seeds (semen?).

“ In the female, the Fallopian tubes are continued in an arch with each other across the spine ; or more correctly, the fold which is connected with the uterine glands, and is prolonged into the oviducts, is extended anteriorly, and forms an arch with its fellow across the spine in front of the *ovaria*. The *ova* in the individual examined were rounded, yellowish, and of various sizes, from that of a small pea to the size of a boy's large marble ; they were numerous, and hung from the oviducts by means of their membrane, between the uterine glands and the middle of the connecting arch on each side. The uterine glands are flattened, and have the form of an isosceles triangle, the base being directed forwards. At this base the oviduct may be said to enter as it proceeds backwards, and to be continued through the gland, dilating immediately on its entrance, and contracting a little on leaving it towards the apex or acute angle posteriorly. It is then continued in a wide tube to the space around the vent, where each opens separately behind and a little to the outside of the *anus*. In the median line between the orifices, consequently directly behind the vent, and corresponding to the opening of the *vesicula seminales* in the male, is a concavity with a surface of irregular *rugæ*, to which a substance, in every respect similar to that contained in the *vesicula seminales*, adhered and hung down.

“ Two oblong coriaceous black eggs, with large thin and woolly borders, were dredged up in the Bay : they evidently belong to this fish. The fishes themselves were taken in the seine.”—C.

CALLORHYNCHUS SMYTHII.

Call. pinnis pectoralibus ventrales haud attingentibus.

PLATE XXII. FIG. 3.

Hab. in Oceano Pacifico, apud La Concepción, Americæ Australis.

This fish is known to us only by a drawing of the natural size made by Mr. Smyth. It differs from the *Call. antarcticus* (*Chim. callorhynchus*, Gron.) by the more backward position of its second dorsal and of its ventral fins. The base of the latter is considerably behind the extremity of the pectorals, while in the *Call. antarcticus*, the end of the pectoral fins extends almost half across the ventrals. The following distinctive character may therefore be proposed for the

CALL. ANTARCTICUS.

Call. pinnis pectoralibus ultra ventralium basin productis.

Other differences would probably present themselves on a comparison of specimens, but in the absence of such means of establishing the species now proposed, we rest it on a character so obvious that it cannot possibly escape the observer. It is dedicated to Mr. William Smyth, Mate of H. M. S. Blossom, whose valuable drawings have preserved for us records of several species of fishes which would otherwise have remained unknown to science.

CRUSTACEA :

BY

RICHARD OWEN, Esq.

THE following Crustacea were collected during the voyage of the Blossom by Captain BELCHER and G. TRADESCANT LAY, Esq. They are valuable rather for the rarity and beauty than for the number of the species, which, indeed, is too limited to allow of any general remarks: a descriptive catalogue only is, therefore, given.

The specimens have been presented to and are deposited in the Museums of the Royal College of Surgeons and the Zoological Society.

CLASS CRUSTACEA.

SUBCLASS MALACOSTRACA, *Latr.*

LEGION PODOPHTHALMA, *Leach.*

ORDER DECAPODA, *Latr.*

SUBORDER BRACHYURA, *Leach, Latr.*

SECTION ARCUATA, *Latr.*

GENUS XANTHO, *Leach.*

I. XANTHO EUDORA.

Xantho carpis internè unidentatis, manibus longitudinaliter sulcatis, clypeo utrinque obtusè quadridentato.*

Cancer Eudora. *Herbst, Krabben und Krebsen, 3. heft 2. p. 10. taf. 51. fig. 3.*

The carapace of this species is smooth and shining, but is marked with sinuosities and protuberances, of which the principal are in the lateral regions, disposed two on each side; the cardiac region has four smaller protuberances. The *rostrum* is grooved along the middle, and the frontal margin is arcuated. The inferior and inner border of the orbit is produced in the form of a blunt tooth.

* The crustaceous covering of the Decapoda, taken in connection with its articulated parts for locomotion and prehension, differs so much from the shells of the testaceous *Mollusca* in its mode of attachment, its uses, its density and chemical composition, that the term *Clypeus* (Der Schild of Herbst) is adopted to denote the carapace of the Brachyura, in preference to that of *Testa*, which is used by Latreille. The term *Thorax* is employed in this memoir to signify the crust which protects the heart, stomach, and branchiæ of the Macrourea.

exterior to which is one smaller. Of the four teeth at the sides of the carapace, the two posterior are most pointed, and very small tubercles may be observed in the interspaces.

The *chelæ*, or forceps claws, are of equal size, the *carpus* has a strong obtuse tooth on its inner aspect, and a sinuosity above; the *manus* is marked with four longitudinal and slightly punctuated furrows; the digits are dentated, slightly hooked at the points, and of a very dark brown colour, which colour also extends a little way along the under part of the *manus*. The claws are moderately long and thick, hirsute at their margins and extremities, and gradually diminish in size to the last pair.

The colour of this crab is greyish white, mottled with reddish brown or dull orange.

The longitudinal furrows on the *manus* are omitted in Herbst's description, but they appear in the figure; and the text reciprocally supplies an omission which occurs in the engraving, viz. of the hirsute character of the claws.

The specimens, two in number, are males, and all that Herbst possessed were of the same sex.

They were taken at Oahu, Sandwich Isles; the native name is *Kumimi*.

SECTION QUADRILATERA, Latr.

GENUS GELASIMUS, Latr.

2. GELASIMUS TELESCOPICUS. n. s.

Gel. oculorum pedunculis extra angulis clypei valde porrectis, lateribus clypei trispinosis, femoribus supra unispinosis.

Long. clypei, lin. 8; lat. lin. 12.

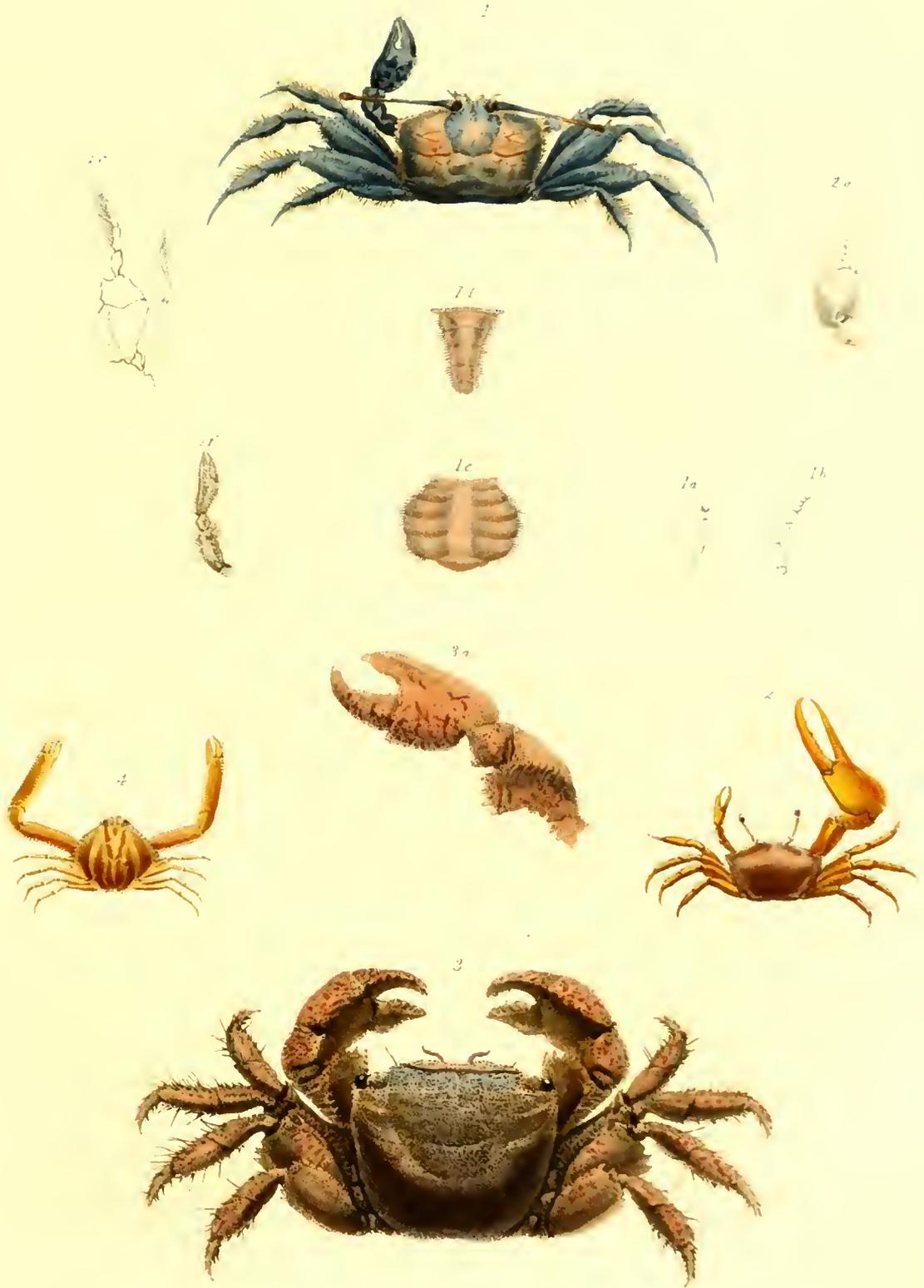
Color, cæsius.

This is a singular and interesting Decapod. It is allied to *Gonoplax* (Leach, *Malacostr. Podophthalm. Britannia*, tab. 13.) in the form of the carapace, and unispinous character of the *femora*, but the *pedipalpi* and *antennæ* accord with the generic characters of *Gelasimus*, Latr. (*Nouv. Dict. d'Hist. Nat.* 12. p. 517.) In the proportionate length of its ophthalmic peduncles, however, it exceeds all other known Crabs: these are slender, endowed with free motion, and so produced as to extend beyond the angles of the shell by half their length.

Of this species Mr. Lay had preserved two specimens, a male and a female, but in both unfortunately the right forceps claw was wanting. This circumstance precludes a satisfactory identity with the beckoning crabs; and at the same time with such a mutilation the formation of a new genus is scarcely warrantable merely on account of the length of the ophthalmic peduncles.

The *pedipalpi* are approximated, but with a space intervening at their base; in which circumstance, and in the form of the first joint of the mesial *antennæ*, which is elongated and not transverse, this species deviates from the generic character of *Macrophthalmus*, (Latreille, *Cuv. Règne Anim.* 4. p. 44, *nouv. ed.*) The second and third joints of the *pedipalpi* are large, flat, and unequally quadrilateral; the fourth joint is inserted at the superior and external angle of the preceding. The lateral *antennæ* are situated at the inner angles of the insertion of the ophthalmic peduncles; they are four-articulate, with their last joint setaceous. The mesial *antennæ* are smaller, and lie beneath the *rostrum*; their last joint is dark-coloured and bifid. The carapace is transversely quadrilateral, broader in front, smooth, slightly convex, with a narrow depressed *rostrum* which is grooved along the middle, and with three small spines at the anterior part of the sides of the shell. The eye-stalks are lodged in wide grooves, which have finely crenate edges.

The left *chela* is small and compressed; the *manus* is carinate at the outer margin, as it lies in the prone state; the fingers close with a small circular intervening space at the base; they are pointed, and hirsute at the extremity. The claws are compressed, the fourth pair being the longest, then the third, the second and the fifth. The *femora* have each a small spine at the upper margin, near the distal extremity; the last joints are very slender, and finely pointed.



1. *Zelusimus telescopicus*
 2. *minor*.

3. *Trapesus hukuhar*
 4. *Orthocentrus punctatus* var.

From the soft clay that adhered to the carapace, I suspect that this species has the same burrowing habits as the *Gelasini*.

The specimens were taken at Oahu, Sandwich Isles.

PLATE XXIV.* FIG. 1. GELASIMUS TELESCOPICUS, MAS.

- 1 a. *Antenna media*, aucta.
 1 b. *Antenna lateralis*, aucta.
 1 c. *Pedipalpus externus*, aucta.
 1 d. *Cauda maris*.
 1 e. *Cauda feminæ*.
 1 f. *Chela sinistra feminæ*.

3. GELASIMUS MINOR, n. s.

Gel. clypeo convexo, laevi, lateribus inermibus; chelâ dextrâ majore, pollice longiore, dentibus quinque armato.

Long. clypei, lin. 5; lat. lin. 7.

Color clypei ferrugineus, chelarum aurantius.

The carapace is smooth, convex, broader in front than behind; the anterior margin is sinuate, canaliculate, with a depressed *rostrum*, grooved along the middle, whose base is one fifth the breadth of the anterior margin; the anterior angles are slightly produced. The middle of the carapace has linear impressions in the form of the letter H; slightly elevated lines mark out the branchial regions.

The ophthalmic peduncles extend to the angles of the shell; the grooves in which they lie have finely erenate margins.

The right *chela*, as in the rest of the genus, is disproportionately large: the *humerus* is very small; the *ulna* enlarged, trihedral, erenate at the inferior angle, with a single tooth at the inner angle; the *manus* is minutely granulate like shagreen, convex externally, with an elevated line of granules along the superior and inferior borders; sinuate internally, and bearing on this aspect two transverse rows of small tubercles, near the base of the thumb. The fingers when closed leave a considerable interspace, and the *pollex* overlaps the *digitus*; the latter has an elevated tooth near the extremity, and six or seven near the base; the *pollex* is more bent especially at the extremity, it has an elevated tooth one third of the way from the apex, and three or four near the base. These particulars are constant in three specimens which I have examined. The digits of the smaller *chela* are spatulate, and hirsute at their extremities, as in *Gelasimus Duperreyi*, (*Zoologie de la Coquille, Atlas, Crustacés, pl. 1. fig. 2. 2 a.*) to which this species has considerable affinity, but from which it differs in having the carapace larger in the transverse than in the longitudinal diameter, and more convex than is represented in the figure quoted. The breadth of the *rostrum* also, which in *Gel. minor* equals one fifth of the breadth of the anterior margin, in *Gel. Duperreyi* scarcely equals one eighth; and the ophthalmic peduncles are consequently shorter in our species. The fingers of the great *chela* differ in their proportions, the *digitus* being shorter and more obtuse. From *Gelasimus affinis*, of which part of the *chela* only is represented (*loco cit. pl. 1. fig. 3.*), our species also differs in the projecting teeth along the concave margin of the *pollex*.

Of the claws the fourth pair are the longest; the *femora* are compressed, and notched at the superior margin, near the apex; the last joints are very slender, and slightly curved.

The specimens are all males, and were taken at Oahu, Sandwich Isles.

PLATE XXIV. FIG. 2. GELASIMUS MINOR, MAS.

- 2 a. *Chela dextra*.

* The specimens of Natural History collected in this voyage, and deposited in the Museum of the Royal College of Surgeons, have been figured for this work by permission of the Board of Curators.

GENUS OCYPODE, *Fabr.*4. OCYPODE URVILLII. *Guerin, Zoologie de la Coquille, Atlas, Crustacés, pl. 1. fig. 1.*

The descriptions of the *Crustacea* in the Zoology of M. Duperrey's voyage being still unpublished, I subjoin the following account of this species.

The carapace is ten lines in length, and twelve in breadth, convex, granulate, with a canaliculate margin. The *rostrum* is narrow, inclined, and rounded anteriorly; on each side of it are two incisures in the front of the carapace, lodging the eyes and their peduncles; the latter project slightly beyond the eyes, which are very large. The *cubiti* are dentated at the inner margin; the *manus* of the left *chela*, which is the largest in the specimen, is serrated at the outer margin; the digits are dentated internally, and are marked with longitudinal lines. The claws are compressed, and transversely striated. The *habitat* of the specimen was marked "Low Islands of the Pacific Ocean."

GENUS GRAPSUS, *Lamarck.*5. GRAPSUS THUKUHAR. *n. s.*

Grapsus clypei lateribus striatis; humeris, ulnis, carpique interne spinosis; femoribus supra et subtus spinosis.

Long. clypei, lin. 13. lat. lin. 15.

Color, fulvus brunneo-punctatissimus.

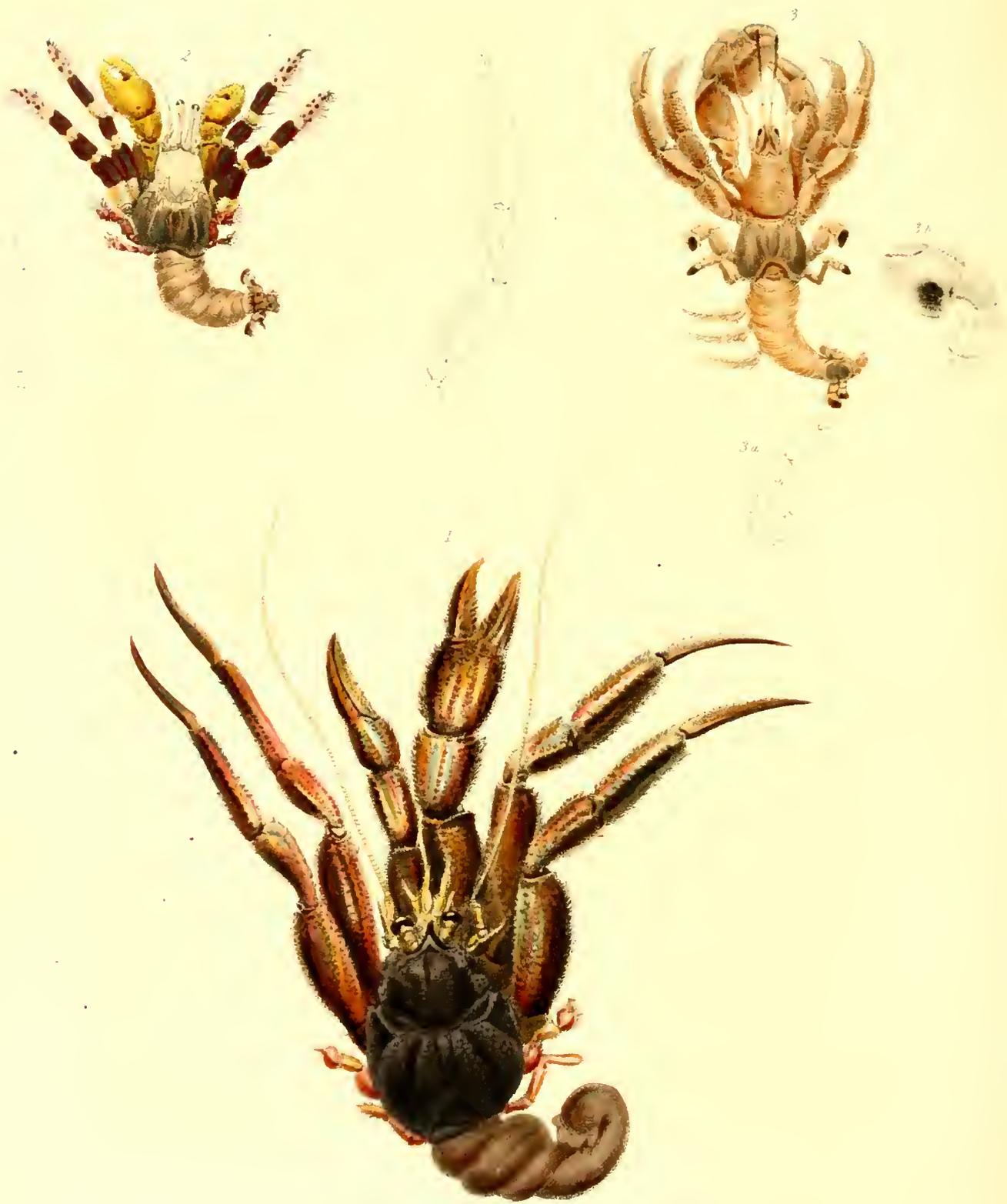
The carapace of this species is broadest in front; the sides slightly converging to the posterior angles, which are truncate. The *rostrum* is very broad, is inclined, and supports four prominences, of which the lateral are the largest. The sides of the carapace are without notches or dentations, but the anterior angles are produced and acute; there are oblique lines over the branchial regions. The *chela* are equal, short, obtuse; the *humeri* have two spines; the *cubiti* have their inner margins dilated and armed with spines; the *carpi* have also one or two spines at their inner aspect; each *manus* is slightly tuberculated at the inner and upper part, but elsewhere is smooth and elegantly mottled with purple. The claws are compressed; the *femora* have a single spine above, and two beneath, at the distal extremity; the other joints are hirsute, the penultimate and terminal ones being also armed with fine small spines projecting distad, and which must be of some service in progression, by preventing the claws penetrating too deep in the sand. The colour of this crab is a dull yellow, sprinkled closely all over with minute brown spots, like the skin of *Scpia officinalis*.

The specimen was captured by Mr. Lay at Oahu; where it is known among the natives under the denomination "*Thukuhar*," which I have therefore retained as the "nomen triviale" of the species.

PLATE XXIV. FIG. 3. GRAPSUS THUKUHAR.

3 a. *Chela sinistra.*SECTION CRYPTOPODA, *Latr.*GENUS CALAPPA, *Fabr.*6. CALAPPA TUBERCULATA. *Fabr., Entom. Suppl. p. 345. fig. Herbst, Krabben taf. 13. fig. 78. mala. Desmarest, Considerations sur les Crustacés, pl. 10. fig. 1. 1a.*

This species inhabits, according to Lamarck, the Atlantic Ocean. Fabricius, who described the species from the Banksian cabinet, and after him Herbst, consider it a native of the Pacific Ocean. The present specimen was taken at Oahu, Sandwich Isles. It is called by the natives, *Papahi*.



1. *Pagurus splendidicornis*. 2. *Pagurus pictus*. 3. *Trachita clypeata*

SECTION TRIGONA, Latr.

GENUS PARTHENOPE, Fabr.

7. PARTHENOPE PUNCTATISSIMA. *n. s.*

Parth. clypeo rhomboideo punctatissimo, chelis longissimis, trihedris, angulis dentatis.
Long. clypei, lin. 6. lat. lin. 7.

The carapace of this species is rhomboidal, universally punctate, and traversed longitudinally by two deep and broad furrows. The middle elevation is produced anteriorly in form of a *rostrum*, along the middle of which is a slight linear depression; posteriorly it is truncate, with the angles spiniform.

The lateral elevations are carinate, and each terminates posteriorly in a spine. The anterior margins of the carapace are crenate, the divisions increasing in size as they approach the lateral angles, which are spiniform, so that there are six spines altogether at the posterior part of the shell, being three less than in *Parthenope Regina*, Fabr. (*Entom. Suppl. p. 353.*) The middle elevation of the caudal joints is slightly indicated, and is without teeth; the last joint is triangular. The *chela* are twice the length of the shell, trihedral, with the sides equal, and shagreened. The dentate character is most distinct on the superior angle of the *ubua*; the superior and anterior angles of the *manus* are deeply crenate and ciliate; the fingers are ciliate, the *pollex* is curved, and internally tuberculate, the *digitus* (4) dentate and sharp-pointed. The claws are subequal, simple and slender.

This single specimen, a male, was taken by Lieutenant Belcher on the coast of California.

PLATE XXIV. FIG. 4. PARTHENOPE PUNCTATISSIMA.

MACROURA, Leach, Latr.

SECTION ANOMALIA, Latr. (*Cuv. Règne Anim. 4. p. 73. nouv. ed.*)

GENUS PAGURUS, Latr. Leach.

8. PAGURUS STREBLONYX. Leach, *Malacostraca Podophth. Brit. tab. 26. fig. 1—4.*

Two specimens were taken at Kamtschatka, which have the twisted claws, and all the other characters of *Streblonyx* save that of colour, being of a dirty brown hue.

The *manus* of the left *chela* of one of the specimens was of a more regular trihedral form than in our common Hermit crab, but this character was less marked in the other specimen. They are beset with minute *Spirorbis*, which very commonly infest the Arctic Crustacea.

9. PAGURUS SPLENDESCENS. *n. s.*

Pag. fuscus, colore viridi nitens; chelis longitudinaliter tuberculatis, sinistrae digitis valde elongatis.
Long. corp. unc. 3½.

This singular species has a convex and heart-shaped *thorax*, tridentate in front, with the middle tooth produced, and some smaller dentations behind the lateral teeth. This is divided, as is usual in the *Paguri*, into a cardiac and branchial region, but the line of demarcation splits to include a small elliptical portion on either side; the anterior angles of the branchial region project forwards,

and four longitudinal furrows are continued down it, arising at equal distances from the transverse groove; posteriorly it is deeply notched. The whole of the *thorax* is of a deep fuscous colour, and granulate, much resembling the back of a toad. The ophthalmic peduncles are short and thick, with the usual spine at the base. The lateral *antennæ* exceed the claws in length; the moveable process at their base is notched along the upper part, and terminates acutely. The mesial *antennæ* extend very little beyond the penultimate joint of the lateral *antennæ*. The first joint of the foot-palpe has three small teeth on the outer margin, and the inner margin finely dentate; the other joints are hirsute; the *flagrum* extends to the base of the fourth articulation. The *chelæ* are elongated, compressed, and of unequal size, the right being largest: beneath they are hirsute and granulate; above they bear longitudinal rows of small tubercles, and reflect hues of green and gold with a metallic lustre; a pink hue is also reflected in some positions. The fingers of each *chela* terminate gradually in points, and close without intervening space; those of the left are elongated, and are bent downwards. The second and third pairs of claws are longer than the *chelæ*, compressed, granulate, with serrated margins, and together with the peduncles of the *antennæ* reflect the same hues as the preceding pair; their ultimate joints are twisted as in *Pag. Streblonyx*. The fourth and fifth pairs of claws are very diminutive, and are hirsute at the extremity, but are unprovided with the dark-coloured rough plate which is observable in some species of *Pagurus*. The abdomen is shorter in proportion to the body than in most of this genus; it has a transparent oval horny plate on each side, near its connection with the thorax, but is without any lateral laminae, or ciliated appendages; at least there was no appearance of any in the three specimens from which the preceding characters were taken; but this circumstance may be peculiar to the males.

Kamtschatka is indicated as the *habitat* of this species.

PLATE XXV. FIG. 1. PAGURUS SPLENDESCENS.

1 a. Side view of the left chela, shewing the bent character of the digits.

10. PAGURUS ANICULUS. *Fabr., Olivier, Quoy et Gaimard, Zoologie de l'Uranie, p. 531. Atlas, pl. 79. fig. 1.*

A single specimen of this species was taken at Whitsunday Island by Mr. Lay, who has given the following note respecting its habits. "This specimen breathes water only, and dies very soon after being removed from that element."

11. PAGURUS GUTTATUS. *Oliv., Encycl. Meth. Ins. 8. sp. 3. p. 640. pl. 311. fig. 2.—Quoy et Gaimard, Zoologie de l'Uranie, Atlas, pl. 79. fig. 3.*

This specimen was captured at Carysfort Island.

The appendages of the post-abdomen in this specimen are situated on the left side, and are five in number; the three first are flagelliform, consisting of a stem or handle half an inch in length, from the extremity of which proceed three longer curved processes, provided with very fine hairs. The fourth appendage is a conical process from the side of the abdomen, the apex of which is elongated and hirsute: this may be accidental, for I have seen nothing analogous to it in any other species, and it is not noticed by Olivier, or Quoy and Gaimard. The fifth appendage is small, and consists only of two joints, the last being simple and ciliated. The whole of the under part of the abdomen has the roughened character which Mr. Broderip has ascertained to arise from the presence of numerous minute acetabula.

12. *PAGURUS PEDUNCULATUS*.* *Oliv., Encycl. Meth. Ins. 8. p. 647. sp. 31.*

Cancer pedunculatus. Herbst, 3. heft 4. p. 25. taf. 61. fig. 2.

A peculiar characteristic of this species, viz. the neat white band that girts the eye-peduncle, is obliterated in Herbst's figure by the carelessness of the colourer, who has passed the tint over it, though it is distinctly indicated in the engraving, and particularly mentioned in the text.†

In Olivier's account of this species, three dentations are described in the front of the carapace, which are exaggerated in the figure, whilst he altogether omits the white zone of the eye-stalk.

In the present specimen the colour of the *thorax* is white, with a slight lilac stain in the middle. The claws are a yellowish white, clouded with lilac. The left *chela* is much larger than the right, the inner margin of the *ubua* is produced in form of a dentated crest, the *carpus* is dentated above, and, together with the *manus*, is tuberculated externally. The antepenultimate joints of the second and third pairs of claws have two teeth superiorly at their distal extremity; the last joints are elongated, dentated superiorly, with a longitudinal line externally, hirsute, and terminated by sharp black claws. Most of the hairs in this species have a beautiful green colour.

The external foot-palpe has the first joint trihedral, with the internal margin minutely dentate, the teeth of a black colour; the anterior margin has also three small teeth, and the second joint is similarly armed on the same aspect; the other joints are simply hirsute. The *flagrum* is nearly as long as the foot-palpe, the first joint is enlarged, compressed, and extends to the third joint of the foot-palpe.

13. *PAGURUS PICTUS. n. s.*

Pag. parvus, chelis inæqualibus, digitis granulatis, sinistrâ majore; pedibus albis rubro armillatis, tertiis infra penicillato-hirsutis.

Long. corp. unc. 1, lin. 9.

Two specimens of this beautiful species were taken at Oahu, Sandwich Isles. The *thorax* is slightly punctate, of a white colour, and with faint indications of the tridentate character at the anterior margin. The ophthalmic peduncles are long, of a pink colour, with the scale at the base of a bright scarlet hue. The mesial antennæ do not exceed in length the greater chela: they are of a yellow colour.

The joints of the *pedipalpus* are slender; it is nearly equalled in length by the *flagrum*, whose second joint is dilated, having a transparent scale externally. The *chela* are obtuse, of a bright yellow colour, smooth, except the digits, which are studded with small white tubercles; the *manus* of the right *chela* is notched at the upper margin.

* The nervous system of this species consists, as in all *annulosa*, of ganglions regularly disposed, and brought into communication by a double nervous chord. The first or cephalic ganglion lies beneath the middle of the anterior margin of the *thorax*; it is square-shaped, and has four lobes faintly indicated; it gives off first the nerves to the eyes, below these, nerves to the *antennæ*, and then two small filaments, that pass down one on each side the stomach, and join a ganglion which supplies the *instrumenta cibaria* and *branchiæ*. The third is a large oblong ganglion, situated at the base of the *chela*, and extending to the base of the second pair of claws, both of which it supplies. The connecting chords then proceed separately for a short distance, and join a ganglion smaller than the preceding, which supplies the third long pair of legs. From its posterior part, this ganglion also gives off three pairs of nerves; the two inferior pairs go to the fourth and fifth diminutive claws; the remaining pair, which are very minute, are continued along the concavity of the liver, partly imbedded in that gland, and when they reach the anus, join a small ganglion which supplies the claspers at the extremity of the abdomen. The larger nerves evidently arise from the ganglions by a number of separate small fibrils.

† "Die Augenstiele selbst sind etwas gedrückt, roth, mit einer weissen Binde in der Mitte," p. 26.

The second and third pairs of claws are marked with alternate transverse belts of white and carmine, the latter being sprinkled with minute white spots, the last joint white with red spots; small stiff pink coloured hairs are scattered here and there over the claws; the third pair has besides several packets of moderately long hairs of the same colour growing from the under parts of the last and penultimate joints, resembling a brush.

The fourth and fifth claws have a roughened brown surface on the outer aspect of their terminal joints, which aids them in adhering to the pillar of the shell selected for their abode. The abdomen has four thin horny plates at its upper part, and as many short and slender ciliated appendages attached to the left side.

PLATE XXV. FIG. 2. PAGURUS PICTUS.

2 a. *Pedipalpus externus, auctus.*

GENUS CÆNOBITA, Latr.

14. CÆNOBITA OLIVIERI.

Cæn. magna, rubra, tuberculata, chela sinistra majore extrorsum muricata, immaculata.
Long. corp. unc. 5.

Pagurus clypeatus. Oliv., *Encycl. Meth. Ins.* 8. p. 643. sp. 14. pl. 311.
fig. 1.

After a careful comparison of the *Pagurus clypeatus* of Olivier with the description of the *Cancer clypeatus* of Herbst, I am of opinion they are distinct species.

Herbst expressly says, "Der Schild ist oben ganz glatt;" The shield is smooth above; "Die Hand ist auf der Oberfläche glatt; auf der Mitte steht ein grosser himmelblauer Fleck;" The hand (speaking of the left *chela*) is smooth above, and marked with a large azure spot in the middle. In neither of these respects does the *Pagurus clypeatus* of Olivier correspond with Herbst's species, having both the carapace and the upper part of the *manus* of the left *chela* muricated, and the latter without any spot. Moreover, Herbst's species is very small; he had not seen any the length of whose carapace exceeded half an inch, and consequently he gave a magnified view of the species (taf. 8. fig. 2 b.); and that it is a small species is proved by one of Mr. Lay's specimens, whose carapace is not quite an inch long, having ova attached to the ciliated appendages of the post-abdomen, and filling the Helix, its habitation, like the ova of *Oeythoë* in Argonauta Argo. In colour, also, which Herbst describes as a dirty white, clouded with brown or blue, the *Pagurus clypeatus* of Olivier is altogether at variance with the *Cancer clypeatus* of the German carcinologist: "Il est fort grand, et d'un rouge tres-clair," says Olivier—an expression which would naturally flow from the contemplation of such a specimen as is before me; and although he adds, "jaunatre ou brune," yet the united testimonies of Mr. Lay and Mr. Stutchbury, who have had opportunities of observing great numbers of Olivier's species in its native islands, are in favour of the bright red being the most prevalent colour.

The *thorax* of this species has the appearance of a roughened tuberculate surface which has been subject to attrition; so that while the middle projecting part is smooth, or impressed with puncta, the sides have retained the tuberculate character. The truncated anterior margin of the *thorax* is canalliculate, with the angles produced forward. The eye-peduncles are compressed, and converge, flattened on their inner aspect, convex externally, to which aspect the visual organ is confined, as indeed, from the close approximation and form of the supporting peduncles, it would be useless on the opposite side. The small scale, which in the *Paguri* usually is situated on the dorsal aspect of the base of the peduncles, is here situated between them. Both parts are marked with small white granules. The lateral *antennæ* are shorter than the *chela*; the mesial are almost as long as these; with their first joint conical, and bearing a flattened process at the upper part near the base; the superior of the terminal *setæ* is double the length of the inferior.

The external foot-palpe has all its joints unarmed, compressed laterally, hirsute; the second and fourth are longest, as in the *Paguri*; the *flagrum* extends very little beyond the second joint of the foot-palpe; its second joint is squammiform.

The left *chela* is largest; all the joints but the last are three-sided, smooth below and on the inner side, tubereulate externally; the *ulna* of the right *chela* has a notch at its upper margin. The fingers of both *chelæ* are obtuse at the extremities, and have tubereulate teeth externally. The *manus* in both is tubereulate externally, and has a tuft of short hairs at the upper and inner part, near the base; that of the left *chela* is more produced inferiorly, and has a ridge along the inner aspect.

The third pair of claws is longer than the second; both are universally tubereulate; the tubercles small, of a whitish colour, with a black apex; arranged in a serrated form along the upper margin of the proximal joints; these are of a rounded form, and are terminated by short obtuse claws. The last joints of the fourth and fifth diminutive claws have the roughened brown surface externally. The *post-abdomen* is shorter than the *thorax*; its concavity has a felted appearance from short downy hairs; there are no lateral appendages in the specimen; the terminal ones are as in the *Paguri*, with the exterior roughened surface on both the small elaspers.

The specimen was captured at Oahu, Sandwich Isles, and is said by Mr. Lay to abound in the Low Islands of the Pacific, where it is an article of food. The natives roast them, after pulling off their claws, which are scattered about. These fragments soon attract others of the species, which come to feed on the remains of their slaughtered companions, so that after the meal has commenced, an ample supply is thus kept up.

Mr. Stutchbury has informed me that they commonly select *Turbo setosus*, Lam. for their habitation, and that he has met with them dragging about this very heavy shell eight hundred feet above the level of the sea, in the Island of Tahiti.

15. *CÆNOBITA CLYPEATA*. Latr., *Fam. Nat.* p. 277. *Règne Anim.* 4. p. 77.

Pagurus clypeatus. Fabr., *Suppl.* p. 413.

Cancer clypeatus. Herbst, 2. p. 22. taf. 23. fig. 2. a, b.

Cæn. parva, albido-cæsia, thorace sublævi, chelâ sinistrâ majore extrorsum lævi maculâ brunneâ, supra lineâ tuberculatâ solitariâ.

Long. corp. unc. 2.

In this species the *thorax* is smooth, but in form resembles the former species, except that the posterior notch is proportionally deeper. The external *antennæ* are also longer, extending a little way beyond the greater *chela*. The internal *antennæ*, the *pedipalpi*, and the ophthalmic peduncles, correspond with those of *Cæn. Olivieri*; and the *chelæ* also, excepting the *manus* of the left, which is more convex externally, smooth, marked with a deep brown or blue spot, and has near the superior margin a single row of small tubercles. The second and third pairs of claws differ from those of the preceding species in having the ultimate joints of a trihedral instead of a rounded form. At the superior part of the abdomen are four narrow transverse crustaceous portions, to the left side of the three superior of which are articulated as many appendages, consisting of a short stem terminated by two ciliated processes, one much longer than the other.

The specimens were captured at Loo-Choo, in the sea of Japan. Herbst gives the East Indies as the native place of his species.

PLATE XXV. FIG. 3. *CÆNOBITA CLYPEATA*.

3 a. *Pedipalpus externus, auctus.*

3 b. *Chela sinistra.*

SECTION LOCUSTÆ, Latr.

GENUS SCYLLARUS, Latr.

16. SCYLLARUS ANTARCTICUS.* *Fabr., Suppl. Entom. p. 399. sp. 3. Fig. Seba, Mus. 3. tab. 20. fig. 1.—Herbst., taf. 30. fig. 2; Cancer (Astacus) ursus major.*

In Latreille's arrangement of the Genus Scyllarus, (*Nouv. Dict. d'Hist. Nat. t. 30. p. 450.*) this species would rank under a division intermediate to the two there proposed, which might be thus characterized:

II. *Oculi ex clypei angulis mediâque parte æquidistantes; articuli pedipalporum externorum secundi neque cristâ, neque sulcis transversis instructi.*

A. *lamina crustacea ex fronte prodeans.*

The figure in Seba represents more accurately than that of Herbst the small triangular crustaceous lamina projecting from the middle of the anterior margin of the carapace, and also the disposition of the larger tubercles along the middle line of the carapace. In Herbst's figure, probably taken from a dried specimen, the middle lamina of the tail is represented too short; it should extend as far as the lateral laminae. As the description of the latter carcinologist is limited to the forms and colouring of the carapace, and that of Fabricius to the specific formula, it becomes necessary to add that the first two joints of the external foot-palpe are trihedral, compressed, with their inner margins slightly dentated; the second joint having neither an outer dentated crest, nor transverse furrows, as in the *Ibacus Peronii* of Dr. Leach; from which species this specimen also differs, in having more numerous dentations (eight) along the front border of the peduncle of the external antennæ; and in having a less deep incisure at the sides of the carapace, extending only one-third of the way towards the middle line. Whilst, however, it differs in these particulars, in general aspect it closely resembles the before-mentioned species, and forms the connecting link between it and the species which have their eyes situated at the angles of the shell; for which reason, in addition to the objections urged by Latreille in the work above quoted, and in the *Encyclopedie Méthodique*, (Art. *Scyllarides*), the generic character proposed by Dr. Leach for *Scyllarus incisus*, Latr., appears not to be founded in nature. This specimen of Scyllarus has its stomach inverted. It was taken at Carysfort Island, and is called by the natives *Ula papapa*.

* In this species the first or cephalic ganglion is situated beneath the middle of the frontal margin; it is smaller in proportion than in other macrourous Crustacea, e. g. *Astacus* and *Palinurus*; it gives off a pair of nerves to the mesial antennæ, and a large pair which pass directly outwards to the eyes; the connecting chords diverge, pass down on either side the stomach, and approximate below, to join a large ganglion which is situated on the same transverse line as the deep lateral incisures of the carapace. From this ganglion nerves proceed to the *palpi* and *instrumenta cibaria*, and a large pair also passes outwards, gives off a branch to the muscles of the eye-stalk, and winds round the crustaceous septum that divides the branchiæ from the abdomen; it then proceeds downwards, and is distributed exclusively to the branchiæ.

After leaving this, which might be called the respiratory ganglion, the connecting chords diverge a little, and four ganglions are formed upon each chord before they again unite; these supply the first four pairs of legs, whilst the fifth derives its nerves from the ganglion formed at the junction of the chords. This divergence of the lateral chords may be observed in *Astacus* and *Crangon*, but in a less degree than in *Scyllarus*; it is most remarkable in the *Brachyuri*, the interspace being almost a complete circle in *Cancer Pagurus*. The degree of divergence has an evident dependence on the space which exists between the origins of the corresponding claws on each side. Six ganglions are situated on the remainder of the chords, which continue in apposition as far as the tail, where the last ganglion gives off three pairs of nerves, the two lateral supplying the lateral laminae of the tail, the middle pair passing on either side the termination of the intestine, to end in the middle lamina.



Handwritten text, possibly a signature or a note, located to the right of the faint illustration.



Circellana coccinea.

SECTION ASTACINI, Latr.

GENUS GRIMOTEA. *Leach, Dict. des Sciences Nat.* 18. p. 50.17. GRIMOTEA GREGARIA. *Leach, Fig. Zoologie de la Coquille, Atlas, Crustacés,*
*pl. 3. fig. 1.*Galathea gregaria. *Fabr.*"They were seen in great numbers floating past the ship during a calm, off St. Francisco, Dec. 1."—*Note by Mr. Lay.*

GENUS PORCELLANA, Latr.

18. PORCELLANA COCCINEA. *n. s.**Por. coccinea, chelis æqualibus, ulnis interne uni-dentatis, carpis quadri-dentatis, manibus supra carinatis.*
Long. clypei, lin. 11; lat. lvi. 9.

The carapace is rugose, grooved at the sides, and along the posterior margin; with transverse lines anteriorly, and oblique lines over the branchial regions: the *rostrum* is advanced, pointed, grooved along the centre, and uni-dentate at the sides. The *chelæ* are equal, large, compressed, slightly scabrous superiorly, smooth beneath; the *cubitus* on its inner aspect has a single tooth, the *carpus* four; the form of the *manus* when closed is lanceolate; above it is carinate; the outer margin is slightly and irregularly serrate; the digits are unarmed, are bent at their extremities, and close without intervening space. The *femora* of the second, third, and fourth pairs of claws are compressed, with the superior margin spinous and ciliate; the other joints are rounded, the last very short, and terminated by a simple curved claw. The *coxæ* of the third pair are perforated, the specimen being a female.

The external *antennæ* are as long as the *chelæ*; the first joint has a triangular plate internally, the second joint has a spine internally at the base, the last joint is setaceous. The internal *antennæ* have a spine externally at their base. The *flagrum* of the foot-palpe is simple, styliform, not extending beyond the middle of the third joint of the latter.

This species is a native of the Low Islands of the Pacific Ocean.

PLATE XXVI. FIG. 1. PORCELLANA COCCINEA. (*dorsal aspect.*)1 a. *Pedipalpus externus.*1 b. *Cauda feminae.*2. PORCELLANA COCCINEA, FEMINA. (*ventral aspect.*)GENUS CRANGON, *Leach, Malacostr. Brit.*19. CRANGON VULGARIS. *Fabr., Ent. Syst. Suppl. p. 410. Leach, Malac. Pod.*
Brit. tab. 27. B.

Specimens were taken at Monterey, California, which differ in no other respect from our common species, than in having the middle lamella of the tail a little more narrow and pointed.

20. CRANGON BOREAS. *Fabr., Suppl. Ent. p. 409.*Cancer Boreas. *Phipps, Voyage, p. 190. tab. 12. fig. 1.*Crangon Boreas. *Sabine, Zool. App. to Parry's Voyage, p. 235.*

21. CRANGON SALEBROSUS. *n. s.*

Crang. salebrosus, thorace septem-carinato, segmentis binis spinis utrinque terminatis.
Long. corp. unc. 4. Color fuscus.

Young and full-grown specimens of this species were taken along the shores of Kamtschatka. The general habit of the body is granulate and scabrous. The *thorax* is seven-carinate; the lateral *carinæ* serrate, the inferior ones indicated by tubercles longitudinally disposed, the middle one with two or three serrate, but not very acute or produced spines; a lateral *carina* is carried on by tubercles along the abdominal segments. It may be remarked, that these *carinæ* are neater and more distinct in the younger specimens, being confounded with neighbouring tubercles in the full-grown animal. The *rostrum* is short, depressed, grooved on each side. There is a short spine at the anterior margin of the *thorax* beneath the eye, and a large and considerably produced one at the inferior angle; other spines exist at the commencement of the *carinæ*: there are four spines beneath the *thorax*, as in *Crangon Boreas*. As in that species also, the *antennæ* do not exceed the length of the *thorax*. The abdominal segments terminate below in two spines, excepting the last, which has a single spine and a double *carina* along the *dorsum*. The ultimate joints of the fourth and fifth pairs of feet are slender, and curved, and terminate acutely.

PLATE XXVII. FIG. 1. CRANGON SALEBROSUS.

22. CRANGON LAR. *n. s.*

Crang. lævis, rostro emarginato, oculorum pedunculis approximatis porrectis.
Long. corp. unc. 3½.

One large and some smaller specimens of this species were taken in the Arctic seas, but the precise situation is not indicated. The length of the larger specimen is four inches. Its exterior is smooth and shining. The *thorax* has two spines behind the *rostrum*, one on each side at the anterior margin, and another some way behind these. The *rostrum* is elevated, but truncate at the apex, or emarginate; the eyes are situated immediately beneath it, their peduncles lying parallel with each other, and in the same line with the body. The second joint of the superior antenna is dilated and spiniform externally, the *seta* projects very little beyond the *lamina* of the inferior antenna; these, as in the preceding species, not exceeding the length of the *thorax*. The ultimate joints of the fourth and fifth pairs of legs are compressed and lanceolate. The abdominal segments are simply ciliate inferiorly; the first five are carinate above, the last has a double *carina* which is continued along the middle *lamella* of the tail, where towards the end they become indicated by lateral spines.

PLATE XXVIII. FIG. 1. CRANGON LAR.

GENUS HIPPOLITE, *Leach, Malacostr. Pod. Brit.*

23. HIPPOLITE ACULEATA.

Alpheus aculeatus. Sabine, Suppl. to Parry's Voyage, p. 237. pl. 2. fig. 9, 10.

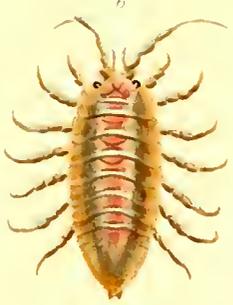
As it seems now agreed to restrict the genus *Alpheus* of Lamarck to those species whose second pair of claws are shorter than the first, I have referred this and the following species to the well-founded genus of Leach and Desmarest.

The specimens are from the Arctic seas.

24. HIPPOLITE ARMATA. *n. s.*

Hip. thoracis carinâ quadri-dentatâ, margine antico trispinoso, segmentis spinis binis aut ternis utrinque terminatis.
Long. corp. unc. 3, lin. 3.

In this species the *thorax* is granulate, with the inferior and posterior margin canaliculate; along the middle line it bears four elevated spines; the anterior margin has three spines. The *rostrum* is



1. *Stamona solobiusus*
2. *Staphylea amala*

3. *Staphylea solobius*
4. *Staphylea amala*



1. *Paramecium* - Lar.
2. *Hyphalite* - *circinata*

3. *Hyphalite* - *circinata*
4. *Paramecium* - Lar.

slender, extends to the root of the *seta* of the mesial *antennæ*, has two teeth above, behind the middle, as many beneath, before the middle; but the chief characteristic of this species, and that which distinguishes it from the preceding, which in other respects it closely resembles, is, that the second, third and fourth abdominal segments terminate below in three spines, and the first and fifth in two spines, whilst the last only is terminated by a single spine, directed backwards. The first joint of the superior or mesial *antennæ* has a long spine externally at the base, and a short spine at the same aspect of the apex; the second joint has also a spine externally at the apex, and the third has a spine at the apex, but on the upper part. The internal *seta* extends very little beyond the *squama* of the lateral *antenna*. The peduncle of the scale of the superior or lateral *antennæ* has two spines externally. The terminal *seta* is as long as the body, and spinous externally throughout its whole length. The *femora* of the third, fourth and fifth pairs of legs are spinous externally, the terminal spine being the longest. The last joint of the foot-palpe is hirsute, and spinous at the extremity. The middle *lamella* of the tail has two rows of eight spines each along the superior aspect.

This species is abundant on the shores of Kamtschatka.

PLATE XXVII. FIG. 2. HIPPOLITE ARMATA.

25. HIPPOLITE CORNUTA. *n. s.*

Hip. thoracis carinâ dentibus quatuor, margine antico trispinoso, setis antennarum superiorum elongatis.

This species presents the singularity of the internal *setæ* of the superior *antennæ*, being produced to nearly an equal length with the inferior *antennæ*, but in every other respect adheres closely to the generic type; and I am less inclined to consider it as other than a specific difference, from observing that the individuals of the genus *Crangon* differ considerably in the length of their *antennæ*, the exterior of which in our common species, and some others, surpass the length of the body; whilst in *Boreas* and *Lar* they barely reach beyond the thorax.

In this species of Hippolite, the *setæ* of the external *antennæ* are alternately annulated with red and white,* as in *Pandalus amulicornis*, Leach, and are spinulose along the inner aspect. The abdominal segments terminate inferiorly in two spines, of which the posterior is the longest; in every other respect the description of the preceding species will apply to this.

PLATE XXVIII. FIG. 2. HIPPOLITE CORNUTA.

26. HIPPOLITE PALPATOR. *n. s.*

Hip. rostrum brevi tenui, thoracis margine antico bispinoso, pedipalpis prælongis.
Long. corp. 1 unc. 10 lin. Color ruber.

This species may be easily recognised by the length of the feet-palpes, which extend forward beyond the second pair of legs. The second joint is spinous externally, and reaches to the root of the *seta* of the external *antenna*; the last joint is subhirsute and spinulose at the extremity. The *rostrum* in the single specimen I have examined had two spines above, and one beneath, near the apex; it extended to the penultimate joint of the mesial *antenna*. Behind the *rostrum* are four spines along the anterior half of the *thorax*, and there are two spines at the anterior margin, both below the eye; the rest of the *thorax* is smooth. The mesial *antennæ* do not extend beyond the *squama* of the lateral *antennæ*. These are longer than the body. The abdominal segments are ciliate inferiorly, but unarmed, save a small spine on either side the last segment. *Lamellæ* of the tail short and broad, the middle one with two rows of four spines each along the superior aspect.

It is a native of Monterey, California.

PLATE XXVIII. FIG. 3. HIPPOLITE PALPATOR.

* I suspect this is also the case in the preceding species, but the colour is too far gone to speak with certainty.

Two other species of Hippolite were also taken at Monterey, California, but their distinguishing features are less marked than the preceding; they may be thus characterized:

27. HIPPOLITE LAYI.

Hip. rostro acuminato, supra multi-serrato, ante medium subtus quadri-serrato.
Long. corp. unc. 2½. Color ruber.

PLATE XXVII. FIG. 3. *Rostrum auctum.*

28. HIPPOLITE AFFINIS.

Hip. rostro antennis superioribus brevioribus, supra multi-serrato, ante medium subtus sex-serrato.
Long. corp. 1½. Color ruber.

PLATE XXVII. FIG. 4. *Rostrum auctum.*

In addition to the difference in the serrations of the *rostrum*, which probably varies in different individuals of the same species, (although the number was constant as above quoted in three specimens of each species which were preserved.) *Hip. Layi* has a longer and narrower *rostrum*, extending to the extremity of the superior *antennæ*; the inferior *seta* of these *antennæ* is also proportionably longer. *Hip. affinis* has a spine above the eye, at the root of the *rostrum*, which is wanting in the *Hip. Layi*; whilst this species has the fifth and sixth abdominal segments unispinous inferiorly on each side, *Hip. affinis* having the sixth segment only so armed.

From the *Alpheus Polaris* of Sabine (Zool. Appendix to Parry's Voyage, p. 238. pl. 2. fig. 5.), which is a *Hippolite* of Leach, and from the species characterized by the latter author in the *Malaecostraca* Podoph. Brit., the above species differ in the forms and proportions, as well as in the serrations of the *rostrum*.

ORDO STOMAPODA, Latr.

SECTION UNIPELTATA, Latr.

GENUS SQUILLA, Latr.

29. SQUILLA CILIATA. Leach, MS. n. s.

Sq. flava, lævis, pedipalpis primis inermibus ciliatis, pollicibus secundorum tridentatis.
Long. corp. unc. 2. lin. 8.

This species has a smooth and polished body, of a yellowish colour. The penultimate segment of the abdomen has six spines, two of which are placed on the superficies, and four at the posterior margin. On the last segment are three *carinæ*, which end in spines; at the posterior margin are six spines, of which the middle two are moveable. The exterior of the natatory *lamellæ* of the tail is serrate along the outer margin, and unispinous at the extremity, to which a round ciliate plate is also attached; the inner *lamella* has two spines at the extremity.

The first pair of *pedipalpi* is long, slender, and terminates in a flattened oval plate, unarmed and ciliated. The pollex or moveable joint of the second pair has three elongated spines.

In the proportions of the *antenna*, and in the form of the natatory caudal *lamellæ*, this species resembles the *Squilla Chiragra* of Fabricius; but differs from it in having spines on the thumb, and from every other described species of *Squilla* in having the first pair of feet-palpes unarmed.

On looking over the Crustacea at the British Museum, I found a specimen of this species, with the *nomen triviale* here adopted attached to it, in the handwriting of Dr. Leach, but without other history. The present specimen was taken by Mr. Lay, at Woahoo, Sandwich Isles.

PLATE XXVII. FIG. 5. SQUILLA CILIATA.

- 5 a. *Antenna media.*
 5 b. *Antenna lateralis.*
 5 c. *Pedipalpus primus.*
 5 d. *Pedipalpus secundus.*

LEGION EDRIOPHTHALMA, *Leach.*

ORDO AMPHIPODA, *Latr.*

GENUS GAMMARUS *Latr. Leach.*

Cauda stylis geminatis, superioribus stylis subæqualibus.

30. GAMMARUS TYPHLOPS. *n. s.*

G. lævis, pedibus anticis articulo ultimo subtus serrato, processu inter antenas subacuminato, oculis vix apparentibus. Long. corp. lin. 15.

The body of this species is smooth and shining. The *head* is large, and vertical in position; it is overlapped by the first segment of the body. The first seven segments have lateral plates attached to them, of which that of the fourth is the largest. The *legs*, fourteen in number, are subequal, and terminate in simple curved claws, the first pair having in addition serrations along the under part of the last joint. Behind these are four pairs of spurious or natatory feet. The *tail* consists of six elongated processes, to each of which is articulated a pair of acuminate styles. A small triangular plate, which is bifid at the apex, overlaps the origins of the caudal processes.

PLATE XXVIII. FIG. 4. *Side view of GAMMARUS TYPHLOPS.*

- 4 a. *First claw.*
 5 b. *Caudal styles.*
 5 c, d. *Head and antennæ, magnified,*

of a specimen in which the superior *antennæ* have lost some of the terminal segments, and end in a black convex speck.

From the simple character of the feet, this species would probably have constituted a new genus with Dr. Leach; but as the superior *antennæ* manifest the peculiar character (*viz.* the styliform appendage at the fourth joint) of the group to which he has restricted the term *Gammarus*, it has not been thought advisable to separate it.

It is a native of the Arctic Seas.

ORDO ISOPODA, *Latr.*

GENUS IDOTEA. *Fabr.*

31. IDOTEA ENTOMON, *Latr.*

Oniscus Entomon. Pallas, Spicil. Zool. fasc. 9. p. 64. tab. 5. fig. 1. 2. 6.

This specimen, which measures four inches in length, was taken on the coast of Kamschatka.

32. *IDOTEA BICUSPIDA*. n. 5.

I. corpore elongato-ovato, caudâ apice bidentatâ, antennis tertiam corporis partem æquantibus.
Long. corp. lin. 14. Color, cinereus rubro maculatus.

This species appertains to the section which Latreille has characterised by the *antennæ* exceeding in length the head and first two segments of the body. (*Nouv. Dict. d'Hist. Nat.* XVI. p. 104.) It is readily distinguished from the species therein comprehended, by the triangular form of the tail, consisting of a single segment, smooth and convex above, and notched at the apex. The body consists of seven segments, the margins of which are slightly rounded off; the middle of each segment is more elevated than the sides, giving the appearance of two lateral longitudinal lines, as in the trilobites. There is an indication of a division of the caudal segment by two lateral incisions. The head is transversely quadrate; the eyes are convex, and situated in the angle of the head and first segment. The front is slightly produced, and has a shallow incisure anteriorly. The external *antennæ* are five-articulate, the last joint setaceous; the internal *antennæ* are four-articulate, and reach to the third joint of the external. The feet are simple, and ciliate beneath. The *instrumenta cibaria* agree with the detailed description given by Latreille, (*loco citato*, p. 99.) but the mandibles have black horny extremities. The portal *laminæ* which cover the branchial and ovarian appendages, open and close as in the preceding species, and reach to the end of the tail.

It is a native of the Arctic Seas.

PLATE XXVII. FIG. 6. *IDOTEA BICUSPIDA*.

REPTILES:

BY

JOHN EDWARD GRAY, F. R. S. &c.

EMYS ORNATA, *t.* 29. *f.* 2. *Gray's Syn. Rept.*, 30.—*Griffith, Anim. Kingd.*

The shell oblong, longitudinal, rugose, olive; costal and marginal shields, with a central black spot and dark-edged pale rings; vertebral plates irregularly ringed; the first ureolate, second and third long, hexagonal; beneath pale yellow, varied with two dark-edged pale lines in the centre, a double dark-edged pale line the whole length of the sterno-costal suture, and a series of eyed spots on the sutures of the marginal plates.

In the young the shields are fine green, with a central spot and some yellow and two bright orange rings on the costal shields.

Head yellow lined, with an interrupted orange streak on each side the occiput, and a forked one on the side of the throat.

Inhab. North America, Mazatlan.—A. COLLIE, Esq.

AMBLYRHYNCHUS SUBCRISTATUS. *Gray, Zool. Misc.* 6.

Head with unequal short broad pyramidal scales. Back and tail with a series of rather larger, short, broad scales, and a crest of seven or eight large short conical processes on the back of the neck. Scales short, conical, blunt, smaller on the neck and larger on the tail and limbs. Length twenty-one inches.

Inhab. Galapagos. Found in immense numbers on the small black lava rock, ten or twelve yards from the beach. They swim well, and are black when alive.

This species is very different from *A. cristatus*, which has a long dorsal crest, and long, triangular, conical, acute scales.

IGUANA TUBERCULATA.

The *I. cerulea*, (Seba. 1. *t.* 95. *f.* 2.) is only a young specimen of this species.

Inhab. Brazil.

IGUANA DELICATISSIMA, *Laur.*

Ig. nudicollis, *Cuv.*

Inhab. Brazil. The Baron Cuvier has made a mistake in referring the *Amblyrhynchus cristatus* of Mr. Bell to this species, to which it has not the least affinity.

IGUANA FASCIATA.

First described by M. Brongniart, (*Bull. Soc. Philom.* II. No. xxxvi. t. 6 f. 1.) as having been collected by Riche. It has been said since to come from Java, but it proves to be a common American species. Kuhl (and Daudin?) referred it to the genus *Agama*. Cuvier has formed of it a genus, under the name of *Brachylophus*, placing the genus among the *Agama*; but it has the palatine teeth, and all the characters of the true *Iguana*.

CYCLURA ACANTHURA. *Gray in Griff. Anim. Kingd.*

Lac. acanthura. *Shaw, Zool.*

Olive, black dotted and marbled with several black bands across the back, containing one or two oblong pale spots on the sides.

The end of the tail, which in this specimen had been re-produced, armless, covered with nearly uniform oval, keeled, rather small scales, somewhat like the scales between the rings of armed ones, but rather larger, more oblong, and more keeled.

OPHYESSA BILINEATA.

Olive black, with a broad transverse dark brown band, interrupted with a pale streak, down each side of the back; side of the head with three black streaks, diverging from the back of the orbit, the two upper arising from the back angle of the lid, and the third tending to the middle of the tympanum; chin, and beneath, greyish white; sides of chin and body, brown, dotted. Limbs and tail banded, bands of the tail becoming broader towards the tip. Scales of the back small, squarish, convex; of the outside of the limbs, larger, keeled; of the tail, broader, keeled, and thin; of the head, small, irregular, convex. Tail twice as long as the body and head; toes very long, and very unequal.

Inhab. coast of South America.

GENUS CHAMÆLEOPSIS.

Wiegmann's MSS.—Gray in Griffith, Anim. Kingd.

Head lyrate; forehead dilated, expanded over the eye; occiput compressed, produced, covered with small scales like the back. Tympanum exposed, nearly superficial. Teeth small, on the inner edge of the jaws, crown rather compressed, three-lobed; palatine teeth distinct, subulate, in a single row. Nostrils small, round, pierced in the centre of a rather larger scale, placed on the side of the head, rather nearer the tip of the muzzle than the angle of the eye. Throat slightly dilated, covered with longitudinal rows of large keeled scales. Body compressed, covered with small scales. Back, with a slight denticulated crest of rather larger scales. Ribs apparently encircling the body. Limbs long, slender. Toes, five, five, long unequal, especially the hinder ones. Claws five, five, sharp, incurved. Femoral or subanal pores, none. Tail long, slender, tapering.

This genus has much of the external appearance of the chameleons; but its toes are regular and free, and its teeth, like those of all the *Saurians* of the New World, are placed on the inner edge of the jaw. It has a considerable affinity to the basilisk in habit, but differs in the form of its head, and in the tail being round.

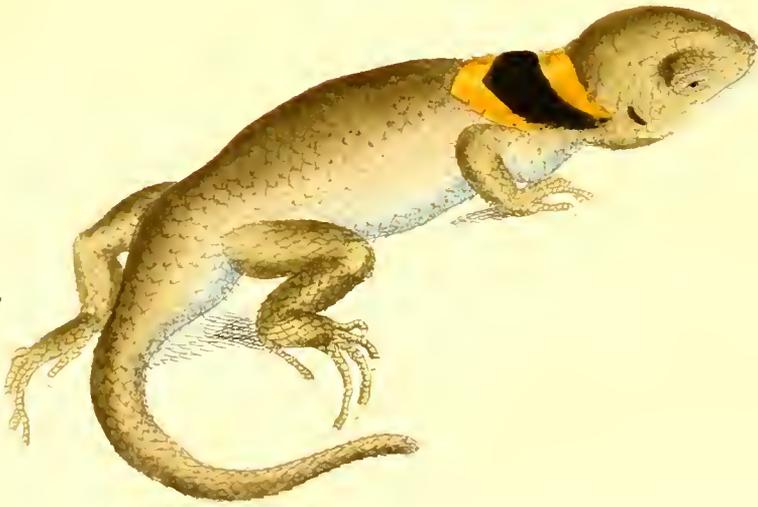
CHAMÆLEOPSIS HERNANDESI, t. 30. f. 1. *Wiegmann's MSS.—Gray in Griffith, Anim. Kingd.*

Pale brown, (under the epidermis, whitish) varied with irregular brown spots and bands. Tail brown, with distant whitish bands. The edge of the lips brown spotted, with a band across the fore-

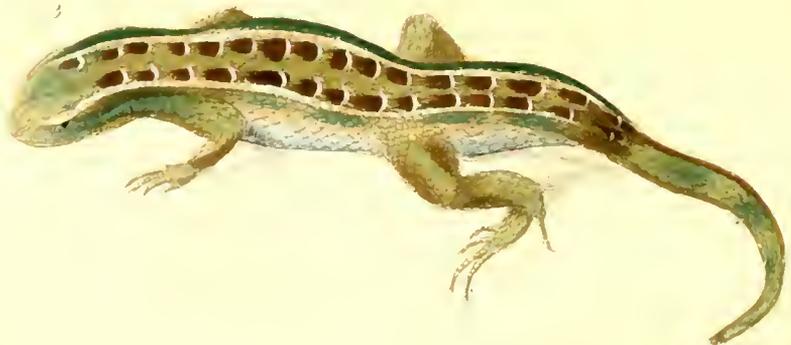
1



2



3



head, widening on the orbits, so as to enclose the eyes, and extended across the cheek to the ears. Forehead rather concave, quadrangular, longer than broad, rounded in front, slightly produced into an angle over the eyes, and contracted into a sharp arched crest on the occiput, covered with sub-equal flat scales, having a pearly appearance. Sides of the head concave, with an angular prominence over the upper front edge of the ears, and a ridge of larger keeled scales, extending on the side of the occipital crest, to the back of the forehead. Labial scales, oblong and sub-equal. The throat covered with longitudinal lines of larger keeled scales, with a rather larger central series, forming an obscure crest. Scales of the body small and thin, with an obscure subspinose tip, larger along the dorsal ridge, forming a slight crest, and smaller on the sides; those of the belly, limbs, and tail larger, keeled; the scales of the toes forming three ridges. The inner and outer fore toes short, the middle ones longer, nearly equal, the inner hind toes reaching just to the first joint of the second, the second toes to the second joint of the third, and the outer to the knuckle-joint. Length of head, 10 lines; of head and body, $2\frac{1}{2}$ in.; of tail, $5\frac{1}{2}$ inches; height of occipital crest, 9 lines; length of thigh and fore leg, 9 lines; of hind feet, 1 inch.

TROPIDOLEPIS TORQUATUS, t. 30. f. 2. *Gray in Griffith, Anim. Kingd.*

Sceloporus torquatus. *Wiegmann, Isis, 1828, xxi. 364.*

Olive brown, pale greenish white or blue beneath. Nape with a broad black band, edged above and below by an arched orange yellow (in spirits, yellowish white) band; the front band commencing a little behind the ears, and deeply curved, the hinder commencing just above the fore leg, over the front of the base of which it extends. Scales large, of the back broad, short, concave, with raised edges and a terminal, central, slightly raised and extended keel, which is serrated at the tip. Those of the neck rather smaller; of the legs and tail, especially those of the latter, longer and more distinctly keeled, and dagger-pointed. The scales of the thighs smaller than those of the fore legs. Those of the tail largest, becoming narrower and longer towards the tip. Scales of the belly moderately smooth, entire edged, rather smaller on the neck, and considerably smaller at the throat and before the vent; of the under sides of the limbs smaller and longer, especially on the under side of the hind legs and tail. Scales of the head numerous and symmetrical, with a large parietal shield, pierced with a hole; and smaller smooth scales over the eyebrows. Lips with a double or treble series of long narrow scales, the hinder ones of which are keeled; those of the under lip with a series of white squarish scales below them; central labial scale unique. Body and head depressed; ears large, fringed by a series of scales in front; limbs short and strong; toes unequal; femoral pores large and distinct.

Length of body and head, $3\frac{1}{2}$ inches; of tail, $3\frac{1}{2}$ inches.

Inhab. Mexico. In the collection of the British Museum, and that of Mr. Bell.

This species was first described by Dr. Wiegmann, who formed from it and some other species a new genus, under the name of *Sceloporus*, not being aware that it belonged to a genus which I had before established, under the name of *Tropidolepis*, for a North American species.

TROPIDOLEPIS SCALARIS. *Gray, tab. 30. f. 3.*

Sceloporus scalaris. *Wiegmann, Isis, 1828, 364.*

Olive, with a white streak down each side of the back, and two series of large irregular spots, edged behind with a slight pale line; beneath silvery white; chin with many bluish green bands; sides varied with bluish green and black. Scales of back keeled, entire; of belly smooth; of tail keeled, the upper ones dagger-pointed.

Inhab. Mexico.

GERRHONOTUS IMBRICATUS, *t. 31. f. 1.* *Wiegmann, Isis.*, 1828. xxi. 364. *Bul. Sci. Nat.* xvii. 298.

Olive green; head white, speckled; sides of the neck, body, and tail, white spotted, the spots placed on the end of the scales; beneath, greenish silvery white. Tail, base compressed, angular above. Body angular above, flat beneath; limbs short.

Scales of the head convex, smooth, symmetrical, with a long seven-sided sunken parietal plate, much larger than all the rest, with two triangular central plates behind it; all the other plates in pairs. Scales of the back rhombic, with an acute elevated oblique keel, forming ridges, placed in six or eight series; those of the outer series least keeled. Scales of the sides similar, rather smaller, and nearly keelless, with a wide band of granular scales between them and the ventral scales. Scales of the upper part of the tail larger, similar, more strongly keeled, and placed in four series; of the sides of the tail similar, smaller, and not keeled.

GERRHONOTUS BURNETTI, *t. 31. f. 2.*

Above olive brown, varied with unequal blackish bands; sides yellow speckled; beneath yellowish white. The yellow spots are on the tips of the dark scales which form the bands.

Scales of the back in twenty or twenty-two rows; those of the six or eight central series the most keeled. The scales of the belly twelve-rowed and smooth. The scales of the head are rather convex, and smooth; of the body square, with an oblique keel, commencing from the middle of the hinder part, and continued to the upper angle of the outer edge. The tail about as long as the body, thick, compressed on the sides, and flattish above.

Length of the body and tail eight inches.

This genus is nearly allied to my genus, *Cicigna*, but differs from it in having no femoral pores.

PHRYNOSOMA BLAINVILLII, *t. 29. f. 1.*

Body yellow and brown marbled, back with scattered larger scales; sides with two series of compressed scales, those of the upper series the largest; the scales of the body moderately smooth, and keelless; of the throat moderate, with three or four oblique diverging closer series of larger pointed scales, placed on each side of the middle of the throat.

Inhab. California.

PHRYNOSOMA WIEGMANNI.

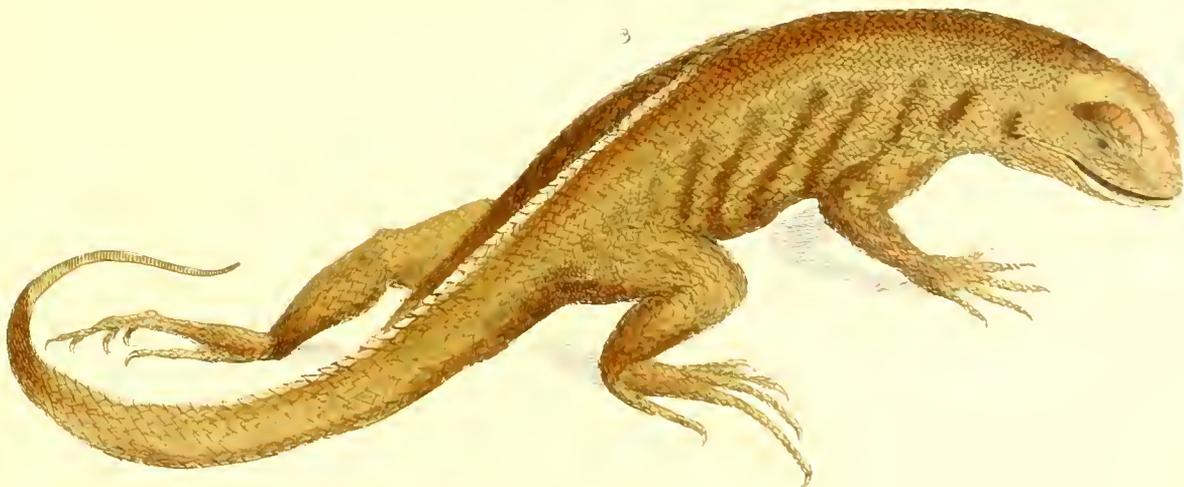
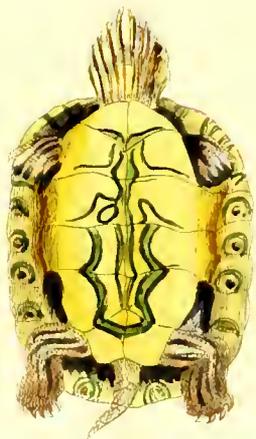
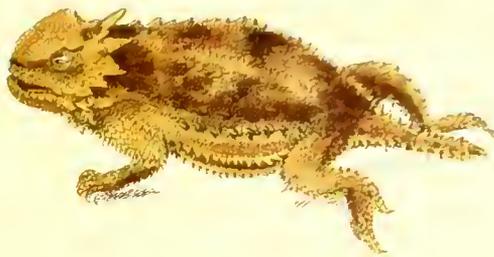
Middle of the back with scattered large scales; sides of the back with two series of large, long, acute angular scales, the upper lateral series largest. The sides of the body with a single series of long, compressed, recurved, spine-like scales, with a band of small scales beneath them. Scales of the belly smooth, and keelless; of the throat, small, smooth, and equal, with a collar of minute granular scales round the lower part of the neck.

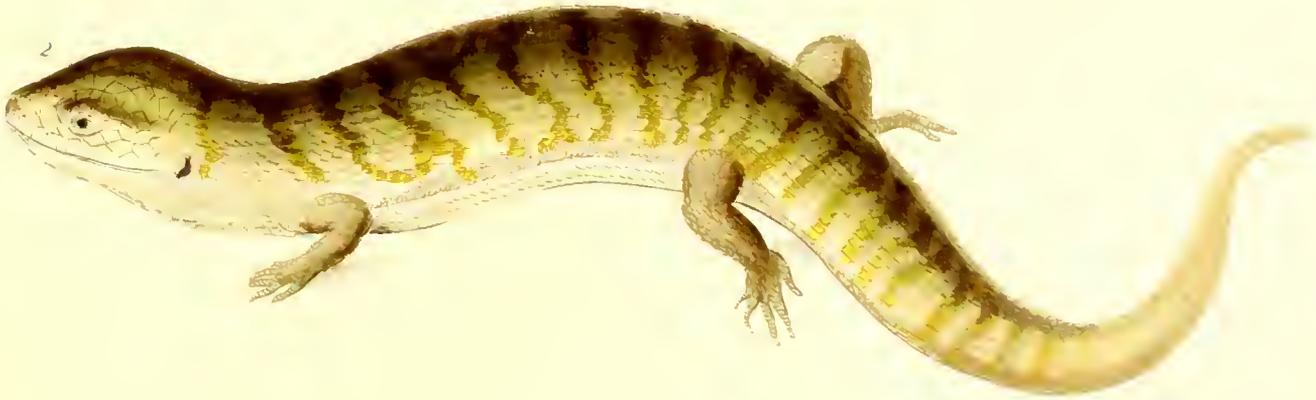
Length 6 in.; tail $1\frac{1}{2}$ in.; width of sides, $1\frac{1}{2}$ in.

From specimens in the collection of the British Museum and W. Ogilby, Esq. From Mexico. This may probably be the *Ph. orbiculare*, Wiegmann, *Isis*, xxi. 361.

From these two species Dr. Harlan's *Agama armata* (*Phrynosoma Harlani*) appears to differ; the latter agrees with *Ph. Blainvillii*, in the double series of lateral scales and in the dorsal scales, but the throat in the figure has very small scales, with only a single oblique ridge of one or two series of rather larger scales on each side. The belly scales are smooth.

Dr. Wiegmann has described another species from Surinam, under the name of *Ph. bufonium*, which has a double series of lateral scales, and the ventral scales keeled; and must, doubtless, be distinct from either of the above.







To these must be added the *Agama Douglasii* of Mr. Bell. *Lin. Trans.* xvi. t. 10. *Phrynosoma Douglasii*, which has no lateral fringe, and the back scattered with trihedral larger scales.

Thus there are at least five species of this genus, which are all peculiar to America. Specimens of three are in the collection of the British Museum.

LEIOCEPHALUS CARINATUS, t. 29. f. 3. *Gray in Ann. Phil. and in Griffith, Anim. Kingd.* 42.

Inhab. South America.—Cab. Brit. Mus.

COLUBER (NATRIX) SUBCARINATA, t. 32.

Above olive brown; sides obscurely brown spotted, beneath yellow; with a black-edged pale dorsal band, two half scales wide. The body fusiform; the head rather depressed, with one rostral scale, triangular notched below. Nasal scales triangular, with nostrils pierced in their centre; with two triangular internasal plates, and two rather larger fronto-nasal plates; two frontal and one nearly equal-sided superciliary scale on each side of it, and two larger parietal plates; one anterior and three posterior orbital scales on each side, with a very small triangular scale between the anterior one and the nasal plate. Mouth very large, gape reaching beyond the eyes. Upper lips with eight, and lower with ten labial scales on each side; the first lower lateral scales on each side very long. Mental plates, two pairs, the hinder largest, with three or four cross series of gular scales before the gular plates. The dorsal scales lanceolate, keeled, in about seventeen longitudinal series; the two central series strongly keeled, with the keels diminishing in distinctness, and the scales increasing in width towards the sides, so that the scales of the series next the abdominal plates are hexagonal, as broad as long, nearly twice as broad as the vertebral scales, and almost smooth. The ventral plates about one hundred and forty, wide, regularly arched, and yellowish. Tail conical, tapering slender, about one fourth of the length of the body, with eight or nine series of strongly-keeled hexagonal scales above, and with about seventy pairs of subcaudal plates. Length of the body, two feet; of the tail, seven inches.

Inhab. common in the hedges of Xalisco, a province of Mexico.—Tradesant Lay, Esq.; the specimen in the Museum of the College of Surgeons.

This species is nearly allied to *Coluber bicarinatus* of Prince Maximilian of Wied, (*Reise in Brasilien*, I. 181), and the *Natrix bicarinata* of Wagler, (*Serp. Braz.* t. 7;) but the latter describes the tail of his snake as more than half the length of the body, and the two dorsal series of scales alone as keeled, and observes that the others are six-sided, with a scarcely elevated line; none of which characters agree with the specimen under consideration.

BATRACHIANS :

BY

JOHN EDWARD GRAY, F. R. S. &c,

BEECHEY'S SALAMANDER. *Salamandra Beecheyi*. t. 31. f. 3. *Gray in Griffith, Trans. Anim. Kingd. App.*

Above black, smooth, with scattered elevated roundish granular tubercles. The chin, throat, abdomen and under side of the hind legs and tail, yellow, mingled with very minute pale, immersed dots, which are larger on the sides of the body and throat, where they appear to be pierced with a pore. Vent with a black cross band. The head is depressed, rounder in front, and very wide behind. The tail is rather longer than the head and body, rounded at the base, and compressed at the end, with a yellow slightly elevated keel along its upper and lower edge. The limbs moderate. The toes, four before and five behind, depressed, and separate; the inner ones of all the feet are very short, and rudimentary; the outer ones rather longer, but shorter than the central ones, which are nearly equal.

The skin of the upper part of the body and head, when the epidermis, which appears to be very fugacious, is taken off, is whitish, with very minute black specks, and the round tubercles are more minute; perhaps the sunk dots and pores on the under part of the body are only visible when the epidermis has been removed, in which state, alone, I have seen those parts.

Length of the head, 10 lines; of the body, 1 inch, 11 lines; of the tail, $3\frac{1}{2}$ inches; fore feet and toes, 8 lines; thighs, 6 lines; hind legs, $4\frac{1}{2}$ lines; hind feet 6 lines; width of the head, 7 lines.

A second specimen, which was rather larger, had the tail only one line longer than the body and head, and varied in the throat being slightly spotted with black.

Inhab. Monterey. Specimen in the Museum of the College of Surgeons.

Eschscholtz, in his Atlas, has described four Californian species of this family :

1. *Salamandra attenuata*. *Esch. Atlas, t. 21.*

He has published considerable anatomical details of this species.

2. *Triton ensatus*. *Esch. Atlas, t. 22.*

3. *Triton torosus*.

4. *Triton tereticauda*.

EXPLANATIONS OF THE PLATES OF REPTILES AND BATRACHIANS.

TAB. XXIX. F. 1. *PHRYNOSOMA BLAINVILLII*, p. 96.

2. *EMYS ORNATA*, p. 93.

3. *LEIOCEPHALUS CARINATUS*, p. 97.

TAB. XXX. F. 1. *CHAMELEOPSIS HERNANDESI*, p. 94.

2. *TROPIDOLEPIS TORQUATUS*, p. 95.

3. *TROPIDOLEPIS SCALARIS*, p. 95.

TAB. XXXI. F. 1. *GERRHONOTUS IMBRICATUS*, p. 96.

2. *GERRHONOTUS BURNETHI*, p. 96.

3. *SALAMANDRA BEECHEYI*, p. 98.

TAB. XXXII. F. 1. *COLUBER (NATRIX) SUBCARINATA*, p. 97.

**MOLLUSCOUS ANIMALS,
AND THEIR SHELLS:**

BY

JOHN EDWARD GRAY, F. R. S., &c.

INTRODUCTORY REMARKS.

IN the following memoranda I have given such observations as I have been enabled to make on the animals of the various genera, brought home either by Captain BEECHEY's expedition, or by several other voyagers, as Captain Lord Byron, Mr. Fryer, and the Rev. Mr. Hennah, who about the same time touched at several parts of the world which were also visited by this expedition. I have been induced to follow this course, rather than to give only a description of the new species discovered by the officers of the expedition, (as it was my intention to have done when first the specimens were put into my hands), because Mr. SOWERBY and Mr. BRODERIP, almost immediately on the return of the expedition, described many of the new and interesting species discovered during the voyage, specimens of most of which were given to the Zoological Society by Lieutenant (now Captain) BELCHER, one of the officers of Captain BEECHEY's ship. In my MSS. I had given names to most of the species, but I have since substituted those used by the above-mentioned gentlemen, that science might not be burthened by the many useless names which an opposite course would have produced.

Many of the descriptions of the animals are from specimens brought home by the expedition, and subsequently presented to the Naval Hospital at Haslar by Mr. MILLER, a most able anatomist, and very accurate observer; others are taken from specimens in the collection of the British Museum; and very many from the collection of Mollusca in the Garden of Plants at Paris, where, through the great kindness of M. de Blainville, I was allowed to work

daily for nearly a month in examining the animals of the various species of Mollusca which the Baron Cuvier and his pupils had been collecting together for several years, and which he had most carefully preserved for his own use, for his intended new edition of his anatomy of Mollusca, a work the loss of which we must all most sincerely regret.

All the descriptions (with the exception of a few of the English species) are taken from animals preserved in spirits, and which had in consequence become much contracted in many of their parts.

I have only given a *zoological* description of the animals; as according to the rules of the British Museum, we are very properly forbidden to dissect the animals under our charge, which might thereby be rendered useless for subsequent observers. Sensible of the propriety of this regulation, I was careful not to injure any of those which I examined in the French and Dutch museums, although in many cases there were several duplicates, the anatomical details of which may hereafter be examined by those who are able to bestow more time on the subject.

The examination of the numerous genera of Mollusca which I have been enabled to make, has not only induced me to alter the position of some of the genera, but has also discovered to me the important fact, that there is often a great difference between the animals of two very similar shells. This is very apparent between *Littorina* and *Assaminea*, the shells of which resemble each other so nearly as scarcely to be distinguishable, and yet the animals are very different.

These descriptions, short as many of them are, will be regarded as of more importance to the Zoologist, when it is considered, that, with the exception of the few animals dissected by Cuvier, and published in the *Annales du Muséum*; and those which Blainville examined in the collection

of the British Museum, in 1814, almost all the descriptions of the animals given by Blainville and Rang, as well as many of those in Cuvier's Animal Kingdom, are taken from the figures in Adanson, Argenville and others, and not from the animals themselves. In some instances, indeed, the description has not even been taken from figures which really belong to the genus—as is the case with *Natica*; the description of this animal in Blainville and Rang being derived from the *Fossar* of Adanson, which is probably a *Littorina*; and again, Lamarck has in the most extraordinary manner united the animal of *Coriocella* (the *Sigaret* of Cuvier), and the shell *Sigaret* of Adanson to form his genus *Sigaretus*, without discovering that they belonged to different orders.

To the descriptions of the animals I have not only added a short account of such of the species and genera as were new, but have also noticed such other species collected by the officers of the expedition, or by the before-mentioned gentlemen, as furnished me with any new observations, either in reference to their nomenclature, or to their natural history.

CEPHALOPODES.

NAUTILUS.

If the animal is naturally situated in the shell, as it is figured in Mr. Owen's anatomy, it offers a great peculiarity in its position with regard to the shell, for in most molluscos animals the shell is applied to the back, and the apex is directed from the front, so that the last whorl but one of the shell is applied to the ventral side, where the gills are placed in this genus. This is the case with the cuttle fish, where, if the apex of the bone were elongated, and twisted into a spire, the whorls would be placed as in most of the genera of spiral shells; but in *Nautilus*, according to the figure above referred to, it is exactly the reverse of this position, the spires being directed from the ventral side, so that the last whorl but one is applied against the back.

A position of the shell similar to that here given to the *Nautilus* is certainly to be found in the genera *Patella* and *Lottia*, where the apex of the shell is directed towards the head, instead of, as in all the other conical shells, in which it is directed towards the tail, so that, if any of these shells were spiral, the whorls would be as in *Nautilus*; and a somewhat similar position is also to be found in most bivalves, but it is not easy to compare the animals of these latter shells with the *Cephalopodes* or *Gasteropodes*.

It is certainly desirable that the truth of this position should be verified. If the animal were placed in the shell in the opposite direction, the flap (*t. 1. f. 6.* of the illustrations of Mr. Owen's memoir) would explain the reason why the front part of the outer whorl is not coloured like the rest of the shell, as this part of the shell would then be covered from the atmosphere.

GASTEROPODES.

STROMBUS.

The foot is more or less rounded beneath, so that it can be of very little use for the animal to walk upon. There is a groove in the females on the right side of the body, which is continued across the front edge of the foot; the crystalline lens* of the eyes is large, perfectly globular, and horn-coloured, and easily extracted, by pressing the end of the pedicle of the eye. The operculum is free for the greater part of its length, claw-shaped, and only marked with a small scar.

A young specimen of *Strombus gigas*, in the collection of Mrs. Atkins, which has been cut through the cavity of the upper whorls, is nearly filled with a calcareous deposit of a rosy tint, and this same deposit fills up the hinder angle of the cavities of the lower whorls.

APORRHAIIS.

The tentacles are far apart at the base, very long, slender; the eyes are rather large, and placed near the outer base of the tentacles; the trunk is large and expanded; the foot is flat, rather narrow, but like the foot of other *Gasteropodous Mollusca* in shape; the operculum horny, annular, small with a sub-central scar, surrounded by a callous edge.

It is remarkable that the animal of this genus, the shell of which is so like *Strombus* in character, should be so different from that of the latter. It is figured by Muller in the *Zool. Dan. t. 87.*

I have adopted the above genus, which was formed for this shell by Dacosta, as I believe it to be different from *Rostellaria*—my friend, Dr. Ruppell, having informed me in a letter, that the true *Rostellaria* has an animal exactly like *Strombus* in form and in the position of the eyes.

* It is remarkable that any person should have doubted the use of the black dot called eyes in Mollusca, as Swammerdam long ago described the humours and crystalline lens in the eyes of the snails (*Helix*), and the iris round the eyes of the periwinkle (*Littorina*). The lens is to be found of a large size in most of the marine spiral shells, and the iris is of a different colour in the different species of Strombs.

STRUTHIOLARIA.

The tentacles are subulate on each side of the base of the thick elongated conical trunk ; the eyes are placed on short pedicles near the outer base of the tentacles ; the foot short, peduncled, not folded. The gills are formed of very fine thread-like fibres ; there is a groove and a slight tubercle on the side of the right tentacles ; the operculum is very small, horny, ovate lanceolate, with an elongated conical tip in front.

The animal is very like the animal of *Aporrhais* in form and character, and justifies the position which I had long ago proposed for the shell, next to *Rostellaria*, before I knew the animal.

STRUTHIOLARIA MICROSCOPICA. *n. s.*

Shell ovate, conical, whitish, with a narrow brown central band ; whorls rounded, with two very indistinct keels ; suture crenulated ; the outer lip margined externally, with two large teeth on the outer edge, one in the middle, and the other in front near the siphon.

Inhab. Indian Ocean. Paris Museum.

PHIOS, MONTFORT.

The tentacles are high up, very long and slender, placed close together at their base ; with the eyes placed near their tips, which are rather slender beyond them ; the foot is peduncled, expanded ; the penis is very long, slender, subulate ; the respiratory siphon is elongated ; the operculum is small, ovate, horny.

The shells of this genus have been confounded with *Nassa* and *Cancellaria*, but they differ from both in having a sinus in the front of the outer lip, like the *Strombidæ*, and in the front of the pillar having a single sharp marginal plait.

The species are numerous ; I have at least ten in my possession. The genus *Cyllene* chiefly differs from this in having a groove extending up the suture like *Oliva*.

MUREX.

The tentacles cylindrical, with the eyes placed within one-third of the top, and the tip above the eyes very thin and slender. (*M. Pomum*.)

MUREX VITULINUS, *t. 33. f. 4. 6. Lam. E. M. 319. f. 1.*

Murex militaris. *Gmel. 35, 36.*

Murex purpura scabra. *Chem. f. 1832-33.*

Murex salebrosus. *King, Zool. Jour. v. p. 347.*

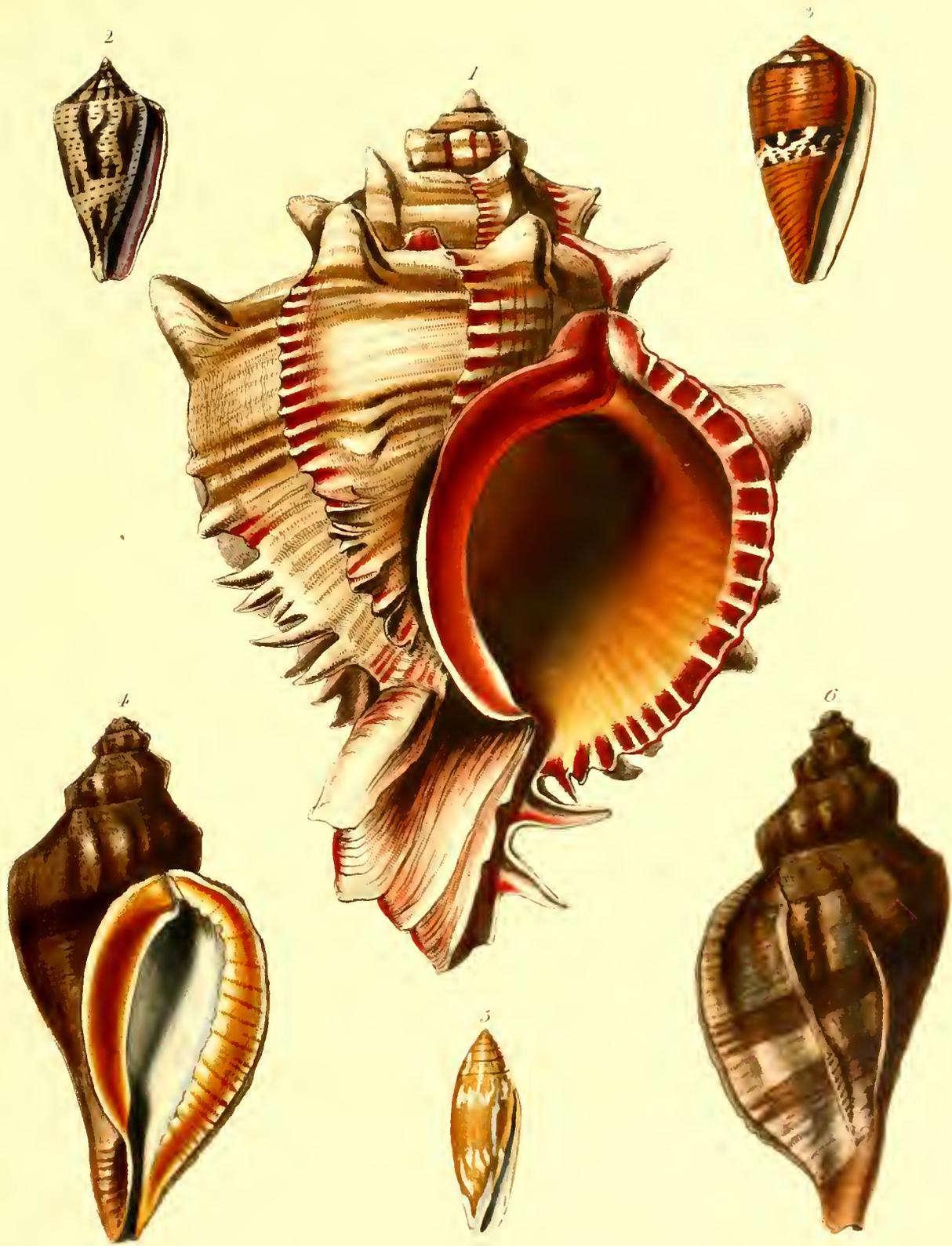
The specimens brought by this expedition are larger than those formerly in the collections ; they do not differ in any character of importance, and certainly can only be regarded as a local variety.

MUREX BRASSICA, *t. 33. f. 1. Lam. Hist. vii. 167.*

Murex ducalis. *Brod. and Sow. Zool. Jour. iv. 377.*

Inhab. Pacific Ocean.

I have compared this shell with Lamarck's own specimen, in the collection of the Prince Massena, and it agrees with the one here figured in every particular ; that it is the shell he described is proved by its having the name written on it by Lamarck himself.



MUREX IATONUS. *E. M. t. 418. f. 1.*

Murex lingua vervecina. *Chem. x. f. 1540-41.*

Murex lingua. *Wood. Cat. f. 14.*

Iaton. *Adanson Seneg. t. 9. f. 21.*

Murex gibbosus. *Lam. 366. n. 30.*

Inhab.

MUREX ACANTHOPTERUS. *Lam. 165.*

Murex monodon. *Esch. Atlas, t. 9. f. 1.—E. M. t. 417. f. 2.—Schroet. Ein. 1. t. 3. f. 8.*

Murex phyllopterus. *Sow. Gen. f. 5. not Lam.*

Murex foliatus. *Wood. Cat. t. 25. f. 13.*

Murex purpura alata. *Chem. x. f. 1538-39.*

Inhab. Pacific Ocean, New Zealand, &c.

The specimen of *M. trigularis*, in Lamarck's cabinet, is only one of this species, with the varices filed down to an even edge; and I may here remark, that *M. tenuirostris*, of the same cabinet, is *M. tenuispina*, with the spines filed off.

MUREX MONODON. *Sow. Tank. Cat. n. 1703.***MUREX INFLATUS.** *Lam.*

Murex ramosus. *Lam.—Martini, f. 980-81.*

A common species. Sometimes the processes of the varices are short, conical, and not branched, when it is *Murex anguliferus* of Lamarck, and *M. Costatus* of Gmelin, from Martini, *f. 1029-30*, and *M. Senegalensis* of the same author, from *Le Sorat* of Adanson, *t. 8. f. 19*. The tubercles between the varices are rarely produced into a varix, so that the shell has six instead of three varices on each whorl, which proves that these tubercles are what some of the German naturalists would consider as abortive varices.

The above four species are distinguished from all the other *Murices*, which generally have three varices. In having a spine like *Monoceros* on the front of the outer lip. This character is also found in *Murex crassispina*, and one or two other long-beaked species.

Mr. Turner informs me, on the authority of the person who collected these shells, that the different species of rock shell, (*Murex*) of the Pacific ocean have the following geographical distribution:—The *Murex regius*, and common variety of *Murex radix*, are found at Panama; further north occurs the wide-variced *Murex radix*; and further north still the *Murex Brassica* of Lamarck, the *Murex ducalis* of Broderip.

RANELLA.

Tentacles separate at the base, on the side of the base of the trunk, with the eyes on short pedicles at their base, trunk very large and very long. (*Ran. tenuis*).

RANELLA CLATHRATA.

Shell ovate, lanceolate, solid, white, closely cancellated, with equal fine longitudinal and spiral ridges, sub-tubercular at the crossing; spire conical, rather longer than the mouth; whorls convex; varices riblike, compressed, cancellated. Mouth ovate, outer lip crenulated, inner lip and throat smooth. canal short, open Axis $\frac{1}{2}$ inch.

Inhab. Atlantic Ocean.

RANELLA LÆVIGATA, t. 36. f. 18. Lam. Hist. vii. 154.

Inhab.

This shell does not in the slightest degree differ from the shell described under the above name, which is found fossil in Piedmont. See Knorr, *Fos. t. 46. f. 819.*

RANELLA ARGUS.

The *Triton ranelliformis* of Captain King and Mr. Broderip is a true *Ranella*, and scarcely differs from this species, from which it is distinguished only in being rather smooth and slender.

This species is apt to vary greatly in the ventricoseness of the last whorl. I have some much more slender than the specimen of *T. ranelliformis* sent by Captain King to the British Museum. It also varies in the size and distinctness of the tubercles; in some, the three or four central ribs on the back of the last whorl are largely nodulose, while in others the ribs of all the whorls are slightly nodulose; and, lastly, in a few specimens, the ribs of the upper whorls are slightly nodulose, while those of the last are quite smooth.

TRITONIUM.

The tentacles conical, with the eyes placed at the end of a sub-cylindrical peduncle, about one-third their length, adhering to their base.

The operculum horny, thick, annular, rounded behind, rather acute in front, with the nucleus near the middle of the outer side, the inner surface callous, with a large scar.

TRITONIUM CHEMNITZII.

Murex argus. Var. Chem. x. f. 1322.

Shell ovate, fusiform, ventricose, thin, cancellated, pale yellow, with narrow brown spiral lines; whorls rounded, slightly concentrically plaited, and with narrow, simple, and broad grooved subnodulose spiral ribs. Mouth ovate, outer lip with ridges in pairs, inner lip thin, ridged, with many elevated transverse ridges in front; canal rather elongated.

This shell, like *Triton clandestinum*, has only one varix; it is somewhat like *T. cingulatum* and *T. Tranquebaricum*, but differs in the lips and the convexity of the whorls.

TRITONIUM CANCELLATUM.

Shell ovate, conical, elongated, pale yellow or white, rather thick, cancellated, subnodose; spire rather longer than the mouth; whorls rounded, slightly longitudinally plaited and spirally striated, behind subangular. Mouth small, outer lip largely and equally toothed; inner lip smooth, with four or five close ribs in front. Axis 1 inch.

Inhab.

TRITONIUM FOXII.

Shell ovate, conical, white, rather thin, spotted with pale brown; spire nearly as long as the mouth; whorls rounded, with alternate minute, even, and larger nodulose spiral ribs; behind subangular nodulose; throat white, outer lip subnodose in front; inner lip smooth, concave, with two or three slight plaits in front. Axis $1\frac{1}{2}$ inches.

Inhab. Pacific Ocean.

TRITONIUM VIFREUM.

Shell ovate, turreted, white, transparent, finely spirally striated, and concentrically wrinkled; spire acute, rather longer than the mouth; whorls rounded, varices laminar, radiately striated, with the edge crenated and reflexed. Mouth ovate, throat smooth, inner lip smooth, produced, laminar and elevated, canal slightly recurved. Axis $1\frac{1}{2}$ inch.

Inhab.

TRITONIUM TENERUM.

Shell ovate, turreted, thin, pale, fulvous, pellucid, cancellated, with equal fine longitudinal and spiral ridges; spire attenuated, longer than the mouth; whorls rounded, varices rounded, cancellated, with two brown spots. Mouth ovate, oblong, outer lip crenulated, throat smooth, inner lip thickened, smooth, elevated, canal short, perforated in front. Axis $3\frac{1}{2}$ inches.

Inhab.

Allied to *T. maculosum*, but thinner and cancellated.

TRITONIUM CAUDATUM.

Bucc. caudatum. *Gmel.*—*Martini*, *f.* 1053.

Cassidaria cingulata. *Lam.*

Inhab. Indian Ocean.

TRITONIUM PILEARE. *Lam.*

Var. The shell ventricose, the spire about two-thirds the length of the mouth; whorls ventricose; and lips smooth, black, white plaited; otherwise exactly like the common state of the species. Length 2 inches.

POLLIA. *n. g.*

This genus contains several shells, which have been scattered into various genera, but which all appear to have a common character. Their mouth has much the appearance of *Triton*, but they have many varices, and therefore cannot be ranged with that genus. The inner lip is generally crossed by a few plaits in front.

POLLIA SCABRA. *t.* 36. *f.* 16.

Triton scaber. *Brod. and King, Zool. Jour.* v. 348.

Shell ovate, oblong, solid, white, covered with a brown, bran-like periostracum, with hairy lines over the spiral ridges; spire conical, as long as the mouth, whorls rather convex, rapidly enlarged, concentrically waved, regularly and closely spirally ridged, with the ridges widening and becoming subnodose over the cross folds. Mouth ovate, oblong, white, outer lip with nine or ten small distant single conical protuberances on its inner side, the columellar lip with short ridges behind, and conical tubercles in front; canal short, wide. Axis 23. Diam. 13. Mouth 13 lines.

Inhab. Coast of Chili. Mr. Fryer.

POLLIA TROCHLEA. *Favanne, t.* 97. *f.* D.

Shell ovate, fusiform, ventricose, white, smooth, with deep, distant spiral grooves; the spire rather shorter than the mouth, conical; whorls rounded, produced behind over a very deep broad spiral sutural groove; outer lip very obscurely grooved; inner lip thickened, smooth, with three or four very oblique plaits in front. Axis $1\frac{1}{2}$ inch.

Inhab.

POLLIA SPIRALIS.

Shell ovate, solid, thick, white, brown-streaked, spire as long as the mouth; whorls with a deep groove at the suture; upper with three or four, and last with nine to twelve rather large flat-topped compressed spiral ridges, sub-angular and strongly transversely plaited behind; mouth white, outer lip crenulated, throat grooved; inner lip smooth. Axis, slightly perforated, $1\frac{1}{4}$ inch.

Inhab.

This is a very common shell, but I do not find it described.

POLLIA IOSTOMA.

Shell ovate, solid, dark brown, closely spirally striated, slightly longitudinally plaited, covered with a thin hairy periostracum; spire short conical; last whorl sub-angular, and nodulose behind. Mouth ovate, large, black; throat purple, grooved; outer lip crenulated; inner lip rather expanded, and strongly veined. Axis $1\frac{1}{2}$ inch.

Inhab. Pacific Ocean.

POLLIA VARIEGATA.

Shell ovate, fusiform, solid, green, varied with short black cross lines, finely and closely spirally ribbed, covered with a thin olive periostracum; spire about two-thirds the length of the mouth, acute. Mouth ovate, white; throat grooved behind; outer lip crenulated, especially in front; inner lip rather spread, veined, with a strong rib behind. Axis $1\frac{1}{2}$ inch.

POLLIA HÆMÄSTOMA.

Shell ovate, fusiform, rather thin, dark brown, pale varied; finely, closely, spirally striated, slightly longitudinally plaited, with a few distinct rather tubercular spiral ridges; spire about two-thirds the length of the mouth. Mouth blood-red; throat white, smooth; outer lip crenulated, especially in front; inner lip veined, with white tubercles, and a distinct posterior plait. Axis $1\frac{1}{2}$ inch.

Inhab.

Var. mouth white.

These three species differ from the others in the inner lip being veined the whole of its extent; there is a distinct canal at the hinder end of the mouth, caused by a spiral ridge on the inner lip and the contraction of the hinder part of the outer one.

Besides the species here described, the following species should be referred to this genus:—

Pollia melanostoma. Bucc. *melanostoma.* Sow. *Gen. f.* 5.—*Wood. Sup. t.* 4. *f.* 3.

Pollia Tranquebarica. Bucc. *Tranquebaricum.* Sow. *Gen. f.* 6.—*Martini* iv. *f.* 114—6, 47.

Pollia undosa. Triton *undosum.* Lam. 189. Bucc. *undosum.* List. t. 938. *f.* 33. Bucc. *affine.* Wood. *Cat. f.* 97, 98.

Pollia pulchella. Murex *pulchellus.* Lam. 176.

Pollia Camælii. Bucc. *Camælii.* Payrad. *Cors. t.* 8. *f.* 7—9.

Pollia cingulata. Murex *cingulatus.* Lam. 175.

Pollia plumata. Fusus *articulatus.* Lam. 132. *Purpura fasciolaris.* Lam. 249. (*vide Cab.*) Bucc. *plumatum.* Gmel.—*Wood. Cat. f.* 88.

Pollia ignea. Bucc. *igneum.* Gmel.—*Wood. Cat. f.* 87.

Pollia maculosa. Bucc. *maculosum.* Lam. *Enc. t.* 400. *f.* 7.—*List. t.* 96. 4. *f.* 49. *Poli. t.* 4, 46, *f.* 44. The animal, with the eyes at the base of the tentacles.

Mediterranean.

Pollia Mauritiæ. Bucc. *Sancti Mauritiæ.* Chem.—*Wood. Cat. t.* 24. *f.* 125.

Pollia distorta. Bucc. *distortum.* Gray.—*Wood. Cat. Sup. t.* 4. *f.* 7. *Columbella triumphalis.* *Ductos MSS.*

And about six or eight undescribed species in the author's cabinet.

ENGINEA. n. g.

Shell spiral, mouth ovate, linear, variced, concave, with a broad oblique plait in front; inner lip expanded, veined; outer lid thick internally, and toothed, with a groove behind.

This genus is most like the former, but it resembles some *Ricinulæ* and *Purpuræ* in form; it differs in the inner lip being rather extended and veined. When young the lips are simple, the throat smooth, and the pillar lip concave, with a distinct oblique plaiting in front, margining the canal.

ENGINA ZONATA.

Shell ovate, fusiform, ventricose, solid, dark brown, with a central white band, longitudinally plaited, finely spirally striated; spire conical, acute, nodulose; last whorl angular, with four or five nodulose spiral ridges; throat white; outer lip three or four toothed. Axis $1\frac{1}{2}$ inch.

Inhab. Atlantic Ocean.

ENGINA ELEGANS.

Shell ovate, fusiform, solid, dark brown, with a grooved central and two narrow anterior spiral bands of white beads, slightly longitudinally plaited, and closely spirally striated; spire acute, nodulose; last whorl angular behind, with five or six rather beaded spiral ribs in front; throat pale brown. Axis $3\frac{1}{4}$ inches.

Inhab. Atlantic Ocean.

TURBINELLA.

The tentacles short, small, compressed, with eyes about one third from the tip.

The operculum rather produced behind, thick, with a thick roundish rib on the outer edge of the inside.

The feet, tentacles, and trunk of *T. craticulata* and *T. angulata* are bright red; the grooves on the throats of these extend up the cavity of the shell, so that the grooves on the throat are not the marks of age as in many shells.

TURBINELLA STOKESII.

Shell ovate, fusiform, ventricose, solid, brown, slightly spirally striated; spire acute, conical, nearly as long as the mouth; whorls, upper, with a row, and last with two rows of conical tubercles, and with two close sub-tubercular cross bands in front, the two front rows placed together. Mouth ovate; throat white, slightly striated; inner lip concave, with three small folds in front. Axis $1\frac{3}{4}$ inch.

Inhab. Port Praya.

Named in honour of the late Captain Stokes, the commander of one of the ships employed in the survey of the Magellan Straits, well known for his great attachment to science.

TURBINELLA RIGIDA. *Gray in Wood's Cat.*

Murex rigidus. *Wood, Cat. Sup. t. 5. f. 3.*

Shell fusiform, elongate, solid, purplish (very white when bleached), covered with a thin smooth olive periostracum, finely spirally striated; spire acute, attenuated; whorls rounded, with large oblong rounded distant tubercles, the front of the last spirally ribbed. Mouth ovate, purple or red; throat slightly grooved; pillar, with three small plaits in front; canal slightly perforated. Axis $2\frac{1}{4}$ inches.

Inhab. Pacific Ocean.

Somewhat allied to *Turbinella Tarentina* (*Fasciolaria Tarentina*, Lam.), but differing in colour.

TURBINELLA CROCEA.

Shell ovate, turreted, thick, spirally striated, and coarsely longitudinally plaited, white, brown at each end; spire tapering, larger than the mouth; apex ovate, brown; whorls rounded, upper with a sutural band

of brown spots, last dark brown in front; axis perforated. Mouth small, ovate; throat yellow, grooved; inner lip thin; pillar with three oblique plaits in front. Axis $1\frac{1}{4}$ inch.

Inhab.

TURBINELLA CASTANEA.

Shell ovate, fusiform, solid, red brown, closely spirally striated; spire nearly as long as the mouth; whorls rounded, slightly plaited, and subnodose behind. Mouth ovate; throat yellow, grooved; pillar lip yellow, with three moderate plaits in front. Axis $1\frac{1}{2}$ inch.

Inhab. Pacific Ocean.

This shell is somewhat like a small variety of the former, but the plaits on the pillar are larger, and the throat and lips are differently coloured.

TURBINELLA STRIATA.

Shell ovate, fusiform, solid, dark brown, closely spirally striated; spire acute, as long as the small rounded mouth; whorls rounded, transversely plaited; throat deeply grooved; inner lip white; pillar with three rather small close plaits in front. Axis 1 inch.

Inhab.

TURBINELLA CERATA.

Murex ceratus. Gray in Wood, *Cat. Sup.* t. 5. f. 15.

Inhab. South Pacific.

FASCIOLARIA.

The tentacles close together at the base, with the eyes near their middle. (*F. Tulipa.*)

FASCIOLARIA SALMO.

Murex salmo. Gray in Wood, *Sup.* t. 5. f. 4.

Fasciolaria granosa. Wood, *Zool. Rep.*

Inhab. South Pacific.

PYRULA.

The head conical, small (when contracted, placed in the canal), separate from the foot. Tentacles very short, close together at the end of the head. Foot folded across when contracted. Operculum long, large, horny, annular. (*P. bucephala* and *P. Rapa.*)

PYRULA VERSICOLOR.

Shell obconic, solid, spirally grooved; bright crimson, varied with short white and black cross lines; spire short, conic, acute; last whorl acutely keeled, and with a series of compressed nodules behind. Mouth reddish yellow; throat striated; inner lip thick, absorbed behind; pillar concave, acute, deep red in front. Axis $\frac{3}{4}$ inch.

Inhab. Pacific Ocean.

PYRULA LINEATA. Lam.

Bucc. Bulbus. Wood, *Cat. Sup.* t. 4. f. 8.

Inhab.

The nucleus is produced, smooth and convex.



PYRULA ELONGATA.

Shell elongate, fig-shaped, thin, regularly cancellated, pale brown, with many irregular longitudinal streaks; the spire conical, convex, blunt; last whorl very large, much elongated, and attenuated in front, with fine transverse, and rather broader, equal, regular spiral ribs. Axis 4 inches.

Inhab. China.

Like *P. reticulata*, but more regularly cancellated, differently coloured, and larger and more slender.

This species has the suture rather more callous than *P. reticulata*, but not so much so as *P. Ficus*.

PYRULA PATULA, *t. 35. f. 1. adult. t. 34. f. 10. young, t. 35. f. 3. younger, Brod. & Sow. Zool. Journ. iv. 377.*

Pyruia Melongena. Var. n. 1611. Tankerville Cat. 62.

PYRULA SUBROSTRATA, *t. 36. f. 15.*

Bucc. subrostratum. Gray in Wood. Cat. Sup. t. 4. f. 9.

Fusus Lapillus. Brod. & Sow. Zool. Journ. iv. 378.

Inhab.

PYRULA MAWÆE. *Favanne, Conch. t. 34. f. F.*

Shell distorted, largely umbilicated, white, finally spirally striated; spire above flat, with a central point; whorls trigonal behind, flat, with a sharp ridge of reflexed triangular spinous processes, the lower ones becoming disjointed, compressed, and expanded in front, and edged with large triangular compressed spines, outer entire; throat smooth.

Inhab. China.

This species is most like *Pyruia Rapa*, but differs in the flatness of the top of the spire and back of the whorls, and in the keel being formed with compressed spines. It is somewhat like the *Cancellaria trigonotoma* in shape, but has no plaits on the columella.

PYRULA CRASSA.

Buccinum crassum. Gmel.—Martini, Conch. iv. t. 120. f. 1099, 1100.

Bucc. plumbeum. Chem. Conch. xi. f. 1806—07

Inhab. Pacific Ocean.?

This shell has a groove and spine in front, like *Monoceros*, and the inner lip is thick and callous.

FUSUS.

FUSUS JAPONICUS.

Shell elongate, fusiform; whorls convex, two-keeled, the hinder keel elevated, acute, with a series of very compressed incurved spines; the anterior keel acute, simple. Mouth small; canal as long as the spire, cylindrical, with three or four oblique spiral bands of small spines in the middle. Axis 2½ inches.

Inhab. Japan.

FUSUS RAPHANUS. *Lam.—Chemn. Conch. f. 1558.*

Bucc. nodosum. Martyn, Univ. Conch. t. 1. f. 5.

Varices smaller, more solid; whorls less tubercular, and the throat rather finely striated.

Inhab. Pacific Ocean.

FUSUS COLUMBARIUS.

Murex columbarius. *Chemn. Conch. f.* 1637-38.

Inhab. Pacific Ocean.

The young of this species has three very obscure plaits on the pillar that are quite obliterated in the adult state. It is one of those species which appear to unite the *Fusi* with the *Turbinellæ*.

FUSUS RAPHANOIDES.

Purpura fusiformis. *Blainv. Ann. Mus. t. II. f. 7.*

Shell ovate, fusiform, ventricose, white (covered with a brown periostracum); spire conical, as long as the mouth; whorls convex, transversely plaited, with a sub-posterior keel of compressed tubercles, and distant spiral ridges, those in the canal larger and further apart. Mouth ovate; canal slightly twisted; axis perforated; outer lip rather veined. Length 2 inches.

Inhab.

FUSUS SULCATUS.

Shell ovate, fusiform, ventricose, solid, white (covered with a thin brown periostracum), longitudinally plaited, with close small rounded, alternately smaller, spiral ridges; the spire conical, as long as the mouth; whorls rounded. Mouth ovate; outer lip crenulated; throat deeply grooved; inner lip smooth; front of pillar with three very obscure oblique plaits; canal short, straight, wide, open, slightly perforated. Axis 1 inch.

Inhab.

FUSUS GRANDIS.

Shell fusiform, ventricose, solid, white, (covered with a brown periostracum?) with close alternately broad and narrow low spiral ridges; spire nearly as long as the mouth; whorls rounded, sub-angular, and with a series of rounded tubercles behind; outer lip crenulated, internally thickened and grooved; inner lip smooth; canal rather short, slightly twisted, open. Axis 5 inches.

Inhab.

The lower whorls are rather concave behind the tubercles, and the inner part of the throat is smooth.

FUSUS CANALICULATUS.

Shell ovate, fusiform, solid, pale brown, varied and spotted with dark brown, closely and unequally spirally grooved; spire conical, two-thirds the length of the mouth; whorls convex, concave, shelved, and produced into a raised edge over the suture behind, upper one transversely plaited. Mouth very yellow; throat smooth; outer lip crenulated, thin; inner lip rather callous; concave, with four or five close oblique plaits in front; canal short, twisted, open. Axis $3\frac{1}{2}$ inches.

Inhab. China.

FUSUS VIRGA.

Shell fusiform, elongate, solid, white, apex yellowish; spire acute, two-thirds the length of the mouth; whorls rounded, convex, regularly and strongly longitudinally plaited, with alternate broad, sharp edged and very fine spiral ribs; suture distinct. Mouth ovate; throat grooved; outer lip crenulated; canal elongated, tapering, transversely striated, smooth in front. Length 5 inches.

Inhab. China; not uncommon.

Compare with *Fusus laticostatus*, Desh., but the ribs are not broad and depressed. The nucleus of this species, as in most of the genus, is quite smooth, sub-cylindrical, blunt, of one whorl and a half; the periostracum thin, pale brown, hairy.

FUSUS ANGULATUS.

Shell ovate, acute, smooth, rather solid, brownish white; the spire elongated, rather longer than the mouth and canal; apex blunt; whorls convex, rounded, with five or six sub-equal narrow elevated spiral ribs. The mouth small, roundish-ovate; the canal short, rather twisted, open. Length $2\frac{1}{2}$ inches.

Inhab. North Sea.

FUSUS SABINI. *Gray, Append. Parry, Voy.*

Inhab. North Sea. Like *F. Islandicus*, but thinner, and whorls much more ventricose.

FUSUS VENTRICOSUS.

Shell ovate, fusiform, ventricose, thin, white, covered with a thin olive smooth periostracum, finely spirally striated; spire short, conical, blunt; whorls convex, last ventricose, rounded; canal rather lengthened, slightly twisted. Length 2 inches. Resembles *Fusus Sabini* in texture, but is much shorter, and finer lined. It is also very like *Fusus Islandicus*, but the spire is not so long as the mouth, and the shell is much more ventricose and thinner.

Inhab.

FUSUS GLACIALIS.

Shell ovate, elongated, sub-fusiform, white, solid, closely spirally striated; spire elongated, longer than the mouth; whorls rounded, convex, with rather close transverse plaits. Mouth ovate; canal rather elongated, scarcely twisted; inner lip slightly thickened. Length 4 inches.

Inhab. Arctic Ocean.

FUSUS FORNICATUS.

Murex fornicatus. *Gmel.—List. t. 1057. f. 2.—Martini, Conch. iv. f. 1295.*

—*Wood, Cat. t. 27. f. 92.*

Inhab. Icy Cape.

This species offers a very great variety of forms. Most of the young shells have a strong sub-posterior keel on each whorl, but as the shell grows this keel disappears, and its place is supplied by more or less elevated conical tubercles, which are at first united by a slight ridge, and then become quite free; and sometimes the older whorls are quite smooth, with only a slight ridge in the place of the keel in the younger ones.

Secondly. Other young shells (or upper whorls of old shells) have two slightly elevated spiral ribs in the place of the keel, and the ridges generally become less marked as the shell increases in size.

Thirdly. Some young shells have two very distinct spiral central keels, the hinder one being generally the largest, and sometimes tubercular, and the front of the last whorl being covered by six or seven distinct regular spiral ridges.

Fourthly. Sometimes the spire of the shell is very much elongated, and the whorls smooth, furnished with compressed transverse tubercles; the last whorl is marked with two indistinct sub-central keels, which appear to define the length of the tubercles.

Length $3\frac{1}{2}$ inches; spire 2 inches.

In all the varieties the shell varies greatly in the length of the spire, and in the ventricoseness of the last whorls. They are all easily known from all the varieties of *Fusus despectus*, in the canal being more twisted, and the shell browner and more horn-like in appearance.

FUSUS PALLIDUS. *t. 36. f. 14. Brod. & Sow. Zool. Journ. iv. 378.*

Inhab. Pacific Ocean.

FUSUS MAGELLANICUS.

Murex Magellanicus. Lam.

In the young state this shell is only cancellately ribbed, being entirely destitute of the concentric elevated plates; in this state it might be mistaken for another species. From this shell having become very common, it was easy to procure a long set of the species.

FUSUS MURICIFORMIS.

Bucc. muriciforme. King & Brod. *Zool. Journ.* v. 348. ?

Shell ovate, fusiform, purplish white, pellucid; spire conical, two-thirds the length of the mouth; whorls convex, rounded, flattened near the suture, regularly spirally grooved, and concentrically waved. Mouth ovate, oblong; canal short, wide; throat smooth; inner lip white. Axis 14, diam. 7, mouth 9 lines.

Var. *B. subnodosa.* Shell purple; the whorls with alternate narrow low, and wider convex spiral ridges, rising into white tubercles as they pass over the cross waves. Axis 13, diam. 6, mouth 7 lines.

Inhab. Pacific Ocean.

Allied to *F. Magellanicus*, especially in its young state.

FUSUS LAMELLOSUS, t. 36. f. 13.

Shell ovate, fusiform, white, pellucid; spire conical and acute; whorls rounded, sub-angular behind, with numerous close, sharp, elevated, concentric laminæ. Mouth ovate; outer lip reflexed; canal elongated, open, slightly recurved at the tip.

Inhab. Icy Cape.

Some of the laminal *Murices*, as the *M. Magellanicus*, &c., are better referred to *Fusus*.

FUSUS MULTICOSTATUS.

Murex multicostatus. Esch. *Atlas*, t. 9. f. 4.

Inhab. Northern Ocean.

FUSUS MONOCEROS. *Desh. in Dict. Class. H. Nat.* ix. 374. (1826).—*Blainv. Malac.* 62, 3.

Monoceros giganteum. Lesson. *Voy, Coq.* t. 11. f. 4.

Monoceros fusioides. King & Brod. *Zool. Journ.* v. 348.

Inhab. Pacific Ocean.

This shell has been referred to the genus *Monoceros*, because it has a tooth on the front of the outer lip; but if this is to be regarded as the only character of the genus, several *Murices* as *Murex tenuispina*, *Murex acanthopterus*, *Murex inflatus*, and many other species of shells, such as *Turbinella angulifera*, *Pyrula plumbea*, *Struthiolaria monoceros*, &c., must be referred to it. Lamarck never intended that this should be the case, for he expressly speaks of the flatness of the pillar and the shortness of the canal.

CONUS.

Tentacles short, placed on the lower side of the base of a short large cylindrical cavity, in the base of which the real trunk is placed. The eyes near the top of the tentacles. Trunk conical, acute. Foot truncated in front, grooved all round its edge, making it double edged. Operculum linear, horny, thick, annular.

The trunk appears to vary in length. *Conus geographicus*, and the wide mouthed *Cones*, have no opercula; *C. textilis*, *C. striatus*, *C. Hebraeus*, &c. &c. have distinct ones.

The animal of these shells absorbs the outer layers of the inner whorls, leaving only the inner of the three to separate one twirl of the body from the other, thus lightening the weight of the shell without destroying in the least degree its strength, as the outer whorl is of the usual thickness, and at the same time furnishing itself with lime for increasing the size of its shell.

CONUS SOLANDRI, *t. 33. f. 3.* *Brod. & Sow. Zool. Journ.* v. 50. *t. 40. f. 4.*

Otaheite.

CONUS CYLINDRACEUS, *t. 33. f. 5.* *Brod. & Sow. Zool. Journ.* v. 51. *t. 40. f. 5.*

CONUS XIMENES.

Shell solid, smooth, grooved in front, pellucid, pinkish or purplish white, varied with purple brown, with close, nearly uniform, narrow, closely articulated brown and white spiral bands; spire conical; whorls concave, white, with a series of spots near the suture; throat purplish.

Inhab. Panama.

Rarely the lines are alternately narrower, and sometimes the marbling is pale or wanting. This is one of the most beautiful of the genus.

CONUS INTERRUPTUS, *t. 33. f. 2.* *Brod. & Sow. Zool. Journ.* iv. 379.

Inhab.

CONUS ARCUATUS, *t. 36. f. 22.* *Brod. & Sow. Zool. Journ.* iv. 379.

Inhab. Pacific Ocean. Collection of Mr. Sowerby.

PLEUROTOMA.

PLEUROTOMA CONIFORMIS.

Shell fusiform, solid, yellow brown, rather ventricose; spire conical, acute; whorls cancellately grooved, leaving square tubercles, with a broad deep spiral groove behind, having a series of tubercles before it.

Inhab.

PLEUROTOMA ELONGATA.

Shell turreted, elongated, pale brown; spire very long, of fourteen whorls; whorls four-keeled, the central keel largest, and very acute. The mouth ovate; the canal short. Axis 3 inches.

Inhab.

PLEUROTOMA FASCIALIS. *Lam. Hist.* vii. 93.

Murex and *Pleurotoma elegans.* *Wood. Cat. Suppl. t. 5. f. 8.*

Inhab.

PLEUROTOMA MARMORATA, *t. 34. f. 9.* *Lam. Hist.* vii. 95.—*Martini, Conch.* iv. *t. 145. f. 1345, 1346.*

Shell fusiform, turreted, white, varied with transverse brown wavy lines; spire acute, rather shorter than the mouth; whorls convex, unequally spirally ridged, with a short angular keel on the hinder part; suture indistinct. Mouth ovate; canal elongated, rather tortuous. Axis 2 inches; diam. 7 lines.

PLEUROTOMA CRYPTORRAPIE, *t. 34. f. 8.* *Sow. Tank. Cat. App. xiv.*

Murex and Pleurotoma bicarinata. *Wood, Cat. Suppl. t. 5, f. 7.*

Shell turreted, brown; spire subulate, nearly twice as long as the mouth; whorls convex, acutely keeled, with an impression close to the suture, and the last whorls with several keeled ridges in front. Mouth ovate; canal not so long as the mouth, tortuous, and slightly umbilicated. Axis 2 inches, 9 lines; diam. 9 lines.

PLEUROTOMA CINGULIFERA, *t. 34. f. 1.* *Lam. Hist. vii. 94.*

Shell subulate, turreted, white, minutely brown dotted, the dots sometimes forming cross waves; the whorls rounded, convex, finely spirally striated, front of the upper with two, and of the last with four or five angular ridges, the hinder part with a convex rounded ridge marked with square reddish spots, formed of three raised ridges; the suture deeply impressed. The mouth ovate, oblong; the canal short, rather wide, recurved, the slit rather wide, placed on the angular ridge. Axis 2¼ inches; diam. ¾ inch.

It is much to be regretted that Mr. Wood should have altered in his Supplement the names given to this and other species, especially where the figures were taken from the specimens in the Museum, which were named as far as possible after their original describer.

PLEUROTOMA ALBINA, *t. 34. f. 4.* *Lam. Hist. vii. 96.*

Shell fusiform, turreted, white; whorls with rather unequal slightly raised spiral ridges, with fine spiral lines between them, and angularly keeled behind, the angular ridge with quadrate brown spots, each formed of three brown raised lines. The mouth ovate, lanceolate; the canal slender, cylindrical, rather shorter than the spire, the slit deep, placed on the angular ridge. Axis 2 inches; diam. ½ inch.

This shell agrees with *P. cingulifera* in the square spots on the keel, but differs in the canal being elongated.

PLEUROTOMA TUBERCULATA.

Shell fusiform, turreted, white, brown spotted, tubercular; spire elongated, slender; whorls with a posterior groove, and spiral series of rounded tubercles, the last with from eight to ten distant beaded spiral ridges, those of the canal least beaded. Mouth ovate, with a deep wide sub-posterior notch; canal elongated, straight. Axis 16 lines.

Inhab.

BUCCINIDÆ.

CASSIS.

The foot oblong, moderate sized. Trunk rather short, cylindrical, ringed. The tentacles short, conical, on the sides of the base of the trunk, with the eyes placed near the outer side of their base.

The operculum varies with the species which I have examined. In *Cassis Bezoar* it is half ovate, thin horny, smooth, red; crown concentrically ringed, with the nucleus placed in the centre near the margin of the straight side, which is bent up and slightly thickened. In *Cassis achatina* the operculum is oblong, with the inner side rather convex, the outer surface deeply radiately grooved, and the outer rounded edge deeply crenated, rounder behind, and rather acute in front.

The Queen Conch, and probably all the species which have narrow mouths, has a narrow oblong operculum, not more than one-third the length of the mouth.



PERSONA.

The foot very large, expanded, forming the expanded base round the mouth as in *Cassia*. The internal varices are permanent, as in that genus, and the pillar is very tortuous, with two very strong plaits in front—the front one is longest, and irregularly toothed; the cavities of the upper whorls are quite filled up, and the cavities of the succeeding ones are furnished internally with concave shelly septa.

These shells have generally been placed with *Triton*, but they differ from them in the large size of the foot of the animal, and the expanded base and permanent varices in the shell. They agree in their resemblance in the shell and mouth to that genus.

CASSIDARIA.

The foot is small, oval, folded across. The proboscis cylindrical, conical, long, slender. The tentacles subulate, thick, placed on the sides of the base of the proboscis, with the eyes on the outer side of their base. The male organ large; the respiratory canal rather short. The operculum is oblong, large, horny, solid, nearly straight on one side, and rather narrow in front, like that of *Buccinum* in shape.

CASSIDARIA ACUTA.

Shell ovate, fusiform, ventricose, white (with two or three brown spiral bands); spire conical, acute; whorls longitudinally transversely ribbed, subnodular, with an acutely angular subposterior ridge; outer lip thickened externally, ten or twelve toothed internally, inner lip slightly raised, with rather distant cross ridges.

DOLIUM.

The foot very large, expanded, not folded, rounded behind, without any operculum. The proboscis very long, subcylindrical, tubular, situated in a deep cavity, on the edge of which are placed the tentacles. The tentacles subulate, placed on each side of the base of the trunk, and with the eyes placed on short tubercles at their outer base. The male organ is very large, and like that of *Buccinum undatum* in shape; respiratory canal short.

I have been enabled to examine the male of *D. Pomum* and two females of *D. Perdix*. In the former the proboscis is elongated, conical, and in the latter it is very large and trumpet-shaped, with a short exposed hooked tongue on the top. The three specimens of *D. Pomum* varied in their tentacles; one had both the tentacles perfect, one had no tentacle on the right side, its place being occupied by the penis, and the last had none on the left, but a large one on the right side before the male organ. All the specimens of the other species being female, I could not observe whether it was liable to similar variations.

HARPA.

The foot very large, expanded, nicked even with the head on each side in front, and produced and keeled above behind, without any operculum. The edge of the mantle is thin, and not reflexed, and furnished with a rather large conical respiratory canal. The trunk is long, conical, hard. The tentacles are conical, thick, rather close together at their base; their base is thickened for about one-third of their length, and at the outer tip of the base the eyes are placed. The male organ is large and conical. When alive these animals are orange-spotted; they live on sand-banks, and are taken with meat attached to lines, or with nets attached to a rake. They are said only to feed at sun-rise.

HARPA ROSEA CRENATA, t. 34. f. 5.

Harpa crenata. Swainson. *App. Bligh. Cat.* 5.

Inhab. Pacific Ocean.

Lesson in the Illustrations of Conchology has given it another name.

HARPA MINOR B. GRACILIS, t. 36. f. 17.

Harpa gracilis. Brod. & Sow. *Zool. Journ.* iv. 373.

This shell, of which I have seen three or four specimens, is certainly only a small slender variety of *H. minor*. The specimen figured is in my private collection; it is rather larger than Mr. Bland's, noticed by Mr. Broderip. Length, 1 inch, 2 lines; diameter half an inch. In colour and form it exactly agrees with the type species.

PURPURA.

The mantles end in a short groove in front, which slightly extends beyond the shell when the animal walks, and is furnished with a short groove behind. The foot short, longest in front. The tentacles are long, linear, dilated and united together at their base, as if they sprang from the same place, as long as the front of the foot, with the eyes placed a little above the middle of their outer side. The operculum is horny, and bends so as to fit the pillar; and when the animal is walking it is placed against the worn part of the pillar lip.

Montagu observes that the ends of the tentacles as far as the eyes are retractile, in the same manner as those of the snail. I have often examined the animal alive, but have not observed this fact.

The egg of the common *P. Lapillus* has been described under the name of *Hydra triticea*.

Our species is found on rocks, often quite as high as high-water mark, so that they are out of the water the greater part of their lives.

Adanson in describing the animal of this genus observes that the two sexes can be distinguished by the ventricoseness of the shell, an idea that has been adopted by De Blainville.

PURPURA CRASSA. Blainv. Mon. t. 12. f. 4.

Purp. melares. Duclos. *Ann. Sci. Nat.* t. 1. f. 2.

Inhab. Peru.

PURPURA CLATHRATA. Blainv. Mon. t. 12. f. 6.

Purp. canaliculata. Duclos. *Ann. Sci. Nat.* t. 1. f. 1.

PURPURA TROCHLEA.

This shell has generally four spiral ribs on the last whorls, the front one being the smallest. I have specimens with the front and next and last, one with all the ribs wanting, when the shell is regularly spirally striated.

PURPURA SACELLUM. (Lam. 241?)

Murex sacellum. Chemn. x. f. 1561-62.—*W. C.* t. 25. f. 20.

Purpura Thiarella. Lam. 246. (*fide tab.*)

Inhab. Pacific Ocean.

PURPURA LANSTORIUM.

Bucc. Lanstorium.—*Martyn, U. C. t. Chemn. x. f. 1449-50.*

Inhab. Pacific Ocean.

PURPURA CARIOSA.

Murex cariosus. *Wood. Cat. Sup. t. 5. f. 22.*

Mouth orange, lip with three or four large teeth in front.

PURPURA SQUAMULOSA.

Shell ovate, rather ventricose, pale brown, closely spirally ribbed, and with short, thin, concentric, scale-like plates. Spire short, convex. Mouth large, inner lip arched; throat smooth; outer lip crenulated. Axis perforated. Axis $1\frac{1}{4}$ inches.

Inhab. Pacific.

Very like *Monoceros imbricatum*, but has no tooth, and the pillar is more arched.

PURPURA CRISPATA.

Bucc. crispatum. *Gmel. Chem. xi. f. 1802-3.*

Murex crispatus. *Lam. 174.—Enc. t. 419. f. 2.*

Murex Lactuca et Murex ferrugineus. *Esch. Atlas, t. 9. f. 2, 3.*

Purpura semiimbricata. *Lam. 246. (fide tab.)*

Inhab. South Pacific.

See also

Murex lamellosus. *Chem. x. p. 179. f. a. b.*

PURPURA COSTULARIS.

Murex costularis. *Lam.*

Bucc. crinitum. *Solander.*

Mur. subglobosus. *Wood. Sup. t. 5. f. 1.*

Murex plicatus. *Martini, iv. f. 954.—Wood, Cat. t. 26. f. 55.*

Mur. Hippocastanum. *Gmel.*

Mur. Neritoideus. *Gmel.*

Fusus Neritoideus. *Lam.*

Pyrula abbreviata. *Lam.*

Pyr. Neritoidea. *Lam.*

Pyr. deformis. *Lam. Hist.—Chem. x. f. 1377.—Enc. t. 419. f. 8.*

Inhab. Pacific Ocean.

Varies very much in shape, and has a white, red, and purple throat. The young is often deformed, being found in the crevices of rock and holes in corals, which sometimes do not allow their increase beyond a certain size. I am aware that many persons with isolated specimens will not allow them all to be varieties of one species, but I think the series I have bears me out in uniting them together.

CONCHOLEPAS.

The foot is truncated, nicked in the middle. The tentacles are short, close together at their base, with the eyes on the outer side of their base. The respiratory canal is short. The operculum is horny, and placed near the back of the foot.

The muscles of the foot form a cavity upon which the liver is laid, so that a lamina might be placed between the liver and the upper edge of the foot as there is in *Crepidula*.

MONOCEROS.

MONOCEROS UNICORNE.

Bucc. unicorn. *Brug.*

Monoceros crassilabrum. *Lam.*

Bucc. crassilabrum. *Wood. Cat. t. 24. f. 167.—Enc. t. 396. f. 2. (young).*

Mon. glabratum. *Lam.*

Bucc. Narwal. *Brug.*

Bucc. dentatum. *Wood. Cat. t. 24. f. 169.—Enc. t. 396. f. 5.*

Purp. Novæ Hollandiæ. *Blain. Mon. t. 12. f. 5.*

Inhab. Pacific Ocean.

Varies reddish, purple, and yellow.

MONOCEROS MONODON.

Bucc. monodon. *Gmel.*

Bucc. monoceros. *Chemn. x. f. 1469.*

Mon. imbricatum. *Lam.* Var. Mon. breve. *Sow. Gen. f.*

MONOCEROS GRANDE.

Shell solid, rugose brown, upper whorls with two or three, and last with five or six flat-topped spiral ridges. Mouth white; throat ridged, ridges placed in twos and threes. Length $2\frac{1}{4}$ inches.

Inhab. Pacific Ocean.

MONOCEROS PUNCTATUM.

Shell ovate, fusiform, solid, white, upper whorls with one band, last with three articulated lines of black and white spots. Throat purplish, outer lip four or five ridged. Length $1\frac{1}{4}$ inches.

Inhab. Pacific Ocean.

MONOCEROS LUGUBRE. *Sow. Gen. f. 3.*

Bucc. denticulatum and Bucc. amatum. *Wood. Cat. Sup. t. 4. f. 11, 12.*

Mon. cymatum. *Sow. T. C.*

Bucc. cymatum. *Soland.*

Inhab. Pacific Ocean.

MONOCEROS MACULATUM.

Bucc. brevidentatum. Gray, *Wood, Sup. t. 4. f. 10.*

Purp. cornigera. Blain. *Mon. t. 9. f. 10.*

Inhab. Pacific Ocean.

QUOYIA.

The foot is small, ovate, folded across and crumpled in front, side of the body quite simple. The proboscis short and ringed. The tentacles are slender, conical, far apart at the base; the eyes are placed on short tubercles at their outer base. The mantle is simple, with a groove at the left angle, but (in the animal in spirits) without any appearance of any distinct canal, as is found in the other zoophagous Mollusca; but in this character as in others it agrees with *Planaxis*. The operculum is half ovate, subspiral, of one and a half or two whorls; the nucleus is subapical.

This shell only differs from the *Planaxes* by having a large groove on the hinder part of the inner lip, which is continued up the pillar, as is found distinctly formed in the young shell, and in the very small size of the anterior canal. The operculum is said to have a notch behind to fit this groove, but I do not find it in the specimen which I have examined, and I am inclined to think that it must have been an accident in the one in which it was described.

The genus *Planaxis* has a somewhat similar, but not quite so spiral an operculum, and the opercula of these two genera are more spiral than those of any genera of zoophagous mollusca. This form of the operculum and the absence of the distinct canal to the front of the mantle, give some colour to Lamarck's position of them amongst the *Turbines*; and I might be induced to have continued them in this situation if there was not such a regular gradation of form and character between the *Purpura* and the *Planaxis*.

TEREBRA.

The tentacles of this genus are exceedingly minute, and placed on the upper edge of the inflexed trunk, and they have no eyes. In one species from St. Christopher which I have examined, there was no appearance of any tentacles, nor eyes; in another, the tentacles were very small with distinct eyes at their tip. The male organ is extremely long, filiform, as long as two whorls of the shell. The foot is small, folded across when contracted. The head is rounded. The mantle has a very long slender filiform breathing canal. The operculum is horny, ovate, nearly as large as the mouth of the shell, with a rather thickened rib on its inner edge.

In nearly all the species of this genus the inner lip is concave and absorbed; in a few only it is thickened and elevated.

Buccinum aciculatum and *B. politum* of Lamarck must be moved to this genus.

EBURNA.

The tentacles are triangular, rather short, separate at the base; the eyes are small, near the outer base of the tentacles. The male organ is rather small; foot longitudinally and transversely folded when contracted. The operculum is horny, acute in front, nearly as large as the mouth, concentrically striated, with the nucleus in front, and the inner ridge is thickened internally. (*E. spirata*).

BULLIA. n. g.

The animal of this genus is very peculiar for the very large size of its foot, which is much larger than the shell; when contracted the foot is folded together, and is capable of being withdrawn into the cavity of the shell. They have no eyes; and the tentacles are long and subulate, and placed on the side of the head

so as to be far apart at their base. The male organ is very long, conical, and often exerted when the animal walks—it is placed near the back of the right tentacles. The operculum is small, thin, and rather thickened on the hinder edge. The shell is ovate, turreted, with a rather large mouth, having a broad canal in front, and the inner lip is rather expanded and thickened behind, where it is slightly spread out, which causes the sutures to be often callous.

The animals are found crawling on the sand in the bays. They generally remain at the bottom of the water, and are easily caught alive with a bit of meat tied at the end of a string, as they immediately attach themselves to it.

Quoy in the voyage of the *Astrolabe* has figured two species under the name of *Buccinum*—(*Bullia levissima*, t. 31. f. 14—16, and (*Bullia achatina*, t. 31. f. 17. : the former of these has the front of the foot rounded, and the latter has an elongated filament on each side in front. The animal also of *Bullia levis* is figured in Freycinet's Voyage, and copied into Guerin, *Iconographie*, t. 17. f. 5.

BULLIA ARMATA.

Shell ovate, conical, solid, white, with two broad brown bands; spire conical, as long as the mouth, whorls rather convex, with a series of rather close conical tubercles near the suture, which has a callosity behind it.

Inhab.

BULLIA POLITA.

Shell ovate, turreted, pale brown, smooth, polished; the spire acute, rather longer than the mouth; the whorls rather convex, with a broad callous band near the suture, the last with close spiral striæ in front of the caual ridge. Mouth ovate, lanceolate, inner lip rather callous behind, absorbed and concave in front, outer one slightly thickened.

Inhab.

BULLIA TURRITA.

Shell turreted, slender, pale, whitish, smooth, very obscurely concentrically striated, whorls convex, inner lip slightly thickened, front of the canal before the cross sides spirally striated.

Inhab.

This species is nearly allied to *Bullia achatina* (*Buccinum achatina*. *Lam. Enc. t. 400. f. 4.*) but is larger, more slender, smooth, and in that the canal is smooth before the cross plait. The *Bullia achatina* is found in a fossil state.

BULLIA COCHLIDIUM.

Bucc. Cochlidium. Chemn. xi. f. 2053, 54.—Wood, Cat. t. f. 95.

Inhab. South Seas.

BULLIA MAURITIANA.

Shell ovate, turreted, yellow, smooth, distantly spirally striated; suture deeply impressed, rather callous, apex very acute, inner lip scarcely thickened.

Inhab. Madagascar.

This shell varies in being very smooth with minute striæ. It is allied to *Bullia vittata* (*Terebra vittata*. *Lam.—Enc. t. 402. f. 41.*), but is very different in the suture. This last shell varies in often having a distant varix or broad thick rib round the outer lip.

BULLIA LÆVIGATA. *Gmel.*

Bucc. lævigatum. *Martini*, iv. t. 127. f. 1215, 16.—*Lam. Ency. Method.* t. 400. f. 1. a. b.

Bucc. lævissimum. *Lam. Hist.* vi. 265. n. 6.

BULLIA LÆVIS.

Buccinum læve. *Gmel.* 3488.—*Dillw.* p. 623. *from Martini.* iv. t. 124. f. 1150. a. b. copied in *Wood, Cat.* t. 23. f. 86.

Buccinum squalidum. *King. Zool. Journ.* n. 63.

This shell varies greatly in size. *Martini's* figure is smaller; and I have a third larger than those described by *Capt. King.*

BULLIA LÆVISSIMA.

Buccinum lævissimum. *Lam.*

B. callosum. *Wood. Sup. t. 4. f. 14.*—*Lister, Conch. t. 978. f. 25.*

Inhab.

BULLIA SEMPLICATA.

Shell ovate, turreted, yellow, pellucid, smooth, spire attenuated, slender, longitudinally plaited; last whorls convex, smooth; suture with a permanent callous rib; inner lip callous; outer lip thin, expanded in front.

Inhab.

NASSA.

NASSA XANTHOSTOMA. t. 36. f. 3.

Nassa luteostoma. *Brod. & Sow. Zool. Jour.* iv. 376.

NASSA ATTENUATA.

Shell ovate, globose, ventricose, smooth, pale brown, marbled with white; spire conical, apex attenuated, acute, upper whorls spirally striated and transversely plaited, last whorl ventricose, distantly spirally striated in front. Mouth small, roundish, outer lip contracted; throat brown, deeply grooved; inner lip smooth. Axis.

Inhab. Pacific Ocean.

Lamarck separates *Buccinum* into two sections. The following species, which he has placed in the first, should be referred to the second, as they are *Nassæ*: *B. olivaceum*, *B. canaliculatum*, *B. crenulatum*, *B. reticulatum*, *B. mutabile*, *B. inflatum*, *B. retusum*, *B. gemmulatum*, *B. fasciatum*, *B. subspinosum*, *B. Ascanias*, *B. grana*, and *B. coccinella*.

BUCCINUM.

BUCCINUM ANGULOSUM. t. 36. f. 6.

Shell ovate, conical, solid, white, very closely and wavyly spirally striated; upper whorls fluted, distantly

and strongly plaited, the last angular, and the middle strongly plaited, like the upper whorl behind, and plain in front, the plait ending in a prominent tubercle.

Inhab. Icy Cape.

The specimen is not complete, but it will prove a very distinct species.

BUCCINUM POLARIS.

Shell ovate, conical, rather ventricose, thin, white; whorls ventricose, closely transversely plaited, and deeply and closely spirally striated, the upper one with a subposterior, and the last with three or more elevated keels. Mouth ovate, inner lip much absorbed; canal only slightly recurved.

Inhab. Icy Cape.

This shell is very like *B. glaciale* in form, but the whorls are deeply striated and closely plaited. The shells of this kind appear to be formed of two coats, an opaque dead white external one, and a hard pellucid white inner one; the outer one is often eroded, from the apex of the Polar species leaving the under one exposed, which being smooth, polished, and without striæ give the tips of the shell quite a different appearance from the rest. In one specimen the last whorl has three equidistant keels—in the other the hinder keel is prominent, and there are three close slight keels in front. There was a fragment of a shell brought from the same place with the former, which is deeply spirally striated, longitudinally plaited, and slightly keeled like the former, but it is rather more solid, more deeply striated, and the whorl has an extra strong prominent keel just before the suture, which gives the shell a very different appearance. I am inclined to consider it only a variety of this species.

BUCCINUM DONOVANI.

Bucc. glaciale. *Donovan. Brit. Shells, t. 154.*

Inhab. South Sea.

The shell differs entirely from the *B. glaciale* of Lamarck (*see Chemn. x. f. 1446, 47 and Enc. 399. f. 3.*) in the whorls being very ventricose and rounded. It varies in the thickness of the shell, and in the whorls being more or less plaited, like *B. undatum*, and also in the whorls being rarely furnished with three or four slightly striated spiral keels. *B. glacialis* of Brown's Conchology, said to be taken at Torbay, appears like an elongated variety of *B. undatum*.

BUCCINUM BOREALE. *Leach. App. Ross. Voy. 173.*

This species is very like the coloured varieties of *B. undatum*, but it is much smaller and thinner than the undulated state of that shell.

BUCCINUM TENUE, *t. 36. f. 19.*

Shell ovate, conical, thin, pellucid, pale brown, very finely and closely spirally striated, and closely longitudinally plaited, the plaits arched regular. The spire acute; the whorls rounded.

Inhab. Icy Cape.

The outer coat of this shell is very thin and powdery, and appears to separate very easily, for in most specimens there are large spaces in which it has entirely disappeared, leaving a thin, pellucid, smooth shell, for the outer coat alone is striated, and in most of the shells it forms the longitudinal plaits.

TRICHOTROPIS.

Judging from the figure this animal appears to be very nearly allied to *Buccinum*. The tentacles are placed on the side of the base of a large retractile trunk. The penis is conical; the foot small.—*See Zool. Journ. iv. t. 9. f. 5 & 8.*

COLUMBELLA.

The tentacles are close together at the base; the eyes are two-thirds from the base of the tentacles. The trunk is cylindrical from the under side of the tentacles. The mantle edge is simple, with a rather long siphon in front. The male organ is elongated, subcylindrical, slender. The trunk is very long, large. The foot rather small. The operculum is horny, oblong, like that of *Buccinum*, with a subcentral longitudinal rib on the inner side.

COLUMBELLA CRIBRARIA.

Buccinum cribrarium. *Lam. Hist. n. 43.*

Columbella mitriformis. *Brod. & King. Zool. Journ.—Lister. Conch. t. 929. f. 24.*

The apex of this shell is constantly truncated like the apex of some of the land shells; this is not common amongst marine shells, which has caused the only other group of sea shells in which this truncation has been observed to be called *Truncatella*. I have not observed it in any other *Columbella*. The synonym of Lamarck is added on the authority of his cabinet, and of the plates of the species which have been engraved from the shell in his cabinet by the Prince Massena.

Lister's figure is rather larger than the specimen there seen, and the mouth is rather more striated. It has a thin, dark brown, horny operculum which is nearly as large as the mouth.

COLUMBELLA COSTELLATA. *t. 36. f. 9. Sow. Zool. Proc.*

: Inhab. Panama & Coast of Africa.

COLUMBELLA MARMORATA. *t. 36. f. 11.*

Shell ovate, fusiform, smooth, white, yellow marbled; apex reddish; front spirally striated; spire conical, shorter than the mouth; whorls rounded. Mouth narrow, white, outer lip denticulated.

Inhab.

COLUMBELLA UNIZONALIS.

Shell ovate, lanceolate, smooth, dark chocolate brown; spire conical, acute, as long as the mouth; whorls convex, last with a central white band and spirally striated in front. Mouth ovate; outer lip simple, sinuous, inner lip simple, slightly thickened; throat smooth. Axis four lines. Operculum thin, pellucid.

Inhab. Arica, coast of Peru.

Perhaps rather a *Nassa*.

It is to be remarked that *Buccinum levigatum*, *B. Brasilianum*, *B. semiconvexum*, *B. flexuosum*, *B. corniculatum*, *B. aurantium*, *B. dermestoideum*, of Lamarck, as well as this species are *Columbellæ*; the first is *Col. concinna* of Sowerby.

OLIVA.

The foot of these animals is very large, expanded, ovate, and folded longitudinally when contracted into the cavity of the shell. The mantle is thin, not in the least expanded, and ends in a very slender, long, subulate process behind, which being twisted round the spire forms the groove over the suture. The head is quite in front, with two subulate, conical, rather long tentacles. The eyes are placed near the tip of the tentacles, which are very thin above them.

The shell is more than half immersed in the middle of the foot, and it is this immersion which causes it to have the polished coat. Most of the large species have no operculum, but the smaller species often have an oblong, horny one, which is nearly as long as their mouth; this is particularly the case with *O. zonalis*, *O. semistriata*, *O. conoidalis*, where the operculum is bright sea green.

The olives live buried in the sand, and are generally taken by fishing for them with lines baited with flesh. According to M. Quoy, these animals are exceedingly active, and they have the power of regaining their proper position even when they are laid upon their backs.

The inner whorls are absorbed exactly as in the *Cones*. The pillar is very tortuous and thin; and the apex is filled inside with a glossy deposit.

The distinction of the species of the olives is attended with very great difficulty. It appears that Linnæus made too few, and that Lamarck and succeeding authors have gone to the other extreme and made too many. Their arrangement might be facilitated by dividing them into sections, thus,

They have all a belt in front of the last whorl over the canal. Some have a second belt behind this, as *O. utriculus*, *O. clavula*, *O. gracilis*, *O. undatella*, *O. acuminata*, *O. subulata*, and *O. leucozonias*. But most are without this belt. Most of them have the inner lip even, as *O. porphyria*, *O. semistriata*, *O. Brasiliensis*, &c. But some have two callosities on their lip as *O. undatella*, and its variety *O. bifasciata*.

The operculum of *O. eburnea* is green when fresh, it is ovate, lanceolate, and with the nucleus very slightly curved and spiral, so that it very nearly resembles the operculum of a *Littorina*, but the nucleus is not spiral. The scar of attachment for a band nearly the shape of the operculum but half its breadth is along the straight side.

OLIVA GRACILIS. *t.* 36. *f.* 21.—*Brod & Sow. Zool. Jour.* iv. 379.

Shell oblong, subcylindrical, white, varies in the irregular brown spots near the suture, and near the anterior belt of the last whorl. Spire conical, convex; suture distinct; anterior belt about one-third the breadth of the last whorl, marked with a spiral groove on its hinder margin. Mouth lanceolate, wide in front, with eight or nine obscure folds, inner lip thickened, and the callosity behind extending to the last whorl but one. Axis $8\frac{1}{2}$; diam. 3; mouth 5 lines.

Differs from *O. nivalis* in its colour and in the belt being divided into two by a groove.

OLIVA LEUCOZONIAS. *t.* 36. *f.* 24.

Shell ovate, fusiform, slender, polished, pale brown, dotted with a white spiral band near the suture and the back edge of the hinder anterior belt. Belt and suture black spotted; spire acute, half as long as the mouth. Mouth narrow, pillar obliquely plaited, front of pillar callous. Axis $\frac{1}{2}$ inch.

Inhab.

OLIVA SEMISTRATA. *t.* 36. *f.* 10.

Shell ovate, lanceolate, bluish grey; spire conical, acute, rather produced, smooth, with an obscure band near the suture; last whorl closely concentrically striated on the hinder half, with a white central band; anterior belt, narrow, white. Mouth lanceolate; outer lip expanded in front; inner lip callous, extending up to the upper suture, with an obscure oblique fold, producing a single protuberance in front; canal wide; throat black; operculum horny, lanceolate. Axis 9; diam. $3\frac{1}{4}$; mouth 6 lines.

Var. 2. LUTEA.

Shell yellow-brown, with a whitish band near the suture, and another in the centre of the last whorl not so distinctly lined near the suture.

OLIVA ZONALIS. *t. 36. f. 25.*—*Lam. Hist. 439. n. 61.*

Shell ovate, fusiform, polished, pellucid white; spire conical, acute; last whorl with two black and one central fulvous spiral band. Mouth linear, ovate, rather less than twice as long as the spiral column; lip thickened, with a single oblique fold in front, and a black spot behind near the suture; the anterior belt narrow. Axis 2; diam. $\frac{1}{2}$; mouth $1\frac{1}{4}$ lines.

OLIVA UNDATELLA. *t. 36. f. 23, 27.*—*Lam. Hist. vi. 438.*

Shell ovate, oblong, brown, with black undulated bands; spire conical, convex, apex produced, acute, with a narrow articulated brown and yellow band round the suture; anterior belt broad, occupying more than one-third of the last whorl; behind yellow, with brown concentric lines, with two oblique spiral grooves in front, just over the canal. Mouth linear, inner lip thickened to the suture behind, with transverse grooves before, with four or five very oblique grooves. Axis 7; diam. 3; mouth 6 lines.

Var. 2. UNDATA. *t. 36. f. 26.*

Shell pale pinkish; body of the last whorl with wavy concentric bands placed in three series; front of columellar lip brownish, sometimes a few brown waves on the anterior belt.

Var. 3. NITIDA.

Shell white, with irregular black spots and lines, some of which are seen on the inside of the shell.

OLIVA AURICULARIA. *Lam.—Guerin. Icon.—Mott. t. 16. f. 13.*

Oliva patula. *Sow. T. C. 2331.*

Inhab. Pacific Ocean.

OLIVA LINEOLATA.

Voluta lineolata. *Gray. Wood. Sup. t. 5. f. 37.*

Inhab. Coast of Peru?

OLIVA NANA. *Lam. 438. n. 60.*

There are three very distinct varieties of this species; the first figured by Lister, *t. 733. f. 22.* is obconic; spire white; body whorls yellow, with zigzag brown lines in front; yellow and rounded behind. The second variety is ovate, slender, coloured like the last. And the third is of the same shape as the former, but the shell is minutely brown speckled with a series of black spots near the suture, and the front of the pillar is brown. So distinct as these varieties appear, it is not difficult to find specimens intermediate between each of them.

OLIVA VOLUTELLA. *Lam. 43.—Wood. Sup. t. 4. f. 36.*

There were brought home by the expedition some specimens of this shell, of a dark purple black colour, with the back edge of the anterior belt pale.

AGARONIA.

The genus appears to be intermediate between the *Olivæ* and the *Ancillarix*, for it has the twisted columella and the wide mouth of the latter, and the grooved suture of the *Olive*; but the animals offer the

best character, and they have much more resemblance to the *Ancillaria*, for they have no distinct eyes, nor any tentacles, without the two perpendicular plates on each side of the mouth are to be considered in this light.

Its foot is large and dilated, with a flap on each side in front; the front lobe has a longitudinal slit in front, and is separated from the rest by a cross groove on each side, even with the front edge of the flat and opposite to the hinder edge of the callous band placed on the front of the last whorl of the shell. The respiratory tube is very long; and the male organ is elongated, compressed, bent back when contracted, and furnished with a sub-posterior inferior conical process.

AGARONIA HIATULA.

Oliva hiatula. Lam. Hist. vii. 435.

Inhab. South America.

This shell differs from the *Olives* in the belt across the front of the shell being much broader than in most of the species of that genus, and in the shell under the belt being deeply spirally grooved, bearing slight notches on the front of the edge of the outer lip.

ANCILLARIA.

The animals have a very large foot, into which the base of the shell is immersed; it is truncated and extended behind. The mantle is thin, small, not in the least expanded beyond the edge of the shell, with a long subulate siphon. The tentacles are very short, and the trunk is cylindrical. The operculum is small, ovate, thin, with a nearly central nucleus and placed high up the middle of the back of the foot.

According to the observation of M. Quoy they have the same habits as the *Olives*; they secrete abundance of mucus. They differ from the *Olives* in the small size of the tentacles, and in having no throat-like process to the back angle of the mantle.

CYPRÆA.

The young shell most resembles the shell of *Bullina* in general form, but they are easily distinguished from them by the inner lip not being thickened nor elevated.

The young shell of most of the species of this genus is smooth, but the young of *C. pustulata* is covered with regular spiral and rather flat topped concentric ridges with equally wide grooves between them. The young shells have generally thin lips, but sometimes they become thickened; thus, in a rather solid young specimen of the small variety of *C. cervina* there is a rather sharp raised ridge round the inner part of the outer lip which is very sharp, compressed, and strongly denticulated in front.

The nucleus of the *C. nigropunctata* (which is only to be seen in the young shell) is finely concentrically and spirally ridged, so as to be closely and acutely cancellated.

The animal of *C. Arabica* is black brown, with a yellow edge to the foot; *C. carneola* red, white dotted; *C. felina* pale, black dotted; *C. Talpa* black, with small white spots? *C. Caput serpentis* brown, covered with green, and the tentacula red spotted.

CYPRÆA MAURITIANA.

The front of the foot truncated, grooved across the edge; the penis rather large, conical, acute, grooved, the groove along the anterior side.

CYPRÆA LYNX.

The tentacles are subulate, far apart, on each side of a large trunk; eyes on small tubercles at the outer base; the foot simple, folded longitudinally; the lobes of the mantles with tufts of minute filaments.

In a young specimen, the mouth of which was not formed, the mantle on the pillar side was dilated, with a lobe covered with processes, and the outer side was simple with a slightly thickened edge.

CYPRÆA SPURCA. *Var. t. 34. f. 6, 7.*

This shell sometimes instead of having the usual mouth has a wide irregular scarcely toothed one, and the base and lips are purple brown, while in the common state they are yellowish. I have seen some shells in an intermediate state, and therefore have no doubt of its being a variety of this species. When I first described it, I thought it might be a variety of *C. erosa* with the lateral spot suffused over the base, but this does not prove to be the case.

CYPRÆA ANNULUS.

The lobes of the mantle are covered with numerous papillæ.

OVULA.

OVULA TUBERCULOSA.—*Lam.*

The animal like the Cowry; the tentacles rather blunt; mantle edges reflexed, smooth, with small oval brown dots. Foot large, crumpled on the sides, pale brown, black dotted; the penis large, low down.

ERATO.

The adult animal, like the Cowries, when alive extends a thin, membraneous, beautifully speckled mantle over the shell—the mantle is not extended in the young state.

Most conchologists have confounded it with *Marginella*; though Montagu, who was one of the first describers of the shell, refers it to its most natural situation amongst the Linnæan genera.

CORIOCELLA.

CORIOCELLA NIGRA.—*Blain.*

Sigaretus.—*Cuv. Ann. Mus. Anat.*

Grows to a large size. The shells are the large *Sigaret* of English Cabinets; they are green when fresh and soon become white; the foot is not one-fourth the size of the mantle; the penis is large, on the right side; the trunk is long, like that of *Buccinum*. The tentacles depressed, close together, united on the inner side over the top of the hole of the trunk, with the eyes near the extremities; the penis is very long, subulate, acute; operculum none. The canal of the mantle is very distinct, and lined with a cartilaginous skin.

Lamarck referred the description and anatomy of this animal to his genus *Sigaretus*, and thus his character consists of the animal of this and the shell of that genus.

VOLUTA.

Mantle small, thin, not extended beyond the margin of the shell, with a rather short thick open respiratory canal, furnished with a subulate ear-like lobe or process on each side of its base. The tentacles short, conical, far apart, with the eyes on their outer base, and behind them is placed along the side of the head a semicircular lobe. The trunk rather thick, conical; the foot large, folded longitudinally when contracted; the male organ is large with a conical reflected tip; operculum none.

The respiratory canal of this genus with its two lobes at its base may easily be mistaken for a trunk with its two tentacles. In some species the tentacles are placed on a semilunar hood from under which the trunk arises; and the eyes are sometimes rather behind the base of the tentacles, and the tentacles are sometimes nearer the margin than at others.

I have examined *V. vespertilio*, *V. nivosa*, and *V. undata*.

The cavity of the nucleus in a cut specimen of *V. vespertilio* is nearly entirely filled with an amber-coloured pellucid calcareous deposit; and the whole of the rest of the cavity is lined with a thick glossy deposit. The nucleus of the shell is very thin, pale yellow, nearly transparent, with two indistinct plaits on its pillar.

In a cut specimen of *V. Hebræa* (the nucleus of which is destroyed) the cavity of the upper whorl is quite filled with a white glossy deposit, and a similar deposit lines the whole of the inner cavity of the shells.

VOLUTA NIVOSA.—Lam.

The foot and head purple with unequal white-edged black spots; foot large.

VOLUTA UNDATA.—Lam.

Foot pale, with netted waved red brown lines; head cross lined with red; eyes rather far behind the tentacles.

CONOHELIX.

The shells of this genus have no operculum.

They have the same nauseous odorous purple secretion as the mitres.

I have examined the animal of *Conohelix marmorata*, *C. olivæformis*, and *C. olivaria*.

MITRA.

The trunk of the mitres is very long, larger than the shell; their animals expand themselves very little. The shells are extremely solid and difficult to break.

This genus from the immense number of species which it contains requires being divided into sections. After considerable study of the species in their various stages of growth; the innumerable forms which they exhibit agreeing with the different circumstances in which they live, I have been induced to divide them thus:—

The throat smooth, the outer lip simple or crenulated; they have four or five plaits in the pillar. These are the true *Mitres*. Some are variously dotted, as *M. papalis* and *M. episcopalis*; others are smooth, like *Olives*, as *M. fissurata*, *M. filosa*. The rest have short spires and many plaits on the pillar—these form the genus *Conohelix* of Swainson. Others with smooth throats have the outer lip thickened internally, so as to give them much the appearance of *Columbella*, these form a good section.

M. bifusciata, *M. retusa*, &c. with the *M. Ziervogeliana* and some allied species form another group which is allied to this, but differing in having the inner lip thickened and expanded, and the outer lip toothed internally.

The rest of the *Mitres* form a very good group for which the name *Vulpecula* may be retained, which are peculiar for their throat being deeply grooved in all the stages of their growth. The shells of this section are perfect *Protei*, the species assuming in different situations such very different colour and forms.

The genus *Volvaria* of Lamarck, restricted to the fossil species for which it was established, does not differ from the true *Mitre* except in the length of the spire. The recent species Lamarck has referred to it are *Marginella*.

MITRA REFUSA. t. 36. f. 5.—Lam. Hist. vii. 319. Var.

The pillar as seen in a section of the shell is very thin and tortuous; the plaits as the shell enlarges become placed on the back of the canal of the former whorl, and the whole cavity of the upper and the back angle of the cavity of a few of the succeeding whorls are filled with a clear glossy deposit. The inner parts of the whorls are so thin that the colour of the last whorl is to be seen distinctly through it.



MITRA STRIATA, t. 36. f. 7.

Shell ovate, fusiform, solid, brown, with a rather pale posterior band finely regularly spirally striated; spire acute, tapering; whorls flat, last rather ventricose. Mouth white, narrow; outer lip thickened, inflexed with a broad notch behind, and with a slight reflexed sharp external edge in front; pillar plaited. Length

Inhab. Pacific Ocean.

This is the *Mitre* of which I described the animal in the first number of the *Spicilegia*; it is allied to *M. acuminata* of Swainson, but differs in being striated, that species having the inner lip, like this and the following, less thickened and reflexed.

MITRA

Shell ovate, conical, solid, pale brown, slightly spirally striated; spire conical, attenuated, acute. Mouth contracted, pale, inner lip thickened, expanded in front; outer lip thickened internally, grooved, with a deep groove behind.

Inhab. Pacific.

Allied to *M. Ziervogeliana*, but smoother, and spire longer and more acute.

MITRA CHINENSIS. t. 35. f. 2.

Shell ovate, fusiform, solid, pale brown, covered with a smooth, olive, periostracum; whorls rather round behind; upper ones spirally punctately striated, last with a few obscure grooves in front; throat pale brown. Inhab. China.

When worn covered with white. Sometimes the striæ are deeper than at others.

CYMBIUM.

The animal like *Voluta*, but the respiratory canal larger; the appendix on the right side of the canal is bent back, and the one on the left forwards. The foot is very large and longitudinally folded; the hood is half circular, with the small tentacles near its edges, and with the eyes far behind their base. The mantle is not enlarged nor reflexed. Operculum none.

I have examined *C. porcina* and *C. Olla*.

MARGINELLA.**MARGINELLA PULCHRA. t. 36. f. 20.**

Shell ovate, oblong, thin, pellucid, reddish yellow, with two broad purple bands; spire conical; whorls convex; pillar four-plaited; outer lip thickened, with a sharp external edge and a deep notch behind. Length 1 inch.

Inhab.

NATICA.**NATICA IMPERFORATA. t. 37. f. 1.**

Shell ovate, globose, solid, smooth, pale yellow, imperforated; the spire short, conical; whorls rounded, flattened and marked with close wavy concentric brown lines behind. Mouth white, inner lip callous, convex, and covers the front of the axis. Axis 1 inch.

Inhab. Cape of Good Hope.

NATICA CLAUSA. *t. 34. f. 3. & t. 37. f. 6.* *Brod. & Sow. Zool. Jour. iv. 372.*

Inhab. North Sea, where the shell was discovered by Capt. E. Sabine.

NATICA BOREALIS. *t. 37. f. 2.*

Shell ovate, subglobose, umbilicated, thin, white, smooth, pellucid; spire conical, half as long as the mouth; whorls rounded; suture deep. Mouth semicircular; inner lip rather thickened, slightly reflexed over the perforation of the axis. Axis $\frac{1}{4}$.

Inhab. North Sea. Capt. Edw. Sabine.

Natica globosa of Capt. King, *Zool. Jour. v. 344*, is very nearly allied to this species, but the spire is shorter and the mouth larger, and the umbilicus smaller.

NATICA SUTURALIS. *t. 37. f. 4.*

Shell ovate, subglobose, thin, subimperfected, pale brown, slightly spirally striated; spire conical; whorls rounded, with a deep angular canal at the suture. Mouth ovate, elongate, rather extended in front; inner lip white, slightly reflexed over the slight perforation of the axis. Axis $1\frac{1}{2}$ inch.

Inhab. North Sea. Capt. Sabine and Capt. Beechey.

NATICA PALLIDA. *t. 34. f. 15.—Brod. & Sow. Zool. Jour. iv. 372.*

Inhab. Icy Cape.

The back dark, and the apex often eroded like many shells from high latitudes.

NATICA SORDIDA. var. *GLOBOSA*. *t. 37. f. 5.—Swain. Zool. Ill. t. 79.*

This species differs greatly in shape: the most elongated variety is figured under the name of *N. plumbea*. Wood. *Cat. Sup. t. 8. f. 2*; the common state is figured in Swainson's *Zool. Illust. t. 79*, under the name of *N. sordida*. I have here figured another variety which differs in being much thinner and more globular; it may prove distinct, but as I have only seen a single specimen, I am unwilling to separate it. *N. melastoma*. Swain. *t. 72*. may be also a variety of it.

NATICA MANILLA.

The operculum is horny.

NATICA SEMISULCATA.

Shell ovate, suborbicular, solid, pellucid, white, smooth; spire short, convex, rather blunt; whorls convex, with six or seven narrow regular compressed lines near the suture, and few round the umbilicus; suture compressed; umbilicus simple, rather large and deep. Mouth very oblique. Axis 6; diam. 6 lines.

NATICA DEPRESSA. *t. 36. f. 2.*

Shell subhemispherical, depressed, white, smooth, pellucid; spire very low, short; whorls rapidly enlarging, last with five spiral bands of small, square chesnut spots, closely concentrically striated behind; umbilicus very large, expanded, with a very broad anterior rib, and deep posterior cavity. Axis $\frac{1}{2}$ inch.

Inhab.

NATICA OTIS. *t. 34. f. 13. t. 37. f. 3.—Brod. & Sow. Zool. Jour. iv. 372.*

This species has a notch in the inner lip like *N. Glaucina* and *N. conica*, an almost of the species which have horny opercula.

NATICA QUADRIFASCIATA.

Shell ovate, globose, solid, smooth, chesnut brown; spire very short, conical; last whorl with four narrow white spiral bands, hinder one broadest, extending up the spire; throat purplish; inner lip large, black brown. Axis largely umbilicated. Axis $1\frac{1}{2}$ inch.

Inhab.

NATICA CRUENTATA.

The front of the foot is produced, tentacles small, on the edge of a small cross membrane, with the mouth in a deep groove below it, between the tentacular ridge and the hinder edge of the front of the foot; the penis very large, like that of *Buccinum*, with a small nearly terminal appendage, retracted into a cavity placed on the hinder side of the right tentacle. The operculum shelly.

NATICA MELANOSTOMA.

The operculum with a distinct elevated spiral ridge in front. The muscle of attachment leaves an elongated scar on the pillar.

SIGARETUS, Lam. CRYPTOSTOMA. Blain.

The animal of this shell only differs from *Natica* in being much larger in respect to the size of the shell, and in being provided with only a small ovate horny operculum. The size of the animal differs in the various species: thus in *S. concavus* it is capable of being withdrawn into the cavity of the shell, which is not the case with *S. haliotoides*.

MERRIA.

The body spiral; the trunk proboscis-like, the tentacles conical, simple, with the eyes on their outer base; the foot small, rounded, with an oblong expansion in front, and a large triangular wing-like lobe on each side; the edge of the mantle simple; the operculum very small, thin, just at the top of the foot. The shell white, naked.

The pedal appendages of this genus are peculiar.

MERRIA CANCELLATA.

Sigaretus cancellatus. Lam.

NERITINA.

Trunk short, annulate, with a short fringe over the head; a low elevatory ridge on each side of the body, from the back of the tentacula to the hinder part; the gills lanceolate, free, except at the base attached to the back of the left side of the respiratory cavity, and bent over towards the right side, formed of lamina united to labia. Eyes on short tubercles, free, but on the side of the base of the tentacles; tentacles conical, separate vent on the right side of the branchial cavity. The muscles of attachment on each end of the columella, large and oblong.

Perhaps this genus on account of the series of fringe on each side of the body should rather be placed near the *Turbines*. It is hermaphrodite like them! for I have not, in the many specimens I have examined, observed any with the male organ exerted.

The lamina which separates the upper whorls of these shells is absorbed; the mantle of *N. Corona* (when preserved in spirits) does not exhibit any process by which it forms the series of tubular spines.

Several of the species live a long while out of water.

NERITOPSIS. GRATELOUP.

Animal and operculum unknown.

NERITOPSIS RADULA.

Nerita radula. *Born. t. 17. f. 78.*—*Chem. v. f. 1946, 47.*—*Wood, Cat. f. 23.*

Inhab. Indian Ocean.

This species is also found fossil, and there are two or three other species. They are all known by the nick out of the middle of the inner lip.

VELUTINA.

The foot lanceolate, moderate, double in front; tentacles short, compressed, rather distant at their base, with a slight crest between them; eyes on the outer side of the tentacles near the base; penis on the right side, large, like that of *Buccinum* in shape, with subapical conical tip; operculum none.

STYLINA. *Fleming.*

It appears from the slight examination that I have been able to make of the animal of this genus, that what is called the mantle in Mr. Broderip's character of this genus is rather the foot.

Dr. Fleming places the English species in *Velutina*, but proposes to establish this genus under the name of *Stylina*; therefore I have adopted it in preference to the one since proposed by Mr. Broderip of *Stylifer*.

There is a great alliance between this genus and the *Helix polita* of Montagu, which forms the genus *Eulima* of Risso. It is remarkable that both the genera are very apt to be curved.

LITTORINA.

The tentacles subulate, rather distant; the eyes rather prominent on the outer base of the tentacles; the operculum horny, ovate, spiral, of a few, very rapidly enlarging whorls.

The animals inhabit the sea coast between the high and low water marks where they are often left dry for many hours.

The colour of the animals of the common English *L. retusa* agrees with the colour of the shell: thus the orange shells have orange inhabitants, and the dusky ones dusky; they are always of an uniform colour, while the animal of the *L. vulgaris* is always varied with black lines.

LITTORINA IRRORATA, *t. 38. f. 1.*

Turbo irroratus. *Say.*

Phasianella sulcata. *Lam.*

Shell obovate, conical, solid, whitish, brown dotted, spire conical, apex acute, brown; whorls closely spirally grooved, close together in front and wider apart near the sutures. Mouth ovate; columellar lip yellow brown; throat white; outer lip thickened internally, with two rows of brown dots near the thin part of the outer edge. Axis 1 inch; diam. 8 lines.

LITTORINA PERUVIANA, *t. 36. f. 8.*

Phasianella Peruviana. *Lam. Hist. vii. 53.*

Turbo Zebra. *Wood. Cat. Sup. t. 6. f. 33.*

Littorina striata. *King, Zool. Journ.*



Shell obovate, conical, solid, black, with zigzag cross bands or spots of white; spire conical, rather shorter than the mouth, brown, rounded, whorls flat, the last very obscurely keeled near the front. Mouth ovate, throat black, with a white spiral band in front; columellar lip brown. Axis 8; diam. 3 lines.

Inhab. Coast of Peru. Arica. T. II. Fryer, Esq.

The young are generally all blackish, with the white band on the front of the whorl visible externally, as well as in the throat. They vary greatly in the degree of the roundness or keeling of the last whorl, like the rest of the genus.

LITTORINA SQUALIDA, *t. 34. f. 12.* *Brod. & Sow. Zool. Jour.* iv. 370.

Shell ovate, conical, ventricose, solid, greenish grey; spirally striated with narrow brown spiral lines; spire conical, acute. Mouth roundish; outer lip thin, brown varied; throat brown, with three or four darker bands; inner lip white, broad, and concave in front of the axis.

Inhab. Icy Cape.

When the surface is weathered, the brown lines are more distinctly seen and have somewhat the appearance of being raised.

LITTORINA FASCIATA.

Shell obovate, suborbicular, with oblique transverse brown bands; the spire shorter than the mouth; apex acute, purplish, whorls convex rounded, concavely impressed near the suture; suture indistinct. Mouth very oblique with the axis of the shell, half round: lips and throat pale brown; outer lip black spotted by the tips of the bands. Axis 1 inch, 3 lines; diam. 1 inch, 1 line.

Inhab. Pacific Ocean? My collection.

LITTORINA LIMAX.

Limax. Martyn. Univ. Conch.

Shell conical, ovate, solid, pink or white, smooth; spire conical, acute, rather larger than the mouth; whorls slightly convex, the last angularly keeled. Mouth small, ovate; outer lip white; the columellar lip and throat intense orange; the axis impressed, covered by the columellar lip. Axis 8; diam. $5\frac{1}{2}$ lines.

Inhab. Society Islands. My collection.

LITTORINA MINIMA.

Turbo minimus. Gray. MS.—Wood, Cat. Sup. t. 38. f. 29.

Shell obovate, solid, yellow or white, with numerous regular minute dots placed in oblique cross bands; spire blunt, shorter than the mouth: throat brown; inner lip purplish. Axis perforated with a slight pit. Axis 2 lines; diam. $2\frac{1}{2}$ lines.

The perforation gives this shell much the appearance of a minute *Natica*. In one specimen it is deep, in the other there is a slight impression of the same size as the perforation.

LITTORINA NODOSA.

Shell obovate; black or brown, marbled with white in front; spire short, much shorter than the mouth; whorls convex, with a spiral series of large red or white tubercles near the suture, the last with a similar sub-central series of rather large ones, and small irregular tubercles in front. Mouth ovate, very oblique; columella and outer lip varied with white; throat black, with a narrow white spiral band in front. Axis 5; diam. 4 lines.

My collection.

LITTORINA UNDULATA.

Shell ovate, conical, solid, smooth, white with irregular broad brown zigzag cross lines; spire conical, rather longer than the mouth; lips acute, purplish; whorls convex, round, the last slightly impressed near the suture. Mouth roundish; outer lip white, brown spotted; columellar lip and throat purple. Axis 11; diam. 7 lines.

My collection.

Varies with the axis obscurely perforated, probably a deformity.

LITTORINA NIGRO-LINEATA.

Turbo obtusatus. *Chem. v. t. 185. f. 1854, 1855?*

Shell ovate, suborbicular, pale whitish, with numerous, close set, impressed, narrow, brown spiral lines; the spire very short; whorls convex; suture impressed. Mouth ovate; outer lip black and white spotted; inner lip white, dilated in front; throat pale brown. Axis 7; diam. 5½ lines.

My collection.

The spire varies from being very low to nearly the length of the mouth.

LITTORINA MELANOSTOMA.

Shell ovate, turreted, thin, pellucid, distantly spirally striated, white, dotted or concentrically banded with brown; spire conical, tapering, rather larger than the mouth, lip acute, purplish; whorls nearly flat, the last one very obscurely angular; hinder part of columellar lip black to the axis; the front part of the last whorl not so much coloured as the rest of the shell, and the front of the mouth slightly expanded; outer lip thin. Axis 11; diam. 6 lines.

Inhab. Indian Ocean. My collection.

LITTORINA TUBERCULATA.

Turbo tuberculatus. *Gray, MS.—Wood, Ind. Test. Sup. t. 7. f. 3.*

Shell obovate, conical, solid, varied pale and dark brown; spire conical, as long as the mouth; whorls rather convex, nodulose, the upper with one and the last with two rows of close set roundish tubercles in front. Mouth roundish; throat black. Axis 6; diam. 4 lines.

My collection.

LITTORINA GRANULARIS.

Shell obovate, solid, brown, spire conical, shorter than the mouth; whorls rounded, convex, the upper with five or six, and the last with twelve or thirteen spiral irregularly beaded lines. Mouth ovate; throat pale brown; inner lip much worn, with a slight impression over the axis. Axis 7; diam. 5 lines.

My collection—much worn.

The ridges on the front of the last whorl are much smaller and scarcely beaded.

LITTORINA TROCHOIDES.

Shell conical, elongate, solid, black; spire conical, acute, rather longer than the mouth; whorls convex, spirally striated, impressed, and nodulose near the suture, with a series of compressed nodules on the upper and two on the last whorl, with a series of close-set, roundish granules round the edge in front of the last one. Mouth ovate, columellar lip and throat black, with a narrow white spiral band in front; the lip with an obscure groove in front. Axis 7; diam. 4 lines.

My collection.

Shell bluish, and the nodules white in some specimens.

It is probable that *Trochus melanostomus*, Gmel. from Chem. v. t. 161. f. 1526, 1527, will form a new section of this genus, characterised by being trochiform, and having a quadrangular mouth, with a sharp edged twisted concave callosity on the columellar lip; to which will belong.

LITTORINA AUSTRALIS.

Shell trochiform, whitish, with irregular oblique transverse black bands; whorls flat; the last acutely keeled, slightly waved; the suture indistinct, slightly nodulose, front of last whorl spirally subnodulose ridged; outer lip black spotted; throat pale reddish brown. Axis 8; diam. 10 lines.

Inhab. New Holland.

A very variable species.

LITTORINA IMBRICATA.

Shell trochiform, brown, varied with white between the tubercles; front white, brown spotted; whorls flat, with irregular large nodulose protuberances near the sutures, the last whorl flat and spirally grooved in front. Mouth ovate; outer lip varied with black; columellar lip and throat whitish. Axis 8; diam. 7½ lines.

My collection.

This species chiefly differs from the last in the large nodules near the sutures and in the colour: it may prove a variety of it.

ASSAMINIA. Leach, MSS.

The tentacles short, thick, with the eyes on the outer side of their tip; the foot ovate; mantles and sides of the body simple; the operculum ovate, horny, spiral, of a few whorls.

The shell is exactly like *Littorina*.

This genus was established by Dr. Leach for a shell which I discovered in the Woolwich marshes in the year 1817. It is referred to by Dr. Fleming under the name of *A. Grayana*. Brit. Anim. 275; he places it at the end of *Lymnea*, and Mr. Jeffreys has referred it to that genus! It is an instance of shells very nearly allied in external character having different animals.

PAGODUS.

The foot short, simple, sides of the body quite simple; trunk short, annular; tentacles conical, distant at the base; eyes on tubercles attached to their outer base; penis large, exerted, club-shaped, placed a little below and behind; the right tentacle conical and covered with minute spicula at the tip, and with two large spinose prominences, almost one-third down the hinder edge. The operculum suborbicular, thin, horny, of three or four rapidly enlarging whorls. (*Monodonta Pagodus*. Lam.)

PALUDINA.

The gills are formed of a series of triangular plates attached to and forming an oblique line down the left side of the branchial cavity.

There is an appendage on each side of the head, arising at the back of the tentacles, that of the left side is small, that of the right larger before. The hinder portion forms a canal as in *Ampullaria*.

The muscle of attachment is double, the portion on the left side is the smallest. There is a similar ridge to that in *Ampullaria*, but the ridge up the back of the neck runs more to the left, and there is a large mass between it and the right edge of the body.

Is the fat mass analogous to the bag in *Ampullaria*?

Eyes nearly seated on the base of the tentacles.

The American and European species are equally viviparous; and the young are covered with bands of hairs differing in number in the different species.

AMPULLARIA.

The mouth simple, thickened at the edge, free above; the gills formed of a series of triangular lamina forming a line down the right side of the branchial cavity, close by the side of the colon and ovarian tube. There is also a small mass of lamellæ at the outer left angle of the cavity; the rest of the cavity is filled with a large fleshy bag, open by a wide slit; tentacles conical, elongate; eyes on short tubercles, but close to the outer base of the tentacles. The trunk short; front of the side expanded into short, conical, tentacula-like lips; foot simple, folded across. From the tentacles on each side to the base of the edge of the respiratory cavity there is continued a broad flat plate which is largest on the left side, and which appears to be bent up so as to form a canal to conduct the water to the respiratory cavity; the one on the right side is folded, and gives origin to a fleshy ridge, which extending up the right side, close to the side of the colon, is continued to the tip of the respiratory cavity, the use of which does not very readily appear. The penis conical, elongated, near the tentacles, and enclosed in a bivalve sheath in the thickened margin of the right side of the collar.

The reversed species (*Lanistes*, De Montfort) are very like the others; the front of the head is bifid; the conical process of the front of the head and the tentacles are spirally twisted; there is a plate on each side of the body forming a canal to the neck! the penis contracted into the right side of the edge of the mantle, and there is a distinct air bag.--The operculum is horny, with a subcentral nucleus.

The *Ampullariæ* are capable of living a long time out of water, for *M. Caillaud* brought some specimen to Paris alive from the Nile; he kept them in dry saw-dust.



The following notes relating to such shells as are represented in Plates XXXIII. to XLIV. and not referred to in the foregoing pages, have been put together at the request of CAPTAIN BEECHY, by

G. B. SOWERBY, F. L. S.

MARGARITA STRIATA, *t. 34. f. 11. Brod. and Sowerby, Zool. Journ. iv. Conch. Illust. Margarita, f. 18.*

TROCHISCUS NORRISHI, *t. 34. f. 14. Sowerby, in Mag. of Nat. Hist. 2d. series.*

TURBO NIGER, *t. 36. f. 1. Gray, MS. in Brit. Mus.*

HELIX MANDARINA, *t. 34. f. 2. and 38. f. 3. Gray, MS. in Brit. Mus.*

Shell subglobular, thickish, smooth, chesnut brown, spire as long as the aperture, conical, blunt, whorls five and a half, convex; suture deep, its edge rounded; last whorl with a narrow white spiral band; aperture broadly semilunate, lip reflected; a nearly obsolete tubercle at the front of the columella. Length 0.75, breadth 0.9 inch.

Inhab. Loo-Choo.

In some specimens there is a slight angle near the middle of the last whorl. The whorls are all striated by the lines of growth.

HELIX LUHUANA, *t. 35. f. 4.*

Shell suborbicular, rather depressed, slightly and irregularly wrinkled by the lines of growth, of a rather dull brown colour, with a narrow darker band about the middle of the last whorl; spire only slightly elevated, of five and a half convex whorls; suture distinct; aperture broad, its margin rather thickened and reflected, particularly at the lower and anterior part near the large umbilicus.

Inhab. Loo-Choo.

HELIX ROSACEA, *t. 38. f. 2.*

Shell suborbicular, rather depressed, thickish, whitish or light brown with a chesnut band in front of the suture, and another round the middle of the last whorl; spire slightly elevated, of five whorls, usually chesnut coloured and transversely wrinkled, most strongly at the suture, which is not deeply impressed, but nevertheless distinct; aperture oblique, broadly semilunar, its margin very slightly thickened, but not reflected; umbilicus small, surrounded by a chesnut coloured band. Axis I., breadth 1.6 inches.

Inhab.

A delicate rosaceous tint is usually suffused over the surface of this species.

HELIX DESPECTA, *t. 38. f. 5. Gray, MS. in Brit. Mus.*

Shell nearly globular, thin, smooth, pale brown; spire somewhat elevated, blunt, of four and a half convex whorls; suture deep, aperture broad, rounded; lip very slightly thickened, and reflected; umbilicus rather small.

HELIX FRASERI, *t. 38. f. 6. Gray, Zool. Proc. 1836, p. 63.*

Shell nearly globular, smooth, subpellucid, light brown with chesnut coloured bands, various in width; spire somewhat elevated, of six convex whorls; suture distinct; aperture large and wide, lip thickened and reflected, wider at the anterior part next to the umbilicus, which is covered by it.

HELIX SPECIOSA, *t. 38. f. 7.* Jay, *Catalogue of Shells, Plate III. f. 9.* New York, 1836.

HELIX VIRGULATA, *t. 38. f. 9.*

Shell suborbicular, rather depressed, striated rather deeply by the lines of growth, light brown, slightly keeled, with a chestnut spiral band at the keel; spire rather depressed, but conical, of five slightly convex whorls; aperture broad, semilunar, brown band seen within, peritreme thickened inside, slightly turned outwards; umbilicus moderate.

HELIX INVERSICOLOR, *t. 38 f. 10.* De Ferussac, *Hist. nat. des mollusques terrestres et fluviatiles.*

Carocolla bicolor. Lam. *Hist. nat. des anim. sans vert. VI. pt. 2. p. 97.*

The figure represents a young shell of this common species.

PARTULA FABIA, *t. 38. f. 4.* Gray, MS. in *Brit. Mus.*

Partula australis. De Fer, *Hist. nat. des moll. ter. et fluv. p. 70.*

Limax Fabia. Martin *Univ. Conch. II. t. 67.*

Found abundantly at Tahiti.

BULINUS OPALINUS, *t. 38 f. 8.* Sowerby, *Conch. Illust. Bulinus, f. 47.*

Shell oblong, pyramidal, smooth, glossy, hyaline and of milky whiteness; spire double the length of the aperture, of eight slightly convex whorls; suture distinct but not deep; aperture elliptical; lip white, reflected; umbilicus rather large; length 1·, width, 0·5 inch.

From Bahia.

BULINUS SCALARIFORMIS, *t. 38. f. 12.* Brod. *Zool. Proc. No. XVI. p. 31.*—Sowerby, *Conch. Illustr. Bulinus, f. 13.*

Inhab. Peru.

The two varieties mentioned by Mr. Broderip, in the Zoological proceedings are represented. Some specimens are destitute of the longitudinal ribs; such is the upper fig. 12 in t. 38, from Lima.

BULINI GUADALOUPENSIS VAR. ALBA, *t. 38. f. 13.*

Inhab. Brazil.

At first I had mistaken the shell here figured for the *Bul. candidus* of Ziegler, but upon comparison I find it to be distinct from that, and that it agrees well with some colourless specimens of *Bul. Guadaloupeensis*, a species which is extremely variable in its colouring and which is found in many of the West India islands as well as on several parts of the South American Main.

BULINUS VITTATUS, *t. 38. f. 14.* Brod. *Zool. Proc. Number XVI. p. 31.*—Sowerby, *Conch. Illustr. Bulinus, f. 6. and 6.**

The specimen represented appears to be a young individual, it is marked on the drawing by Mr. Gray in pencil, *B. Tacna.*

BULINUS MUTABILIS, *t. 38. f. 20.* *Brod. in Zool. Proc.* 1832, *p. 108.* *Sowerby, Conch. Illustr. Bulinus, f. 15. and 15**

Found near Santos in Peru, and in the Campania of Truxillo.

BULINUS ROSACEUS, *t. 38. f. 15.* *King in Zool. Journ. v. p. 341.*—*Sowerby, Conch. Illustr. Bulinus, f. 5.*

BULINUS MELO, *t. 38. f. 16.*

Shell oval, solid, smooth, white with irregular longitudinal brown streaks; spire shorter than the aperture, of five rather convex whorls, wrinkled at the suture and blunt at the apex; mouth oblong, lip very slightly thickened, its columellar edge rather more so and reflected in part over the small umbilicus; length 0.9, breadth 0.55 inch.

Hab. New Zealand.

BULINUS CONSPERSUS, *t. 38. f. 17.* *Sowerby, in Zool. Proc. No. vi. for June 11, 1833. Conch. Illustr. Bulinus, f. 49.*

Found abundantly in the neighbourhood of Lima; the specimen here represented is a young individual.

CHILINA OVALIS, *t. 38. f. 18.* *Sowerby, Conch. Illustr. Chilina, f. 6.*—*Malacol. and Conchol. Mag. part II.*

Found in brackish streams on the Peninsula de Tres Montes on the West coast of S. America.

CHILINA FLUVIATILIS, *Gray. t. 38. f. 19.* *Sowerby, Conch. Illustr. Chilina. f. 5.*

Found abundantly at Quiliota by Mr. Henuah and Mr. Cumming.

HELICINA FESTIVA, *t. 38. f. 23.*

Shell subglobose, smooth, thickish, brown, with reddish transverse streaks on the spire, in front of which is a narrow pale band; spire of four whorls, the last very large, obtusely keeled, with a band of alternately bright red and white streaks, its under side with brown streaks; aperture large, somewhat oblong, outer lip thickened and reflected, inner lip much spread over the lower part of the last whorl, umbilical callus white; a very small indistinct tubercle at the base of the outer lip.

HELICINA MAUGERIE, *t. 38. f. 25.* *Gray in Zool. Jour. I. p. 251.*

HELICINA GONIOSTOMA, *t. 38. f. 21.*

Shell subglobose, smooth, thickish, dark brown, with a whitish spiral band near the suture; spire rather depressed, conical, aperture large and wide, with an obtuse angle at the outer edge corresponding with a very obtuse keel of the last whorl.

HELICINA GLOBOSA, *t. 38. f. 22.*

Shell nearly globular, with a rather elevated acuminate apex, smooth, slightly spirally striated, very pale brown; spire of five whorls with a distinct suture; aperture large, wide, with a spreading outer lip; inner lip not much spread, columellar callus only barely covering the umbilicus.

HELICINA OXYTROPIS, *t. 38. f. 24.*

Shell suborbicular, rather depressed, smooth, carinated, pale yellow; spire depressed, conical, of four sharp keeled volutions; aperture wide, sharply angular at its outer edge.

HELICINA SOLIDULA, *t. 38. f. 26.*

Shell nearly globular, smooth, solid, thick, yellow, spire of four rather ventricose volutions, the last large, obtusely keeled; aperture rather small, thick-lipped, obtusely angular at its outer edge.

AURICULA PALLIDA, *t. 38. f. 27.*

Shell ovate, oblong, almost colourless, smooth, slightly longitudinally striated; apex acuminate; spire very short, of six whorls, the last of these four times as long as the spire; peritreme thickened, outer lip not reflected; anterior part of the columellar lip reflected over the small umbilicus; front of the columella with one distinct fold and another, nearly obsolete, placed anteriorly to it.

MELAMPUS PALLESCENS, *t. 38. f. 28.*

Shell obovate, white, very smooth, covered with a pale greyish yellow periostracum; spire short, consisting of seven or eight whorls, abruptly acuminate at the apex; last whorl very large, rounded, angular near the hinder part, blunt anteriorly; aperture elongated, narrow, rather more so posteriorly than anteriorly; outer lip thickened inwardly, with five or six blunt teeth; columellar lip with three or four rather irregular blunt folds.

CYCLOSTOMA IMMACULATUM, *t. 38. f. 29. Sowerby, Species Conchyliorum. Part II. Cyclostoma, f. 124.*

Shell globoso-conical, thin, pellucid, nearly white, smooth, spire acuminate, of five rounded whorls; last whorl ventricose; aperture nearly circular; peritreme reflected, white; umbilicus small.

Hab. Luçon.

CYCLOSTOMA ALBICANS, *t. 38. f. 30. Sowerby, Species Conchyliorum. Part II. Cyclostoma, f. 104, 105.*

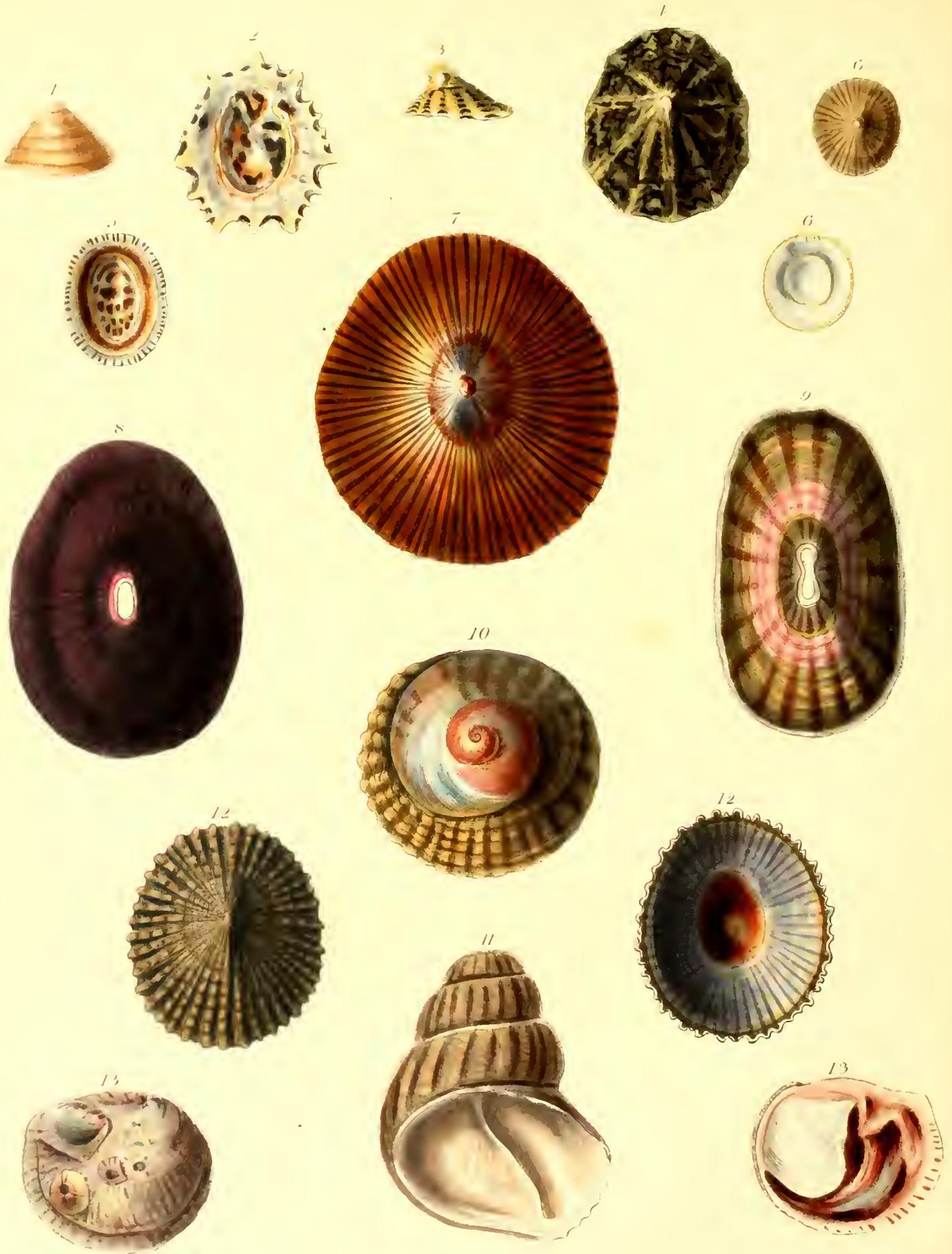
Shell nearly globular, whitish, with an obtuse spire consisting of five rounded whorls, spirally grooved on the upper part, very smooth below; aperture nearly circular, rather acuminate posteriorly, peritreme thickened, somewhat sinuous above, anterior part of the outer edge thickened and reflected; inner edge with an angle on the side of the umbilicus, which is large and smooth within.

Inhabits some of the islands of the Southern Pacific.

CYCLOSTOMA FILOSUM, *t. 38. f. 31. Sowerby, Species Conchyliorum. Cyclostoma, f. 16.*

Shell of a somewhat conical orbicular form, its spire rather shorter than the aperture, thickish, of a pale colour, with five rounded, longitudinally striated and carinated whorls; the two more prominent keels speckled with reddish brown, the lower one running along the suture, which is otherwise very indistinct; aperture circular, peritreme rather thickened, sinuated at the upper part, and rather angular, forming a very short, inconspicuous canal, edge rather obtuse; umbilicus large, deeply grooved within, its edge with two prominent keels.

Hab. India.



CYCLOSTOMA BRASILIENSE, *t. 38. f. 32.* *Sowerby, Species Conchyliorum. Part II.*
Cyclostoma, f. 8.

Shell of a rather depressed orbicular form, thin, white, opaque; whorls four or five, transversely striated, striæ sharp and close-set; suture deep; aperture circular, peritreme thin, sharp edged; umbilicus large; operculum shelly, thick, double, smooth within and with a very fine spiral line outside.

Found in abundance in shady places near Rio Janeiro.

LOTTIA ? PALLIDA, *t. 39. f. 1.*

Shell conical, rather elevated, smooth, pale yellowish horn colour, absolutely radiately striated; vertex nearly central, oval, red spotted, turning towards the anterior of the shell; inside white, with a broad margin of the same colour as the outside. When this shell is laid upon its aperture with the apex upwards, both ends of the lip are slightly elevated.

Inhabits the Coasts of the Pacific Ocean.

I have placed this and the following species with the *Lottia* not without some hesitation, as I have never seen the animals. *Martini, vol. 1. f. 34.* appears to be a representation of a very old specimen of this shell, but he speaks of it as identical with Adanson's *Gadin*, which it does not resemble.

LOTTIA ? COSTATA, *t. 39. f. 2.*

Shell oval, with a slightly elevated anterior apex, and having from fifteen to twenty coarse ribs, radiating from the apex to the margin, some of which are more prominent than the remainder; of a light colour, with interrupted dark fuscous concentric bands: inside generally of a pale colour, mottled in the center with dark brown, margin with many more or less deep notches between the ends of the ribs, black except at the termination of the ribs, which are pale.

Inhabits the coasts of the Pacific Ocean?

This may possibly be only a deeply ribbed variety of the following.

LOTTIA VARIABILIS, *t. 39. f. 3, 4, 5.*

Shell obtusely oval, with its apex more or less elevated, being sometimes very low and flat and sometimes much raised and conical; apex never central, generally about one third nearer to the anterior than to the posterior part; the outer surface is sometimes very deeply radiately grooved, the ribs being rounded; sometimes radiately ribbed with from twelve to fourteen ribs; sometimes almost smooth, or only radiately striated; the colouring being in general a more or less dark olive green with nearly black angular marks irregularly concentrically arranged; the internal surface is also extremely variable, being sometimes of a nearly uniform bright green, sometimes nearly colourless, frequently white or green and more or less varied with brown of various degrees of intensity; its center is also often very elegantly mottled and speckled and varied with lines and spots of a very dark brown colour: the muscular impression is usually white, though not unfrequently mottled with brown: the margin is moreover greatly varied in its form and colouring, being occasionally dentated and sinuated and frequently nearly even; sometimes white, pale brown or green with black spots, and sometimes nearly or quite colourless.

Inhabits the coast of Chili.

This is one of the most variable species of Patelliform shells, both in its form and colouring. Figs. 4 & 5 represent the most usual extremes in both respects. Fig. 3 represents an accidental monstruity.

MOURETIA PERUVIANA, *t. 39. f. 6, 6.* *Sowerby, Zool. Proc. 1835, p. 6.*

Found at Huasco, on the Peruvian coast.

PATELLA ARGENTATA, *t.* 39. *f.* 7.

Shell depressed, conical, somewhat elliptical, radiately ribbed, dark yellowish brown outside, silvery white within: apex slightly anterior; the ribs rather irregular and occasionally rugose: margin slightly and irregularly dentated.

Found on rocks at Valparaiso and other parts of the coast of Chili.

PATELLA MAZATLANDICA, *t.* 39. *f.* 12, 12.

Shell rather depressed, conical, somewhat elliptical, radiately ribbed, with nodulose ribs, of a dull greenish gray, frequently with black spots outside, whiter inside and somewhat pearly, sometimes with a white and sometimes with a dark brown center: apex slightly anterior; margin irregularly toothed.

Inhabits the coast at Mazatlan.

This species varies much in the number and closeness of the radiating ribs, as well as in the size of the nodules upon them. It sometimes measures nearly three inches in length.

FISSURELLA LATIMARGINATA, *t.* 39. *f.* 8. *Sowerby, Zool. Proc.* 1834, *p.* 126.
Conch. Illustr. Fissurella, *f.* 69.

Inhabits—found on the rocks at Valparaiso and Iquiqui..

FISSURELLA CRASSA. *Lam. t.* 39. *f.* 9.

F. crassa. *Lam. Hist. nat. des anim. sans vert.* vi. *Part II. p.* 11. *Sowerby, Conch. Illustr. Fissurella*, *f.* 9, 11.

F. Clypeiformis. *Sowerby, Tank. Cat. app.* *p.* vi.

Found abundantly at Valparaiso.

INFUNDIBULUM RADIANS, *t.* 39. *f.* 10.

Trochus radians. *Lam. Hist. nat. des anim. sans vert.* VII. *p.* 11.—*Encycl. method. t.* 445. *f.* 3.

Calyptræa radians. *Nonnull.*

Found abundantly at Valparaiso, Coquimbo and at other places on the shores of the Pacific. The locality given by Lamarck, namely, the Antilles near Guadaloupe, must be erroneous.

INFUNDIBULUM RADIANS. *Var. t.* 39. *f.* 11.

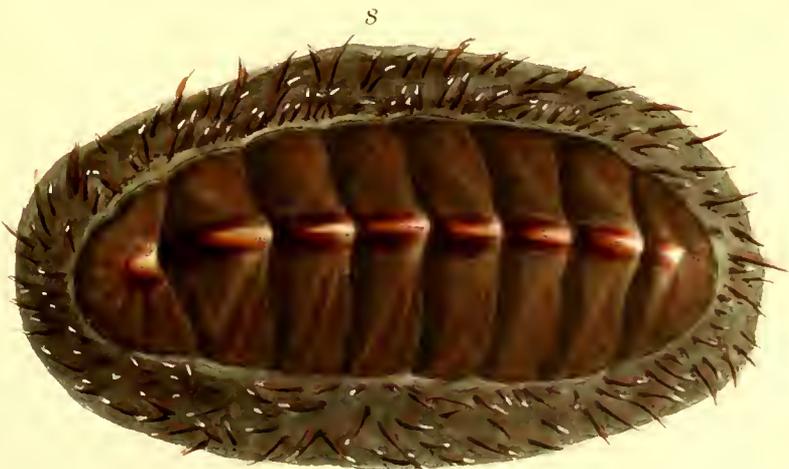
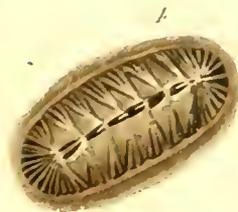
A remarkable variety with an unusually elevated spire.

CALYPTRÆA STRIGATA, *t.* 39. *f.* 13. *Broderip, Trans. of Zool. Soc.* I. *pl.* 28. *f.* 12. *p.* 206.**CHITON HENNAHI**, *t.* 40. *f.* 1. *Gray, Spicilegia Zoologica*, *p.* 6. *no.* 11.—*Sowerby, Conch. Illustr. Chiton*, *f.* 1. 33.

Found abundantly in the Bay of Callao.

CHITON JANEIRENSIS, *t.* 40. *f.* 2. *Gray, Spicilegia Zoologica*, *p.* 6. *no.* 9. *t.* 3. *f.* 8.

Inhabits Rio Janeiro.



CHITON PUNCTULATISSIMUS, *t. 40. f. 3. 3.* *Sowerby, Zool. Proc. 1832. part II. p. 58.*—*Conch. Illustr. Chiton. f. 9.*

Inhab. Bays of Mexillones, Iquiqui, and Arica.

CHITON ALBO-LINEATUS, *t. 40, f. 4.* *Broderip and Sowerby in Zool. Journal, vol. 4. p. 368.*—*Sowerby, Conch. Illustr. Chiton. f. 39.*

Inhab. Found at Mazatlan on the coast of Mexico.

CHITON GRANOSUS, *t. 40. f. 5.* *Frembley, Zool. Journ. vol. III. p. 200. tab. sup. XVII. f. 1.*

Inhab. Found at Valparaiso in the crevices of the rocks generally out of reach of the breakers.

CHITON COQUIMBENSIS, *t. 40. f. 6.* *Frembley, Zool. Journ. vol. III. p. 197. tab. sup. XVI. f. 2.*

Inhab. Found only on the South side of Coquimbo Bay.

CHITON SETIGER, *t. 40. f. 7.* *King, Zool. Journ. vol. 5. p. 338.*—*Sowerby, Conch. Illustr. Chiton, f. 17.*

Inhabits the Seaward coasts of the Tierra del Fuego and the western part of the strait of Magalhaens.

CHITON ACULEATUS, *t. 40. f. 8.* *Barnes.*

Chiton spiniferus. *Frembley, Zool. Journ. vol. III. p. 196. tab. sup. XVI. f. 1.*

Inhab. Found abundantly on the rocks in exposed situations on the coasts of Chili, at Valparaiso and other places. Some individuals attain the length of six inches.

CHITON BARNESII, *t. 41. f. 10.* *Gray, Spicilegia Zoologica, p. 5. t. 6, f. 22.*—*Sowerby, Conch. Illustr. Chiton. f. 2.*

Inhab. Abundant at Coquimbo.

CHITON PLATYMERUS. *t. 41. f. 11.*

Shell ovate, scarcely keeled, slightly convex, smooth, of a dark chestnut brown colour; marginal ligament coriaceous: anterior and posterior valves, and lateral areae of the middle valves obtusely radiately ribbed; central areae of the middle valves longitudinally striated; valves broad.

Inhab.

CHITON UNDULATUS, *t. 41. f. 12.*

Shell oblong, rather convex, slightly keeled, marginal ligament coriaceous, undulated; valves smooth, of a dull pale greenish brown, light brown in the center.

Inhab.

The specimen appears to have been worn; it is probable that small bunches of hairs existed on the marginal ligament.

CHITON STRAMINEUS, *t. 41. f. 13.* Sowerby, *Zool. Proc. Apr. 1832. p. 104.*—*Conch. Illustr. Chiton. f. 28.*

Inhab. Found at Chiloe.

CHITON VESTITUS, *t. 41. f. 14.* Sowerby, *Zool. Journ. iv. p. 368.*

Inhabits the coasts of the Arctic seas. In the specimen represented the points of the reniform valves are much eroded; that of the Zoological Society displayed them covered with minute granules. This is probably the same as *Ch. Emersoni* of Conthony in Boston Journal of Natural History, vol. II.

CHITON TUNICATUS, *t. 41. f. 15.* Wood's *General Conchology and Index Testaceologicus.*

In the specimen figured by Wood the exposed part of the valves is nearly white, having been eroded so as completely to have lost all their natural surface; in the present individual they are only eroded at the very points, so that they exhibit the natural character of the exposed part of the valves, which are nearly smooth, of a dark grey colour, with darker concentric lines.

CHITON ARTICULATUS, *t. 41. f. 16.* Sowerby, *Zool. Proc. March, 1832. p. 59.*—*Conch. Illustr. Chiton. f. 18.*

Inhabits under stones at St. Blas in the Bay of California.

CHITON SETOSUS, *t. 41. f. 17.* Sowerby, *Zool. Proc. 1832. p. 27.*—*Conch. Illustr. Chiton. f. 19.*

Inhabits Guacomayo on the coast of Central America.

CHITON RUGULATUS, *t. 41. f. 18.* Sowerby, *Zool. Proc. 1832, p. 58.*—*Conch. Illustr. Chiton. f. 42.*

Found at Puerto Portrero, and on Inner Lobos Island, in Central America.

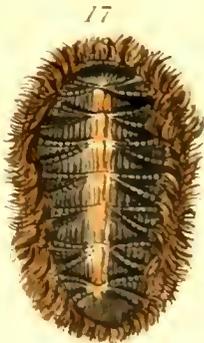
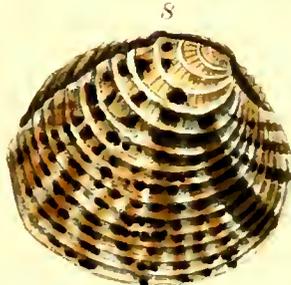
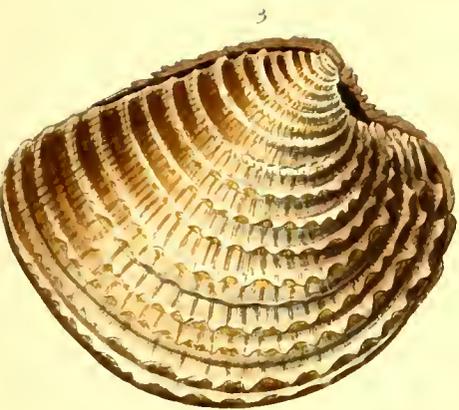
PECTEN PULCHERRIMUS, *t. 41. f. 1, 2.*

Shell nearly equivalve, unequal-eared, very flat, white, one valve with a pink apex, mottled with rose colour, and having nine radiating ribs, one of which at each end is strongly spinose, the seven intermediate ones being broader and covered with transversely fringed elevated scales; the other valve having ten radiating ribs, one of which at each end is spinose, the eight intermediate ones being broader and covered with transverse elevated, slightly interrupted scales; interstices of the ribs deep in both valves; dorsal lines spinose in both valves; ears radiately grooved.

This is a small, but extremely beautiful and delicate species

CHAMA ECHINATA, *t. 43. f. 9.* Broderip, *Trans. Zool. Soc. vol. I. p. 306. t. 39. f. 5, 6, 7.*

When young this shell is covered with numerous small pointed scales. The specimen here represented is a very old one, the outside of whose upper valve has been very much disfigured by *Lithodomi*.



VENUS GNIDIA, *t. 41. f. 3.* *Broderip and Sowerby in Zool. Journ.* iv. p. 364.

Inhabits the Pacific Ocean. Dredged at St. Blas.

VENUS TRICOLOR, *t. 41. f. 7.* *Sowerby, Zool. Proc.* 1835. p. 41.

Inhabits sandy mud at Puerto Portrero on the coast of Central America.

VENUS NEGLECTA, *t. 41. f. 8.*

Shell lenticular, nearly circular, strongly radiately striated, with elevated concentric ridges; anterior side shorter than the posterior, which is rather sloped; dorsal margins, with an elevated ridge at which the concentric ridges begin, within which there is a rather broad, sloping, nearly smooth area: concentric ridges crenulated beneath: anterior and basal margins within finely denticulated, the denticulations becoming smaller from back to front; inside white varied with purple, more particularly at the posterior extremity; outside brownish white with angular dark brown marks and spots.

Inhabits sandy mud on the coast of Central America. I have long been acquainted with this species, its near general resemblance to *V. cancellata*, *Lam.* has probably caused it to be overlooked.

VENUS DECORATA, *t. 41. f. 9.* *Broderip and Sowerby in Zool. Journ.* v. p. 49.
tab. sup. 40. fig. 3.

The representation here given is taken from the only specimen known at the time, which was brought home by the Blossom. I have since seen several others, which are more highly coloured, being of a brownish rose colour with darker speckling: its locality is, however, still unknown to me.

CYTHEREA ROSEA, *t. 43. f. 7.* *Broderip and Sowerby, Zool. Journ.* iv. p. 364.

Found abundantly at St. Blas.

CYTHEREA PLANULATA, *t. 43. f. 6.* *Broderip and Sowerby, Zool. Journ.* v. p. 48.

Found abundantly near Mazatlan.

CYTHEREA BIRADIATA, *t. 43. f. 5.*

Shell ovate-heartshaped, turgid, smooth, polished, fuscous, generally with two, more or less distinct, darker coloured diverging rays; umbones paler, more or less spotted and speckled with dark brown: anterior end short, rounded; posterior more elongated, and more pointed; posterior dorsal margin sloping; inside purplish livid.

Found abundantly at St. Blas and Mazatlan.

This species nearly resembles *CYTHEREA maculata*, *Lam.* a shell which abounds on the Atlantic shores of South America.

PULLASTRA NEBULOSA, *t. 43. f. 8.*

Venus nebulosa. *Lam. Hist. nat. des anim. sans vert.* V. p. 602.—*Chemn. Conch. Kab.* VI. t. 34. f. 359—361.

Lamarck states that this is found at Tranquebar. It is very closely related to *V. opima*, *Lam.* and is perhaps merely a variety of that species.

ASTARTE LACTEA, *t. 44. f. 12.* Broderip and Sowerby, *Zool. Journ.* iv. p. 365.
Inhabits Icy Cape.

ASTARTE BANKSII? *t. 44. f. 10.* Gray in *Brit. Mus.*
From the Northern Seas.

ASTARTE STRIATA? *t. 44. f. 9.* Gray in *Brit. Mus.*
From the Northern Seas.

CARDITA BOREALIS, *t. 44. f. 1.* Conrad. *Amer. Marine Conchology*, cited by
Gould in MS.
Arcturus rudis. Rude Northern Cockle. Humphrey MS.

CARDITA CRASSA, *t. 42. f. 4, 4.*

Shell obovate, subquadrate, very turgid, thick, rather rough, white with a brown periostracum; anterior end very short, scarcely projecting beyond the umbones: surface of each valve covered with 15 or 16 broad, rounded radiating ridges, with narrow interstices; decussated near the umbones which are involute; ligament in a deep depression of the dorsal margin: internal margin irregularly undulated.

Inhab. Found at Acapulco.

CARDIUM FIMBRIATUM, *t. 42. f. 1.*

Cardium fimbriatum. Lam. *Hist. nat. des anim. sans vert.* VI. part I. p. 5.

The shell here figured is in a young and incomplete state, before it has begun to form the crested lamellæ on the ribs at the margin, from which the name has been taken.

CARDIUM BIANGULATUM, *t. 42. f. 5.* Broderip and Sowerby in *Zool. Journ.* iv. p. 367.—*Sowerby Conch. Illustr. Cardium. f. 2.*

CARDIUM DIONÆUM, *t. 42. f. 6. 6.* Broderip and Sowerby, *Zool. Journ.* iv. p. 364.—*Sowerby, Conch. Illustr. Cardium. f. 1. 1.**

Inhabits Southern Pacific Ocean.

CARDIUM PANAMENSE, *t. 42. f. 7.* Sowerby, *Zool. Proc.* 1833. p. 85.—*Conch. Illustr. Cardium. f. 21.*

Inhabits sandy mud at Panama.

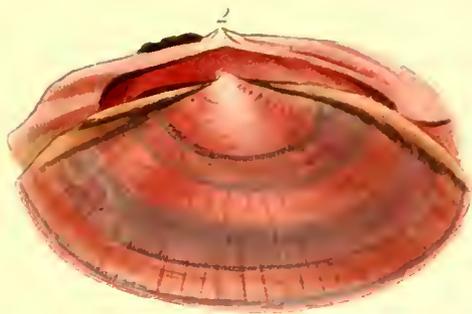
The representation is taken from a very young individual; the species grows to be several inches in height.

PECTUNCULUS INÆQUALIS, *t. 42. f. 3.* Sowerby, *Zool. Proc.* Nov. 1832. p. 196.

Inhabits sandy mud at Panama and Real Llegos.

ARCA GRADATA, *t. 43. f. 1.* Broderip and Sowerby, *Zool. Journ.* iv. p. 365.

From Mazatlan.







SOLENI GLADIOLUS, *t.* 43. *f.* 4, 4.

A species which has long been well known in this country, but which I believe has never yet been properly distinguished from the common European species, *Solen Siliqua*. In form the two species resemble each other very nearly, the *S. Gladiolus* is, however, higher (or wider as some would say) than the *S. Siliqua*, and this difference is more remarkable near the posterior part. *S. Gladiolus* is also in general, a little curved. I am aware that this latter circumstance cannot be regarded as a specific difference, since there is a variety of *S. Siliqua* common on our shores which is also a little curved. A far greater and more important difference exists in the muscular impressions. The anterior edge of the pallear muscular impression in *S. Gladiolus* is much more curved into the form of a bay and also much more distant from the anterior edge of the shell than in *S. Siliqua*. The *S. Gladiolus* is never mottled and streaked with reddish purple as is usually the *S. Siliqua*.

Comparative dimensions of the two species.

	Length.	Height.
<i>S. Gladiolus</i>	6 inches.	1 2-10th inch.
<i>S. Siliqua</i>	6 4-10th inches.	0 95 inch.

A specimen of *S. Gladiolus* which was in the collection of G. Humphrey was marked "S. America, Spengler." Many were brought to England by the *Blossom*; and several have lately been brought by the *Beagle*. This species seems to bear the same relation to *S. Siliqua*, that *S. Americanus* of Beck does to *S. Ensis*.

SOLENI ACUTIDENS, *t.* 43. *f.* 2. *Broderip and Sowerby, Zool. Journ.* iv. p. 361.

From Loo Choo.

SOLENI MEDIUS, *t.* 44. *f.* 2.

Shell obovate, thin, smooth, rounded at both ends; white with an anterior cross bar inside, and livid with a rather thin yellowish brown epidermis outside; anterior side one fourth the length of the shell.

Locality unknown.

GLAUCONOME CHINENSIS, *t.* 41. *f.* 4. *Gray, Spicilegia Zool.* p. 6. *t.* 3. *f.* 13.

13 a. *Sowerby, Genera of Recent and Fossil Shells*, No. 42.—*Sowerby, Conchological Manual*, p. 46. *f.* 64.

Inhabits rivers of China.

TELLINIDES PURPUREUS, *t.* 42. *f.* 2. *Broderip and Sowerby, Zool. Journ.* iv. p. 363.

Inhabits the sandy shores of the Pacific Ocean.

TELLINA ALTERNIDENTATA, *t.* 44. *f.* 5. *Broderip and Sowerby, Zool. Journ.* iv. p. 363.

Epidermis on the young shell very thin and fugacious: its inside is sometimes of a pale rose colour.

From the Arctic Ocean.

TELLINA INCONSPICUA, *t.* 41. *f.* 6. *Broderip and Sowerby, Zool. Journ.* iv. p. 363.

Tellina Grælandica. *Beck, MS.*

From the Arctic Ocean.

TELLINA EDENTULA, *t. 41. f. 5. et t. 44. f. 7. Broderip and Sowerby, Zool. Journ. iv. p. 363.*

From Behring's Straits.

TELLINA PROXIMA, *t. 44. f. 4. Brown, MS.*

Shell oval, depressed, white, anterior side much larger than the posterior, rounded; posterior side angular near the ventral margin; sinus in the pallial impression larger in the left than in the right valve.

Inhabits the Arctic Ocean.

This shell resembles the common *Tellina tenuis*, in general appearance, but nevertheless differs in shape, in being thicker, and in having a thick epidermis, which however only remains near the ventral edge. Its exact counterpart is found in a fossil state on the Isle of Bute, also at Helensburg, and near Glasgow.

LUCINA INTERRUPTA, *var. t. 44. f. 3.*

Cytherea interrupta. Lam. Hist. nat. des anim. sans vert. p. 574.

The shell here represented must be considered merely as a variety of *Lucina interrupta*, the only circumstance in which it differs being that the radiating grooves cover the whole shell, although they are rather less strongly marked in the middle than at the two ends.

MULINIA BYRONENSIS, *t. 44. f. 11. Gray, in Nat. Hist. Mag. new series, vol. I. p. 376.*

Abundant at Valparaiso.

MULINIA DONACIFORMIS, *t. 44. f. 13. Gray, in Mag. of Nat. Hist. new series, vol. I. p. 376.*

From Nevis.

MACTRA SIMILIS, *t. 44. f. 8. Gray, MS. in Brit. Mus.*

From the Northern Seas.

MACTRA AUSTRALIS, *t. 44. f. 6.*

Shell subtriangular, slightly ventricose, smooth, thickish, white, anterior side rather the shorter, its dorsal line curved outwards; posterior dorsal line straighter; ventral margin regular, rounded; epidermis thin, pale; length 1.5, height 1.25, thickness 0.8 inch.

From the Swan River.

The three following subjects, having been omitted in their proper places, are necessarily placed at the conclusion.

FUSUS BUCCINEUS, *t. 36. f. 12.* *Encycl. Meth. t. 427. f. 3. a. b.*

RICINULA ELEGANS, *t. 36. f. 4.* *Broderip and Sowerby in Zool. Journ. iv. p. 376.*

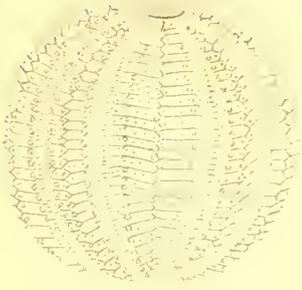
PALUDINA UNICOLOR, *t. 38. f. 11.*

Paludina unicolor. *Lam. Hist. nat. des anim. sans vert. part 2. p. 174.*

Cyclostoma unicolor. *Oliv. Voy. pl. 31. f. a. b.*

The specimen figured is a variety with dark coloured interrupted lines, not unfrequent in Bengal.

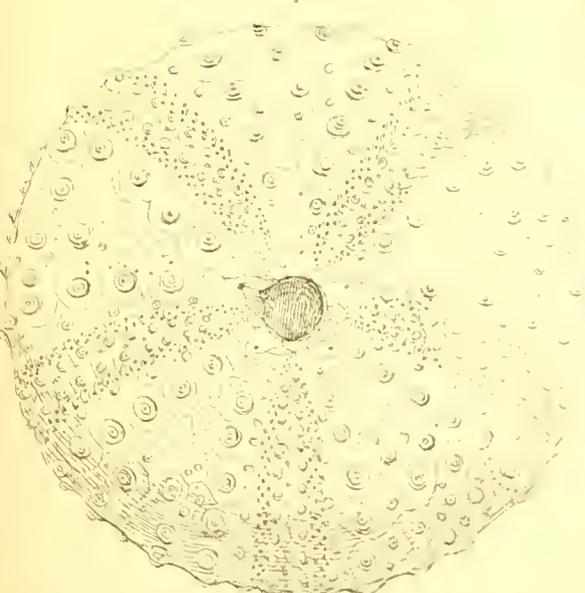
2



1

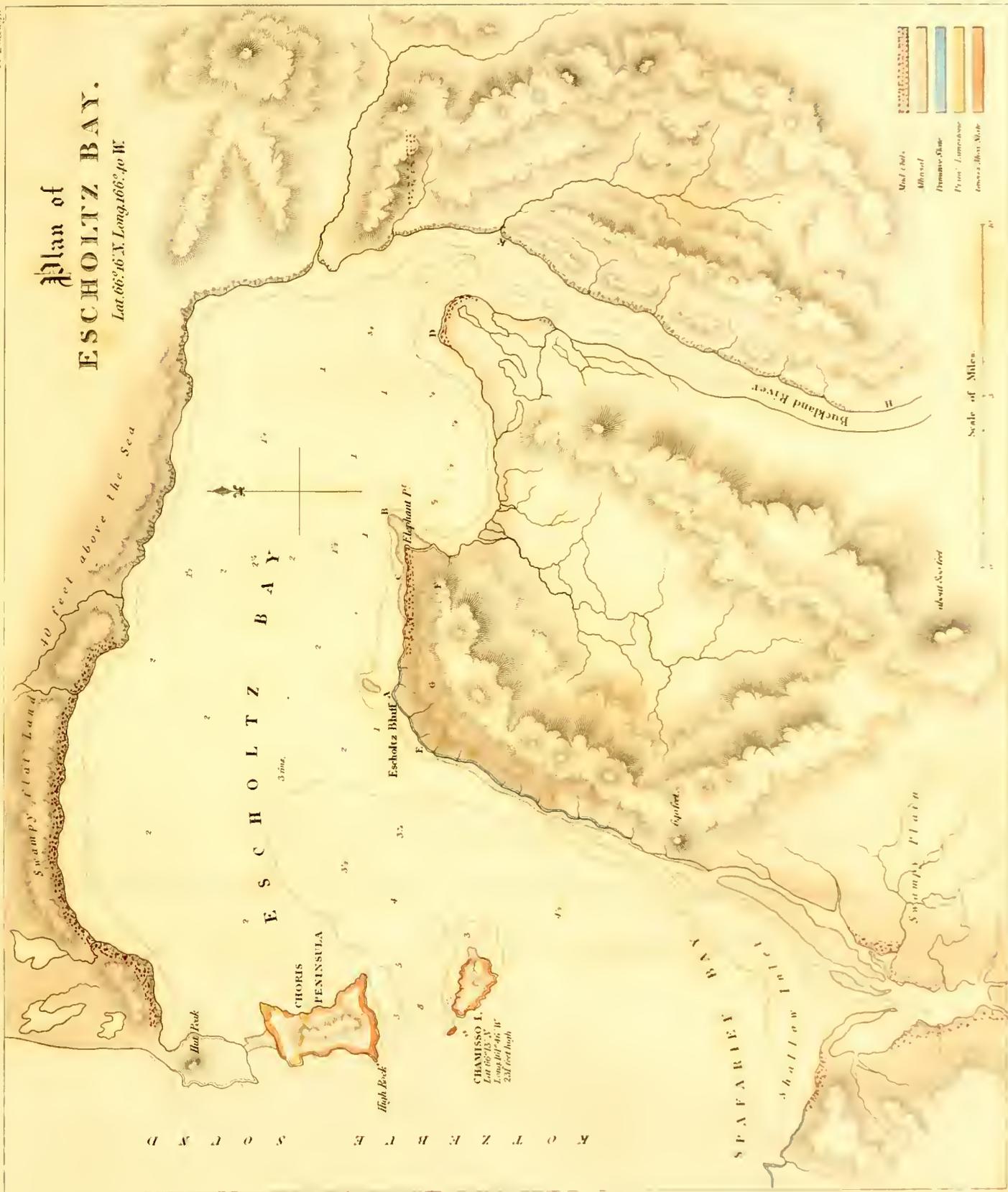


4

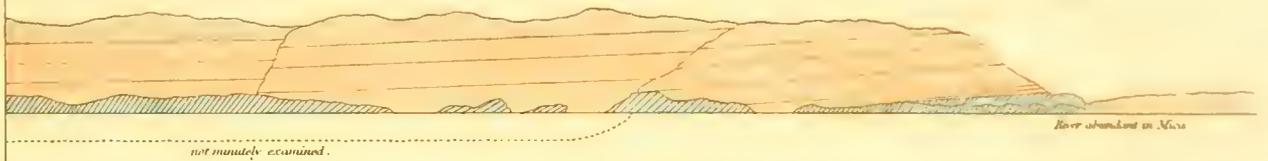
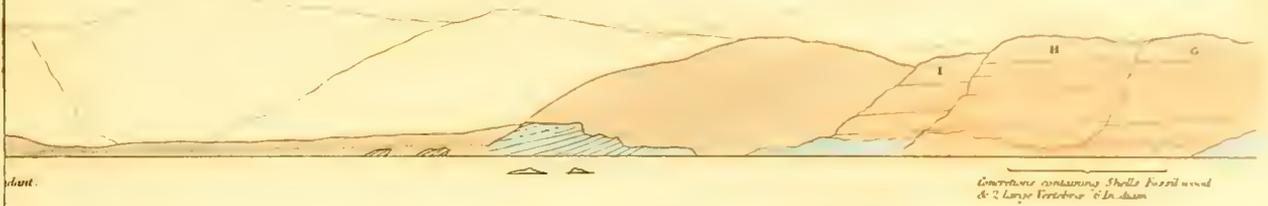
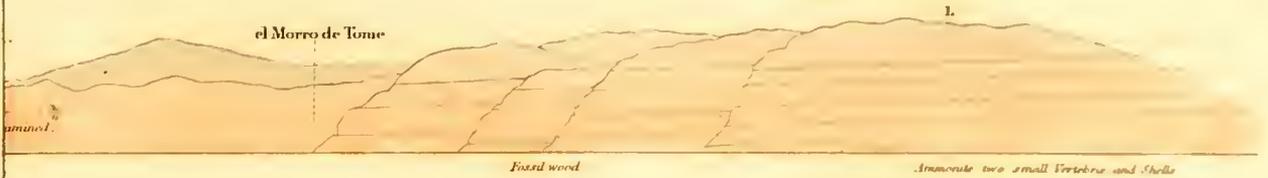


Plan of ESCHOLTZ BAY.

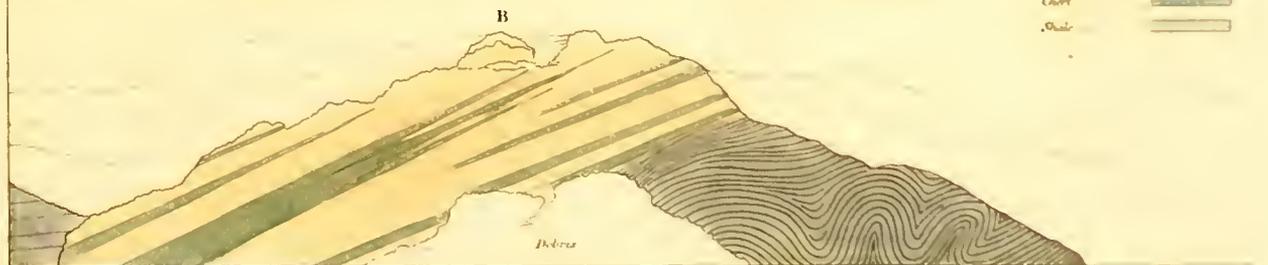
Lat. 66° 46' N. Long. 166° 40' W.

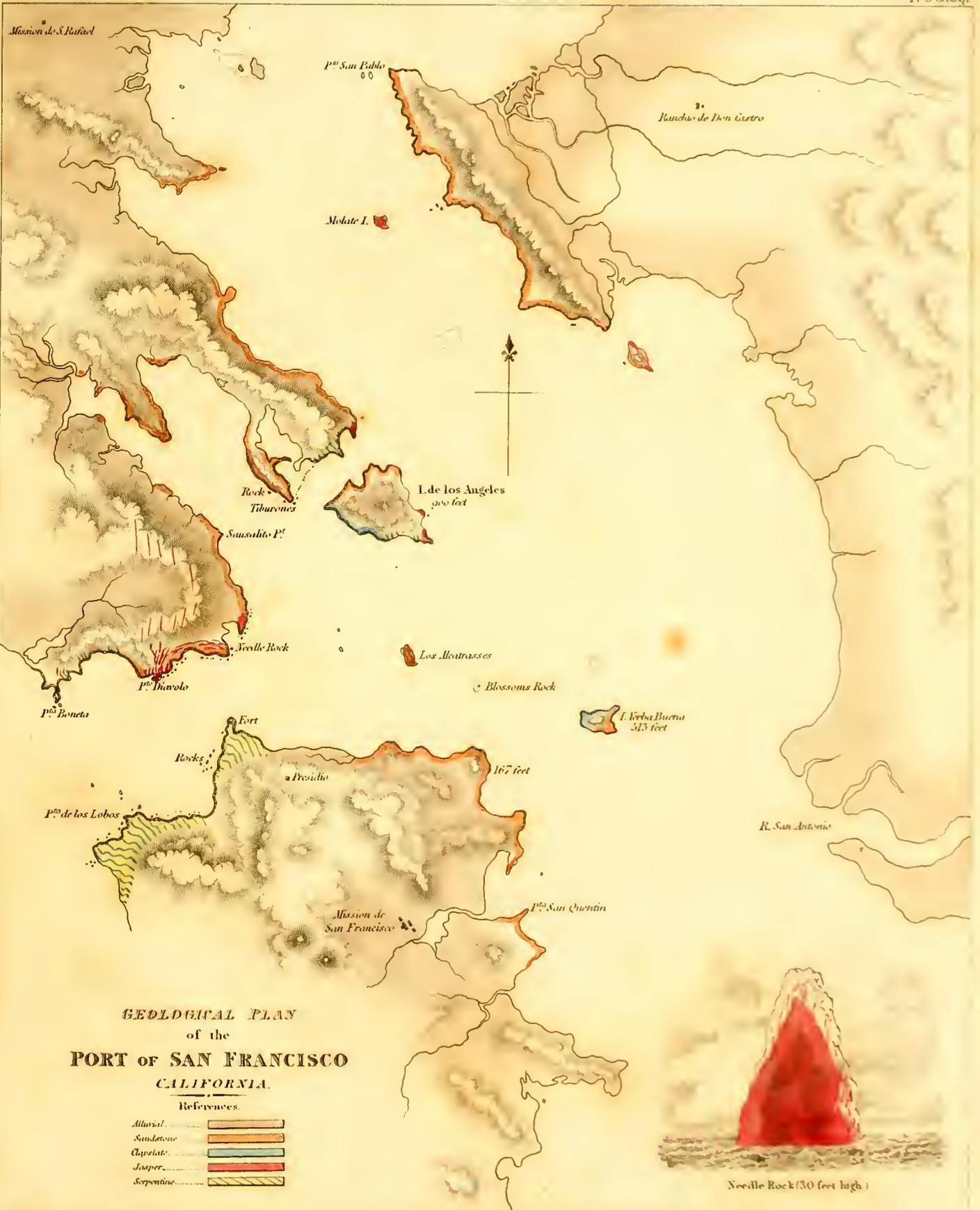


CONCEPTION IN CHILE, FROM D'ARCA TO PENCO.



NE, AT CAPE THOMSON, BEERING'S STRAIT, LAT 68° 7' N. LONG 165° 45' W





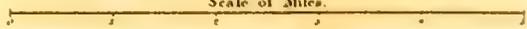
GEOLOGICAL PLAN
of the
PORT OF SAN FRANCISCO
CALIFORNIA.

References.

Alluvial	
Sandstone	
Clay slate	
Jasper	
Serpentine	



Needle Rock (30 feet high)





GEOLOGY.

THE following notices on the geological structure of the numerous and distant points of the globe visited by Captain BEECHEY on his late voyage, have been selected by Professor BUCKLAND from the notes of Lieutenant BELCHER and of Mr. A. COLLIE.

The paragraphs taken from each are designated respectively by the initials of the authors, B. and C. ; the observations of Professor BUCKLAND are marked by the letters ED.

Each place is described in the order in which it was visited by the expedition, excepting in the case of the bones of elephants and other quadrupeds discovered in Eschscholtz Bay ; the peculiar and more generally interesting nature of this discovery has been considered a sufficient reason for noticing it in the Appendix to the First Volume.

By a most unfortunate accident, the principal series of specimens collected on this voyage has been rendered nearly useless, in consequence of the destruction of the labels attached to them, by sea-water ; and the private collection of Lieutenant BELCHER, which he has presented to the Geological Society of London, does but partially enable us to supply the loss.

GEOLOGY.

GEOLOGICAL OBSERVATIONS ON THE NEIGHBOURHOOD OF RIO DE JANEIRO,
BY MR. COLLIE.

THE high, peaked, and abrupt form of the mountains around Rio de Janeiro denote to the approaching navigator a country of primitive formation. The hills are formed almost entirely of granite and gneiss, passing gradually from one to the other. In some places the mica is so abundant as to change the hue from grey nearly to black. The felspar, in various sized crystals, is generally greyish, glassy, and lamellar, not unfrequently exhibiting a pearly lustre. The quartz is grey and transparent. With these are mixed, in greater or less quantity, minute and irregularly crystallized garnets. The rock also contains veins of garnet, mica, felspar, and quartz distinctly crystallized. The mica in the veins is usually less abundant than in the granite, and in large white plates; the felspar, on the contrary, predominates, forming large and regular crystals of pearly lustre, and tinged with red. These generally contain smaller irregular crystals of grey quartz, and are thus converted into graphic granite. Fibrous tremolite and dodecahedral quartz crystals occur also in these veins.

At the most elevated part of the road leading to the Cascata of Tejuca, green-stone prevails for some way; and in another part of the same road there is a bed of greyish opaque and coarse horn-stone, which decomposes into a granular and friable earth.

On the south side of Three Fathom Bay, nearly half-way to the bottom, and opposite a few rocks near the shore, which are uncovered at low water, a regular dyke of basalt cuts perpendicularly through the granite. The basalt breaks into long and rather angular fragments, the longest natural joints being across the vein. The breadth of this dyke is one foot five inches; its direction is north and south. A sharp-pointed portion of basalt projects at one place into the adjoining rock, and in another place a small oval patch of basalt seems completely separated from the vein: there are also two slight shifts of the dyke, both sides continuing parallel, and deviating together. The rock around the dyke is particularly free from fissures and veins.

Among the rocks of this primitive formation is a great quantity of red clay, which not only forms many of the cliffs, but renders the mountain roads in wet weather slippery and disagreeable. This clay results from the decomposition of the red felspar of the granite.

Respecting earthquakes at Rio de Janeiro, I could get no further information than that they are rare.—C.

BAY OF CONCEPCION, ON THE COAST OF CHILI.

Observations by the Editor.

The geological map and sections of the Bay of Concepcion have been supplied by Lieutenant Belcher; the description is partly from his notes, and partly from those of Mr. Collie. These gentlemen appear to have included under the term alluvial, not only

the driftings of modern rivers, but also extensive deposits of drifted materials of various ages and at various elevations, and beds of marine shells, some of which occur more than a thousand feet above the sea. These shells have been examined by Mr. Broderip, and nearly all of them appear to be identical with those of testacea that now live on the adjacent coast. They seem to owe their position to some natural operation which has elevated the land. The probability of their having been raised to their present place by the effect of earthquakes, has been alluded to by Mr. Lyell in his principles of Geology, 3rd Edition, vol. iii, p. 395, and vol. ii. p. 244. Deposits of recent shells have been found on the summit of some parts of the coast, which are derived from testaceans taken up by the natives for food.*

The following list has been prepared by Mr. Broderip :

CRUSTACEA.

Fragments of the pincer of a crab.

CIRRIPEDIA.

Balanus psittacus, (*Lepas psittacus*, Molina); recent at Concepcion de Chile, and on the neighbouring coasts, where it is called *Pico* by the inhabitants, who collect numbers of these cirripeds, together with the conchifera and mollusca of the adjoining sea for food.

CONCHIFERA.

Amphidesma. N. S. (one valve only).

Solenocurtus solidus? Gray. *Solecurtus*, Blainville.

If not this genus, new, approaching *amphidesma* (one valve only, and the hinge is much injured).

Pecten purpuratus, Lam.; recent; common at Valparaiso, Coquimbo, &c.

MOLLUSCA.

Fissurella; two species. Both recent at Valparaiso, Coquimbo, &c.

Calyptrea extincorium, Lam.; recent at Valparaiso, &c.

Crepidula Byronensis? Gray. Perhaps a variety of *C. Peruviana*, Lam.; recent at Valparaiso, Coquimbo, &c. &c.

Helix? The mouth is much injured but enough remains to show that it was not, sufficiently round for a *Cyclostoma*.

Monodon (*Monodonta*, Lam.); very imperfect; recent, common at Valparaiso, Coquimbo, &c.

* The Editor was informed by Captain Phillips King (Sept. 1831) that the natives of the country near Concepcion live almost entirely upon shell fish, of which there is an inexhaustible supply; they carry them to great distances, 50 or 60 miles, into the interior. They have been in the habit of doing this for ages, and along the coast are vast piles of shells thus accumulated by the agency of man. English vessels lay in stores of these testaceans and take them an eight or ten days' voyage from Concepcion, as far as Valparaiso.

Purpura labiosa, Gray; recent at Valparaiso.*

Monoceros crassilabrum, Lam.; recent at Valparaiso, &c.

Monoceros crassilabrum var.; recent at Valparaiso, &c.

Concholepas Peruviana, Lam.; recent on the whole line of the Pacific side of the South American coast. Two specimens, each with balani attached, the young of *B. psittacus*.

With respect to the strata designated as marl and sand-stone, the collection made by Lieutenant Belcher affords no evidence that is decisive of their age and character. The marl and sand-stone seem to be tertiary, and the imperfect coal included in them a tertiary lignite; the petrified wood perforated by the teredo has more the appearance of fossil wood from the London clay than from any secondary stratum. The ammonite mentioned by Lieutenant Belcher is the only fossil indicative of strata of secondary formation. It is much to be regretted that two vertebræ found with this ammonite, and also a vertebra six inches in diameter found near Point Parra, have been mislaid.

It is probable that great part of the extensive deposits coloured as alluvial, particularly those at a distance from any existing rivers, on the summits of hills, and on elevated table lands, are either tertiary or diluvial; but no observations were made sufficiently minute to establish any certain conclusions upon this point.—ED.

EXTRACT FROM THE NOTES OF MR. COLLIE.

The form of the Bay of Concepcion is oblong, about eight miles by six, extending in its longest axis nearly north and south (see map, pl. II. Geology). The land rises from the sea, towards the entrance, in perpendicular and high cliffs, which gradually diminish towards the head of the bay, where a long and low sandy beach is backed by low marshes and meadows. Near the entrance of the bay, the Island of Quiriquina rises in bold and frequently inaccessible precipices, and is nearly connected by a subaqueous reef with the northern extremity of the peninsula that forms the western shore of the Bay of Concepcion, and separates it from the sea. At the extremity of this peninsula is a bed of green-stone.

The Island of Quiriquina exhibits clay-slate near its north-eastern extremity, but its main body is composed of sand-stone and alluvial deposits. On its southern end we find loosely aggregated sand, and large and small rolled stones, united more or less firmly by calcareous cement. The small stones are chiefly slate, green-stone, quartz, and lime-stone. A calcareous marl forms the lower part of the east cliff of this island in several places. In some parts, also, beds of broken and petrified shells compose the beach. A great part of the western shore of the island is so perpendicular that, having once got on the top of the high land, it is impossible to descend and examine the base.

* There are in the collection some other specimens of a *Purpura* also found recent at Valparaiso, and considered by some to be *Purpura labiosa* in an advanced stage of growth. The difference, however, is so striking as to warrant the inquiry, whether these specimens are not undescribed, and specifically distinct from *Purpura labiosa*.

Much of it appeared to be slate, but the whole of the upper part is sand-stone. At the S. W. extremity of the Bay of Concepcion, the ridges to the southward, and behind the village of Talcahuana, are composed of a loosely cemented and rather fine sand-stone, containing some beds of coal. I have been informed that coals abound near the town of Concepcion, on the south side of the Biobio, towards the sea.

In no part could I perceive any lime-stone rock. As to the fossil beds of shells, such as exist at the present day in the bay, I observed them of very considerable extent, and in many situations. They were always immediately under the soil. At one place, about half a mile north from Talcahuana, they form a stratum on the upper part of the cliff, nine feet deep at one end, and diminishing in depth for one hundred paces. Under them is a reddish mould lying upon a micaceous slate. Among the shells Lieutenant Belcher and myself remarked portions of crabs, flustræ, and echini, and of micaceous slate and quartz. Many of the same sort of shells, brought to us with the animals alive in them, prove that they still live in the bay. They form to this day, the chief food of the inhabitants of its shores.—C.

EXTRACT FROM THE NOTES OF LIEUTENANT BELCHER.

From the town of Penco, formerly the city of Concepcion, (see map and section, pl. II. Geology,) the low country to the south-westward, including the Isla de Roguan, has the appearance of being alluvial. On the surface of the hills are beds of shells similar to those found at present in the Pacific. These beds vary from three to ten feet in thickness, and cover the highest parts of land on both sides of the bay, in some places near a thousand feet above the level of the sea. They may possibly have been raised by volcanic agency and earthquakes, to which this part of the country is so liable; particularly Penco, which was destroyed by an earthquake in 1751.

The sand of the beach at Penco, extending to the mouth of the river, is composed of siliceous grains mixed with mica. A small bank in the river is formed entirely of a golden-coloured mica, and was brought by one of my boat's crew as gold. Inland the rocks are granite near the city of Concepcion. Proceeding northerly from Penco, the first cliffs are composed of marl and sand-stone, containing much oxide of iron, and of a slaty texture. Between the layers of the slaty sand-stone there are seams of wood-coal, varying from one to three inches in thickness: the inclination is 11° dipping N. Resting on the slaty sand-stone is a thick deposit of loose marly alluvium. To this cliff succeeds a low tract of sandy soil, with small alluvial hills composed of loose marl, through which the inhabitants cut to the depth of eight or ten feet and procure an inferior small coal. Still further north is marly clay and loose gray sand stone, containing vegetable remains, and seams of imperfect coal. One seam of coal is four feet thick. The next cliff contains harder marl and better coal. Some we obtained for the ship near Lirquen Head at D was of inferior quality, and without the addition of wood or some other inflammable substance would not burn: mixed with English coal, in the proportion of one-third English, it answered passably well. Under some red

calcareous marl also near **D**, **I** met with silicified wood; and between the carbonaceous and marly strata, crystals of sulphate of iron.

The coast from **Lirquen Head** to **Punta Parra** is without variation, composed of alluvium at the summit, compact grey marl in the middle, and clay-slate at the base. On the north of **Punta Parra**, at the cliffs marked **G**, **H**, and **I**, the upper stratum is alluvial; the next slaty marl and loose earthy sand-stone, containing balls of compact marl, and enclosing fossil dicotyledonous wood, shells, and bones. The wood is sometimes converted to black jasper, and sometimes to carbonate of lime; it is also perforated by a teredo, the perforations being filled with crystallized carbonate of lime, as in the fossil-wood of the London clay. The third stratum is compact marl.

On the north of **I** is a sandy beach, with a long valley extending to the river **Caracol**: at this river the sand is chiefly magnetic iron, and had considerable effect on the compass. The iron sand is chiefly on the surface of a very fine siliceous sand, and in some places where it had caked by the sun, I found it unmixed of four and six inches' depth. Similar sand occurs also on the beach near **Penco**, and on the south end of the **Island of Quiriquina**, and other parts of the bay. The shore from the **Caracol** to **Tome Head** is sandy, with a slight mixture of mica; and the cliffs are chiefly of clay-slate. Immediately north of **Tome Head** is a sandy beach, with clay-slate inland. At the cliff marked **L**, the marly strata recommence. 1. The superstratum alluvial. 2. Loose quartz sand. 3. Blue clay approaching fullers' earth. 4. Red marl, with balls of calcareous marl and beds of hard sand-stone, inclination 15° , dipping north. In this cliff

found numerous petrifications, and two vertebræ about the size of those of an ox, (these have been lost:) also a large ammonite, measuring two feet ten inches in diameter, but too heavy to be removed; and some fossil-wood converted into coarse jasper, and containing veins and nodules of chalcedony. In one specimen the small longitudinal vessels of the wood were filled with iron pyrites. At the northern extremity of the section, the vertical slate rocks which form the base of **Point Darca** are divided from the sand-stone and alluvium of the hills above and behind it, by a mass of green porphyry and hornstone; and on the surface of this porphyry is a bed of porphyritic pebbles, about a hundred feet above the level of the sea.—**B**.

VALPARAISO.

The lower hills around **Valparaiso** rise by abrupt and rocky cliffs from the sea-coast; and on both sides of the bay, as well as behind the town, the granite shews itself. But in the head of the bay the country rises gradually at first in a verdant slope, and afterwards by a more rapid ascent. The road which passes over this ridge to **Santiago** is in some places very steep, on a diluvial formation containing numerous boulders. The surface of these hills is bare in many places, and shews large red patches of soil.—**C**.

SALAS-Y-GOMEZ ISLAND.

This island is three-quarters of a mile long, and about thirty feet high. It is composed of a dark-coloured rock, having a reddish brown tint where it is washed by the sea. The cliff is perpendicular for some feet at the water's edge, whilst the interior is

composed of large and detached blocks heaped upon one another, and rising to the greatest height towards the middle of the island; the whole has the appearance of an ancient volcanic production.—C.

EASTER ISLAND

Has its surface diversified by hills and valleys. Many of the hills have round and hollowed tops (the remains of extinct volcanos). The valleys are of gradual ascent, and covered with bare grey stones and a scanty verdure. The high and perpendicular shore of the eastern end is formed of distinct horizontal strata of volcanic rocks, resembling some parts of the Giant's Causeway; but I saw none that assume the regular columnar form.

The rocks upon which we landed in Cook's Bay were a hard vesicular lava of an ash grey colour, and the missiles discharged at us by the natives from behind these rocks were lava of different degrees of hardness, some so soft and decayed as to break with the fall.—C.

PITCAIRN ISLAND.

Rises bold, precipitous and irregular, out of the sea to the height of about 700 feet, with a circumference of nearly four miles. On the north side the slope is gradual, and indented with valleys. To the westward is a steep mountain ridge, excavated in some places into caverns, which afford shelter to the goats. This forms one end of the high and broken ridge, which extends round by the south to the eastern extremity of the island, where it terminates in the lofty cliff that looks down upon the north-east landing place called Bounty Bay. The ascent from the beach everywhere, except on the northern side, is so steep as in many places to be almost impracticable. The whole of the island is of ancient volcanic formation, and in most places is composed of a conglomerated tufa, so loose that it is easily converted into a dry gravelly soil, producing yams, taro, tee, yappe, sweet potatoes, &c. There is a reddish colouring over the greater part of the island, excepting the precipices which terminate each extremity of the high ridge. The western extremity is a black and easily disintegrated tufa, with imbedded masses of compact lava. The north-eastern end is a grey arenaceous tufa, varying in hardness, and has been unequally worn into grooves and projections, smoothed as if by art. The rocks near the sea in Bounty Bay, and along the northern shore, are chiefly formed of a porous lava inclosing crystals of felspar.

The sea around the island is deep close to the shore. Pieces of recent coral are thrown upon the rocky beach.

Specimens from Pitcairn Island.

Vesicular lava, containing large crystals of glassy felspar;—Volcanic tufa, composed of small angular portions of porous and of compact lava, with a yellowish green earth imbedded, and traces of zeolites;—Basaltic lava, with imbedded olivine;—Obsidian.—C.

GAMBIER ISLANDS.

The nine largest and most elevated of this group are of volcanic origin. There are also two small and low islands which are the production of corals. One of these has not yet given root to any vegetable. Corals abound to a great extent beneath the surface of the water, and are gradually rising in the whole space between the volcanic islands. They are also surrounding the group with a wall of circumvallation several yards in breadth.

The general character of the rock composing these islands is a porous basaltic lava, in one place passing into argillaceous tufa, in another into solid and angular columns of compact basalt.

The imbedded minerals are zeolites, soap-stone, chalcedony, olivine and calcareous spar, as in the north of Ireland; there are different coloured jaspers which are peculiar to these islands. They contain also numerous dykes, traversing the strata in a direction generally from east to west, and differing from the strata they intersect in greater solidity and durability, and in containing a greater quantity of olivine; they often project in walls from one to four feet high, and are from one to three feet wide. These veins or dykes are separated by a well-defined line from the general rock which they pass through; some dip slightly to the south, others are perpendicular. They appear to traverse all the islands, occasionally bifurcating, as upon the eastern side of the small island next to Marsh Island. They are sometimes porous, and sometimes, when compact, contain a few particles of olivine; but they almost always, whatever be their individual structure, rise prominent from the surrounding rock.

These islands preserve the general form of igneous productions in other parts of the world, rising out of the ocean by black perpendicular cliffs, and terminating at a considerable height in conical peaks. Two of them are particularly remarkable, being solitary, and when seen from a considerable distance at sea, with a thin cloud hovering over them, have the appearance of smoking volcanos. Small patches of productive soil have been formed at the bottom of the hills, by the rain washing down the disintegrated particles from the declivities, and the waves of the sea washing up sand and fragments of coral. These spaces (with a very few spots on the slopes) are the parts that produce vegetable food or timber, e. g. the cocoa-nut, bread-fruit tree, banana, the yappe, the sweet potato, the amai or miro, the cloth-tree, the doodoe, the hibiscus, rosa sinensis, and some others.

The extensive basin within the vast wall of coral that encircles this group of islands is more or less filled up, mostly so along the shores, where the numerous crowds of coral animals have raised their labours to the surface at low water, or even up to half-tide. In the intervening space the bottom is very uneven, at one place twenty fathoms, at another only of three or four from the surface. The corals which most abound are the explanaria, astrea, madrepora cervicornis, meandrina, and pocillipora damicornis. The transparent limpidity of the water permits the eye clearly to see these different zoophytes at from five to seven fathoms' depth, forming, as it were, a submarine shrub-

bery varied with groves and grottos, in which the sporting fish display their infinite variety of vivid and resplendent colouring.

List of Specimens.

Amygdaloidal trap, containing crystallized zeolite, chabasia, mesotype, analcime ;—olivine ;—soap-stone ;—mica ;—chalcedony ;—jasper, and carbonate of lime.—C.

TAHITI. (OTAHEITE.)

The Island of Tahiti, like those of Gambier, is formed of volcanic rocks and corals. The chief body and centre of the island is composed of the former, while its base is surrounded by a flat zone of the latter, extending in some places from the sea beach to the mountain foot, a distance of three miles, or even more ; whilst at others it is interrupted by the ridge of the sloping mountain jutting out into the sea.

The declivities of the mountains are diversified by numerous knolls rising above each other, and variegated with the long grass of the *saccharum fatuum*, the scanty covering of the *polypodium pedatum*, a few shrubs of the *metrosideros spectabilis*, and the *didonea viscosa*, interrupted by bare and brick-coloured tufa. Their tops are frequently rounded, in a few places uneven and precipitous, but seldom peaked, and are covered with a deeply verdant vegetation. The mountain streams flow rapidly down the deep ravines, receiving accession to their waters from numerous cascades on each side, and carry along with them the lighter volcanic matters to be strewed on the surface of the coral plain, or blacken with their sand the whole line of the beach. On this mixture of lava and coral may in some measure depend the richness of the bordering plain, abounding with cocoa nuts, bread-fruit, sugar-cane, &c. varying from 200 yards to a quarter of a mile.

At unequal distances from the beach a coral reef is raised round the greater part of the island, almost, and in some places altogether, to a level with the surface of the sea. In several places this line of circumvallation has not yet been raised to within several fathoms of the surface, affording at these points an entrance to vessels ; whilst there is room and perfect safety for more than all the navies of Europe to ride in calm water within the reef. These entrances or breaks in the wall are observed to be generally situated opposite the mouth of some river, and have been attributed to the influence of the fresh water preventing the usual growth of the corals. To me it appears more probably dependent upon the original inequality of the bottom, on which these natural artificers have raised their structure.

The island is chiefly made up of basaltic lava of different degrees of porosity. The most solid, formerly used for hatchets or adzes, is frequently met with in nearly horizontal strata, and contains very few imbedded minerals. The more porous lavas are full of basaltic hornblende, olivine and zeolites. In numerous excursions up the ravines, I met with columnar basalt, in one place only, about nine miles up Matavai river, the columns being about twelve inches in diameter, here it forms a perpendicular and picturesque cliff, diversifying its front with natural bendings of the pillars at the

lower part, and a kind of projecting gallery of curved pillars near the top. It is surrounded on all sides by a luxuriant vegetation. This basalt contains nodules of olivine, but wants the basaltic hornblende so universally diffused over the island. In no other place indeed did I find it absent. Olivine and zeolite, although common, are in smaller quantities, and steatite rather rare.

Specimens from this island are varieties of tufa, lava, and basalt;—olivine, mesotype, analcime, basaltic hornblende, steatite.—C.

AVATSCHA BAY, KAMTSCHATKA.

An extended view of the country around the Bay of Avatscha ranges over swelling plains, thinly covered with wood, and in the summer with a deep green vegetation, till it comes to the lower mountains disposed in long barren ridges, among which some lofty and isolated mountains rise abruptly to 8,000 or 12,000 feet. On the 1st day of July, 1826, the lower range had their sides thinly furrowed with white snow, whilst the more lofty had their tops entirely veiled in it. From one of the highest of these (Avatsbinskaia), to the north-east of the bay, we could distinctly perceive volumes of white smoke issuing at more than one opening, and the surface of the snow on its sides blackened, as if by a recent fall of volcanic ashes.

The isthmus that forms the western side of the small harbour of Petropaulski is composed of clay-slate, containing various coloured jaspers, and dipping at an angle varying from 30° to 45° to the south. Between the village and Rakowena harbour the clay-slate ceases and is succeeded by serpentine containing amianthus.

On the left hand of the entrance of the harbour of Rakowena, all around its shores, the cliffs are high and perpendicular, and composed of trap, quartz and serpentine.

Columnar basalt shews itself in several places. The second perpendicular promontory on the right side of the entrance to the harbour of Rakowena is composed of a porous basalt, in perpendicular pentagonal and hexagonal columns of moderate size, reposing upon horizontal strata of slate-clay, apparently hardened by the action of heat. Columnar basalt is seen in the face of the cliff under the north-east signal station, reposing upon an extensive bed of porphyritic green-stone. This rises up from under the basalt towards the south-west, but the cliffs outside this again assume somewhat of the columnar appearance for a short distance, when the tufa seems to preponderate, and is continued to the outer boundary of the bay on the north-eastern side.

On the western side of the bay basalt is disposed in horizontal columns, forming, as it were, a thick wall, standing out from the cliff, and having its base washed by the sea. In the face of the tufaceous cliff behind, there are curved columns of the same nature.

The western part of the bay, towards the entrance, and the coast facing the open sea, appear to be chiefly tufaceous, and frequently of a brick colour. At Paratunka there are thermal springs which are probably in a volcanic formation.

The clay-slate that forms the high isthmus on the north-west of the harbour of Petropaulski is continued into the higher hill, between it and the lake on the road to

Avatscha. The same rock is seen forming the foot of that part of the low range of hills behind Petropaulski, where they border the lake on the eastern side. Veins of variously-coloured quartz, assuming the character of jasper and chert, and of finely waved talc-slate, lie between the strata.

The cliff, that first forms the sea-shore beyond the lake, in going to Avatscha, is less distinctly stratified, but where it can be perceived to be so, the direction and dip are nearly the same as in the isthmus already mentioned. The clay-slate is replaced by talc-slate and basaltic porphyry, whilst the quartz rocks continue the same. A basaltic tufa and green-stone, passing into serpentine, also prevail. Farther on, and close to Avatscha, the cliffs are more generally formed of green-stone passing into serpentine.

From this part round the head of the bay to Paratunka the shore is low, and the country plain for a considerable way to the foot of the snowy mountains, which form the interior of Kamschatka, and assuming the form of an amphitheatre, terminate the view.

Several small and shallow creeks are formed in this low ground near the sea, and are remarkable by the raised banks, so similar to an artificial embankment as to have suggested the idea to some of their having been constructed by art. To me these mounds or dykes appeared the produce of the natural operation of the waters which they contain.

Coming out of the bay, I observed a vein of several feet thick, composed of horizontal basaltic columns, in the cliff forming the western side of the entrance.

Specimens.

- No. 1. Clay-slate, forming the general rock of the coast from Petropaulski to the entrance of Rakowena harbour.
- No. 2. Greenish quartz and jasper, in No. 1.
- No. 3. Horizontal strata of slate-clay hardened, under No. 4.
- No. 4. Columnar porous basalt, forming the second promontory on the right side of the harbour of Rakowena.
- No. 5. Trap tufa, forming part of the cliffs in Rakowena harbour.
- No. 6. Small-grained greenish trap tufa, forming part of the same cliffs as No. 5.
- No. 7. Rolled basalt, forming part of the tufaceous cliff on the right side of the entrance of Rakowena harbour.
- No. 8. Quartz, serpentine and asbestos, imbedded in cliff No. 7.
- No. 9. Chalcedony, in veins of cliffs, in Rakowena harbour.
- No. 10. Chalcedony and crystals of greyish felspar in green-stone porphyry, in the right hand cliffs of Rakowena harbour.
- No. 11. Brownish jasper (altered by heat), from the cliffs of Rakowena harbour.
- No. 12. Brownish felspar porphyry, with crystals of felspar, forming large beach stones in Rakowena harbour.
- No. 13. Reddish felspar porphyry, occurring with No. 12.
- No. 14. Porphyritic green-stone, from the cliffs of Rakowena harbour.
- No. 15. The same as No. 14, enclosing basaltic hornblende; locality of No. 14.
- No. 16. The same as No. 15, lighter coloured; same locality.

- No. 17. Green-stone porphyry, imbedded in and forming one side of the lower part of the cliff on which the north-eastern flagstaff is erected.
- No. 18. Green-stone porphyry, with fewer imbedded crystals of felspar, traversed by veins of milk-quartz.—C.

KOTZEBUE'S SOUND.

The bounding shores of Kotzebue's Sound for the most part rise by perpendicular cliffs, either directly from the water or from a shelving beach. In some places the land is remarkably low, and only so much raised as to render the idea probable, that it is an alluvial formation, the result of the accumulated mud and sand brought down by large rivers and thrown up by the sea. The cliffs are in part abrupt and rocky; others are made up of falling masses of mud, sand, and ice. The first or rocky cliffs, predominate to the southward of a line drawn from the north-west side of Eschscholtz Bay to the south-eastern part of the Bay of Good Hope. The second, or diluvial cliffs complete the remaining north-east side of the sound, and take in part of the south-side of Eschscholtz Bay. Low grounds chiefly border the Bay of Good Hope, and form the land of and around Cape Espenberg. The history of these mud cliffs, and of the remarkable organic remains contained in them, has been given in vol. 1. Appendix.

Three geognostic formations are exposed on the shores of Kotzebue's sound.

The primary, (consisting of clay-slate, mica slate with beds of primitive lime-stone, talc slate, alum slate, &c.) forms the whole of the rocky coast. The diluvial and alluvial formations constitute the remaining part of the adjoining country.

In giving a more particular account of the primitive formations, I shall commence where it first shows itself, in Choris Peninsula, between the Bay of Eschscholtz and Kotzebue's Sound (see pl. I. Geology). This division is in the form of a narrow peninsula, variously indented, and lying longitudinally in a north and south direction. The northern part of it is separated from the southern by a narrow low neck, and assumes the shape of a round and somewhat conical eminence, surmounted by a flat hut-like peak, the sides of which rise a few feet nearly perpendicular above the surrounding surface. The whole height may be about 600 feet from the level of the sea. Both sides of this peninsula terminate in rocky cliffs, which towards the west are 150 or 200 feet high, stratified, unbroken, and dipping to the west at an angle of 30°. On the east side, towards Eschscholtz Bay, they are less high and more broken, presenting no evident dip, and are composed of a greyish mica slate, with very few included minerals. The cliffs expose a general rock of mica slate in loose and falling fragments. The dip is to the north-east in the first promontory looking to Eschscholtz Bay, at an angle of 60°. The mica slate is here of a greenish hue, the mica considerably predominating, with garnets, veins of felspar inclosing crystals of schorl, and fissures filled with quartz. Nearly midway between this promontory and the low neck, a bed of milk quartz protrudes at the top of the cliff, and marks its locality at a distance by the large white blocks which have fallen down and remain unaltered by the seasons. Still nearer the neck, a narrow bed of lime-stone above the mica schist, above ten yards high and five

wide, forms a protrusion in the line of the cliff, traversing the general rock, and projecting towards Kotzebue's Sound. Here it forms the rock first exposed in the cliff to the south of the neck, producing four perpendicular and contiguous promontories, separated from each other by small receding bays, and presenting a white and blue striped stratification, with a dip of not more than 5° . The upper part of this lime-stone contains iron pyrites, and has cavities filled with chlorite. The lower strata are more abundantly intermixed with micaceous schistus, containing compact actynolite and flat prisms of glassy actynolite, crystals of tourmaline, and variously-formed crystals of iron pyrites. The quartz in some places assumes the colour of topaz. Garnets occur in the mica schist, and earthy chlorite is found in frequent small masses, chiefly investing quartz. The iron pyrites in one place becomes predominant, and composes a bed, which does not appear to be continued to any distance.

In one of these promontories, a deep and capacious cavern would afford shelter, and may be a place of retreat for the natives, the foxes or the wolves.

The western side of Choris Peninsula is mostly composed of mica-slate rock, and contains veins of quartz and felspar, with imbedded crystals of schorl, garnets, hornblende, and calcareous spar.

The Island of Chamisso, three or four miles in circumference, has rocky cliffs exposed on all sides except to the east, where a gradual ascent conducts from the low sandy point to the top. In its centre, a mound of bare rock constitutes the highest part; and towards the southern side of it, there is an appearance as if a circular pavement of stones had been laid by the hand of man.

The general rock of this island is mica slate passing into flinty slate, and on the north and south-west into gneiss. The strata rise at an angle of about 60° on the northern side. The imbedded minerals are garnets, schorl, and chlorite; in the veins are hornblende, quartz, felspar, and horn-stone. About seven miles east of Chamisso Island, the cliffs at Eschscholtz Bluff are formed of a chlorite slate containing iron pyrites. This rock constitutes an essential part of the formation for several miles south-westward along that coast; it contains numerous small garnets, and passes into, and alternates with, mica slate and clay slate. The veins and imbedded minerals are quartz, calcareous spar, chlorite, earthy felspar, crystals of tourmaline, garnets, &c. Beds of blue and white primitive lime-stone, of slaty structure, cut the cliff a little, inside East-spot station; they dip at a very great angle to the westward.

Much of the coast of Kotzebue's Sound, on the west of Cape Deceit, is composed of dark blue slate, and slaty lime-stone having its layers separated by mica slate. On the south coast of the Bay of Good Hope, the shore continues varied by cliffs of moderate height and sloping declivities, for the distance of eight miles to the north-west, apparently of the same formation, when it assumes a totally different aspect, being hollowed out by numerous small bays separated by projecting points. The whole is low, and the land rises up by gradual slopes covered with soil and vegetation. These low projecting points are thickly strewed with large masses, partly of vesicular, partly of compact lava containing olivine. Some of these blocks extend into the sea, others are

imbedded in the sandy soil of the beach, but many are insulated and exposed. The empty cavities in some of them are as large as a man's fist. The sand of the beach partakes of the black and volcanic nature of these blocks, and so continues to Cape Espenberg, where the large stones are no longer seen. These large and numerous blocks, collected chiefly on the jutting points, must have been conveyed there by some grand convulsion of nature, from a very considerable distance. No volcanic formation is to be seen in the vicinity.—C.

CAPE THOMSON.

Remarks on the Stratification of Cape Thomson, in lat. 67° 6' N., long. 165° 45' W.

A section of this part of the north-west coast of America is given in plate II. Geology, from a map by Lieutenant Belcher. The summit of the northernmost cape (A) is composed of carboniferous lime-stone, abounding with organic remains similar to those of the lime-stone of Derbyshire. It is also traversed by veins of chert of a blackish cast, varying in thickness from six inches to two feet. It here dips at an angle of 10° to the westward, and is succeeded, about half way down the cliff, by blue and black argillaceous shale, with which it alternates in strata of six or eight feet in thickness; and at about two-thirds down to the base, shale alone occupies the cliff, and becomes abundant in organic remains; it is occasionally interstratified by lime-stone, and much contorted. This contortion is so great as to form two regular arches; the beds at the lowest part are so much bent as to be doubled back on themselves. At this point of greatest contortion, they are cut off by a gap, where a stream (which must be very powerful during the thaws in the earlier part of the season) had destroyed the continuity, but still left sufficient to trace the connexion with the east side of the stream, where the shale ceases to be contorted. Here, as we ascend the cliff B, we find the lime-stone and chert resumed in rectilinear strata, dipping at an angle of 150° to the westward. At the east base of B, beneath the lime-stone, there is a recurrence of contorted beds of shale, similar to those at the base of A, but more abundant in veins of calcareous spar, pyrites, balls of septaria, and compact lime-stone containing tubiporite, enerinite, &c.

At the end of the bay, the lime-stone again commenced, of nearly the same character as A; the chert, however, assuming a greyish cast, and containing organic remains in profusion; and under nearly the same circumstances as at A, the slaty shale underlaid the lime-stone, but was covered in some places by a saline efflorescence (of sulphate of lime), proceeding apparently from the decomposition of iron pyrites. Many of the pieces contained crystals of carbonate of lime and selenite. Some chert which had fallen from the centre of the cliff, I found loaded with layers of shells (chiefly bivalves).

The chert appears to be the same as that from which the natives make their arrow-heads; and with the assistance of a small piece of bone, slices of it are easily reduced to form: the manner in which they work it shows their acquaintance with the flat conchoidal fracture, of which they take advantage. The height of the cliff A, which is the highest of the two, is about 400 feet.

Specimens from Cape Thomson .

- No. 1. Carboniferous or Derbyshire lime-stone, from the upper part of cliff A.
 No. 2. Ditto with chert.
 No. 3. Chert alone.
 No. 4. Lime-stone containing productæ and encrinites.
 No. 5. Ditto.
 No. 6. Calcareous shale, from contorted stratification, containing selenite.
 No. 7. Coralline lime-stone.
 No. 8. Lime-stone containing tubiporite.
 No. 9. Black shale and coralline lime-stone, passing into each other and alternating, containing crystals of carbonite of lime, selenite, &c.
 No. 10. Veins of carbonate of lime, carbonate of iron and blende, in compact lime-stone.
 No. 11. Balls of argillaceous iron-stone, found in the shale.—B.

Many specimens of this lime-stone from Cape Thomson, are not distinguishable from the entrochal marble of Derbyshire, being almost entirely made up of fragments of encrinite. Many shells and corallines also appear to be identical with those of the Derbyshire lime-stone, e. g. the producta Martini, and other productæ, the species of which cannot be accurately made out, from the imperfect state of the specimens; there are also many specimens of the lithostrotion, or basaltiform madreporite (Vol. II. pl. V. fig. 3 and 6. Parkinson's Organic Remains: Columnaria of Goldfuss), and specimens of flustræ.

Mr. Collie, in his notes, speaks of impressions of trilobites also in the argillaceous slate of Cape Thomson, but I do not find any remains of these animals in the collection made by Lieutenant Belcher.—Ed.

To the north-west of Cape Thomson, the coast runs out by means of a low spit to the distance perhaps of twenty miles into the sea. The low point itself seemed to be acquiring almost a daily accession to the basaltic gravel of which the beach was in greatest part formed. I remarked large blocks of angular clink-stone, used about the huts for retaining their turfy thatch on them. A low and apparently diluvial shore extends from this spit for several miles, to a considerable river, and to a rocky cliff beyond it, which Mr. Elson found composed of basalt.—C.

CAPE LISBURNE.

We again approached the coast of Cape Lisburne, and found the brownish grey and black strata of the cliffs to the south-west of it dipping south and west, at various but generally at considerable angles. The whole surface of the country back from the sea is raised several hundred feet above the level of the water, and diversified by saddle-backed hills, separated by wide valleys, conical eminences and perpendicular cliffs. The perpendicular rocks appear to be composed of mountain lime-stone, the acclivities of slate and shale.

Cape Lisburne is composed of two remarkable promontories. The south-western one rising abruptly, is covered with loose grey stones, divested of the smallest trace of vegetation; the north-eastern one rising gradually, and although thinly clad with verdure, it forms a striking contrast to the grey head of the other. The first rises from the sea in distinct strata, dipping south-west at 58° , and consisting of layers of swine-stone in its central and harder projecting portions, and of soft friable slate and shale in its worn and more retiring sides. The front of the second is rugged and shelving, with its stratification very indistinct. It is partly covered with vegetation, and with fallen masses of grey flint, which, with some mixture, apparently of swine-stone, constitutes its chief bulk. It is easily accessible, and rises to about 1000 feet from the level of the sea, being some way back higher than its companion. Both stretch their ridges inland to the south-east.

Specimens.

- No. 1. Black argillaceous slate, filled with slightly fractured terebratulæ, forming the thin strata of the north-east side of the first promontory.
 No. 2. Tubiporite, in black swine-stone; in a separate block at the bottom of No. 1.
 No. 3. Tubiporite and small terebratulæ, in black swine-stone; same locality as No. 2.
 No. 4. Terebratulæ and radiated head of ennerinite, in compact dark swine-stone.
 No. 5. Columnar madreporite.

The highly elevated country and mountainous ridges cease to the north-east of Cape Lisburne, and the coast-line forms a deep and extensive bay, skirted by a low beach, fronting a flat filled with lagoons, for about fifty miles north-east of the Cape. The land rises from the beach all along this bay by low earthy cliffs, and then by very gradual acclivities. About thirty-five miles from Cape Lisburne, I found hills running north-eastward and composed of sand-stone, dipping at an angle of nearly 25° to the south-south-west, with gently sloping and generally verdant backs. Exposed strata form the ridges, and are perpendicular for several feet on the north-west front. Under the perpendicular strata on the north-eastern declivities of the lower ridges, coal protrudes, and is mixed more or less with the alluvial soil.

At Cape Beaufort is a high ridge, in which a narrow vein of coal is exposed, about a quarter of a mile from the beach. It is slaty, burns with a pure flame and rapid consumption. Probably the quality improves at some depth, and extensive beds of it may occur in the neighbourhood. The upper part of this eminence exhibits perpendicular faces towards the sea, and is strewed with broken blocks of slaty sand-stone, containing carbonised impressions of reeds, both fluted and plain, generally flat. Imbedded nodules of horn-stone, quartz, iron-clay, and chert or Lydian stone, with fibrous veins of calcareous spar frequently lie between the thin layers; the sand-stone itself is generally of a reddish grey colour; it rises to its highest elevation at Cape Beaufort, viz. about 300 feet above the level of the sea. This cape seems to constitute a boundary between the hilly ranges above described to the south-west, and the low plains, intersected with lagoons and lakes, which extend on the north-east of it as far as the eye can reach.

These plains are the commencement of a country of diluvial formation, that extends from Cape Beaufort to Icy Cape, Reindeer station, and Wainwright's Inlet. Beyond that, Mr Elson has described the coast and country to be a continuation of the same formations, and at Cape Smyth, near his extreme point, in lat. $71^{\circ} 13' N.$, long. $156^{\circ} 45' W.$, he observed icy cliffs presenting their fronts under the like circumstances as at Cape Blossom and in Eschscholtz Bay.

The following specimens were brought up from the bottom by the dredge, on the evening of August 13, in lat. $71^{\circ} N.$, long. $162^{\circ} 48' W.$

No. 1. Greyish sand-stone, in considerable quantity ;

No. 2. Indurated clay, in greatest abundance ;

No. 3. Coal, in considerable quantity ;

No. 4. Indurated clay, with vegetable impressions ;

and, on the 14th of August, at Lagoon beach, or Reindeer station, there were found among the pebbles fragments of granite, syenite, aventurine, coal, and indurated clay, the latter predominating.—C.

BAY OF SAN FRANCISCO, CALIFORNIA.

See Plate III. Geology.

The specimens collected in and near the Bay of San Francisco consist of many varieties of common serpentine, noble serpentine, bronzite, and asbestos ; clay-slate, and mica slate, chlorite slate, horn-stone, brown, green, and red jasper, and rolled blocks of glassy actynolite ; grey sand-stone, and imperfect wood-coal. The country near the Port of San Francisco is composed chiefly of sand-stone, jasper, and serpentine. Wood-coal is found in slight seams on the north side of the entrance of the bay, and native salt near Santa Clara. Many of the summits of the hills are composed of jasper, forming elongated ridges, of which the general direction is north and south. This jasper is succeeded by sand-stone, of a loose texture, not effervescing with acids, and disposed in every angle of stratification, occasionally it is hard and of a blue cast ; it is frequently interrupted by abrupt masses of laminated jasper in wavy stratification. The appearance of the jasper, at its contact with the sand-stone, is often very remarkable. The jasper appears not to have acted on or displaced the sand-stone ; its exterior, for eighteen inches or two feet, is usually rugged, and mixed with carbonate of lime, quartz, and indurated clay ; its interior, however, presents a very beautiful wavy disposition of the component laminae, a remarkable example of which occurs at the Needle Rock, nearly opposite the fort. A view of it is engraved at pl. III. Geology. It resembles an immense mass of sheets of paper, or bands of list, crumpled and contorted by lateral pressure. This contortion only occurs in the red jasper, the yellow being seldom (if at all) stratified, but generally separated by cracks into rhomboidal pieces. A mass of at least 100 feet in thickness is beautifully stratified in short wavy lines, opposite the fort near Punta Diavolo, and rests on sand-stone.

Between Punta Boneta and Punta Diavolo the sand-stone is of a bluish grey colour, containing particles of coal.

The Island of Los Angeles is of very confused formation. Its eastern side is sand-stone, with occasional jasper rocks; its western side exhibits sand-stone, conglomerate, clay-slate, and serpentine; its south side, bluish earth, (apparently decomposed serpentine), and jasper beds containing red siliceous nodules, and much iron pyrites. The superstratum of this island is almost entirely composed of the debris of sand-stone and jasper rocks, a little slate and bluish earth, and betrays appearances of violence. It is about 900 feet above the level of the sea.—B.

The cliffs of the main land opposite the north-west shore of the Island of Los Angeles afford masses of actynolite and beds of mica slate and talc slate.

The Island of Molate, about four miles north of Los Angeles, appears at a distance to be of a red colour, and contains much red jasper, and in a small portion of the cliff black ferruginous slate.—C.

In the Island of Yerba Buena, the perpendicular cliffs west of the bay are formed of clay slate at their base, whilst the superincumbent rock is sand-stone, for the most part in angular masses, and without distinct stratification. The clay-slate is much contorted, arched, and wavy, assuming an east and west direction, and dipping chiefly to the south at a considerable angle. The sand-stone shows itself in the point that forms the eastern part of the bay.

The rounded hills of the peninsula on which the Presidio of San Francisco is placed, are variously formed of sand-stone, loose sand, serpentine, flinty slate, and jasper. The westernmost hill, which rises from the sea between the fort and the Punta di los Lobos, is serpentine. The north declivity, on which the quadrangle of the Presidio is built, is sand-stone. To the eastward of this the serpentine again forms a hill of equal if not greater height. The hill to the westward of the Mission is serpentine. That which rises to the south of it exposes a bare and scarped brow of flinty slate and jasper. Rocks of a similar nature protrude through the surface of the soil of the hills which separate San Francisco from the extensive valley of Santa Clara (Las Salinas), about six leagues to the southward. These hills are called Sierras di los Sambornos, and terminate on the north in a rocky prominence, in the harbour east of the inlet of the Mission.

The range of mountains, Las Sierras del Sur, which bound the above valley to the south, expose flinty slate approaching to jasper, a little north-west of Las Pulgas, and about eighteen miles east-south-east of the Mission of San Francisco. Between the Missions of Santa Clara and Santa Cruz, these mountains form four parallel ranges, the two middle ones highest (about 1500 feet), with steep declivities: the two first valleys are narrow; the third is more extensive, leading to the fourth range, which is considerably lower than the others. The first two ridges are composed of serpentine and a jaspery rock, the third principally of sand-stone and occasionally jasper, and the fourth, that nearest Santa Cruz, entirely of sand-stone, the upper part being mostly decomposed into loose sand. Petrified bones of a cylindrical form were found in this cliff of sand or loose sand-stone in 1827.

Where this range approaches the road from Santa Clara to San Juan, nearly half-way, the northern declivity is covered with fragments of serpentine, and a little farther

on is sand-stone and flinty slate. In the neighbourhood of the Mission of San Juan is a sand-stone conglomerate, and on the road crossing from San Juan to the plain of Monterey, is sand-stone. From the interior of the range between San Juan and Monterey, the inhabitants of Las Animas had brought compact basalt, containing particles of magnetic iron ore, which encouraged the delusive hope of rich mines. A few miles down the river Paxaros, from where the road to San Juan crosses it, there are thermal springs, and sulphur in their neighbourhood. On the Santa Cruz side, near the Mission, there is said to be coal, but it has never been mined. Along the east shore of the bay of San Francisco, for thirty-five miles east-south-east, from beyond the Island of Molate, towards San Josef and Santa Clara, the harbour is bounded generally by low alluvial soil, and only in a few places do low and rocky cliffs protrude. Near the Mission of San Josef there are some hot springs in the plain, surrounded by a verdant covering. Earthquakes are rather common, and one in 1806 so shook the building of the Mission of Santa Clara, that a new one was obliged to be erected. A few years ago, a boat belonging to a whale ship, when lying in several feet water, was suddenly thrown on the beach and left dry, and a vessel in the bay of Monterey was suddenly and severely tossed about by the sea, and the shock was felt on shore at the same time. At ten o'clock on the 26th December, 1827, a slight shock was felt at San Josef. The shocks are said to come along the coast from the northward, and when they are also felt at Monterey it is some minutes later.

One was perceived at the Presidio of San Francisco in the month of April, 1827. It continued a short time, but the shaking was so slight that it injured nothing.—C.

SANDWICH ISLANDS.

From what I had an opportunity of seeing on the Islands of Oahu (Woahoo), and Nihan (Oneehow), and from what I was informed respecting the rest, I consider the whole group to be volcanic and coralline. The latter formation constitutes no inconsiderable part of the plains around Oahu, where several flocks and herds are pastured. Where nearly on a level with the sea, its surface is often broken into excavations, which contain water, and maintain fish. It is often, however, raised above this level, as on the other side of the bay of Waititi. Ponds at a considerable distance inland communicate by subterraneous passages with the ocean, and are affected by its flux and reflux. From some of these, and one in particular, considerable quantities of salt are procured.

The height of Elizabeth Island can only be plausibly accounted for by supposing that it has been bodily carried upwards by some volcanic power below. In the front of Diamond Island, as it looks to the south, and to the sea, I observed two or three different thin strata of coralline formation, lying horizontally about ten feet above each other, and alternating with strata of volcanic stones and tufaceous sand. The whole must have been at one period under water; the lower stratum of coral may have been covered with a thick bed of volcanic matter from an eruption of the extinct volcano of Diamond Hill, several years may have passed before any more materials were ejected, meantime the coralline formation may have gone on, until a second eruption covered it with a second deposit of volcanic matter similar to the first; a third layer of coral may have then accumulated above the second bed of volcanic matter. All this having taken place under

water, it is necessary to presume a bodily elevation of the whole, to place it in its present conspicuous situation. Diamond Hill has every appearance of having been a volcano, and it may have been raised from under the waters of the ocean at a period posterior to the rest of the island, as the land which joins it to the general range of mountains, if not coral, is on a level with the coral to the east and to the west. A lake is said to occupy the closed crater. Tradition relates, that several years back the sea rose so high as to inundate a great part of the islands, and sweep off a great number of inhabitants. Within the memory of living residents, they say a shower of black stones fell close to the town of Honoruru.

I saw but very few specimens of the rocks. The *mitta* is generally a sort of greyish or reddish porphyry, or black basalt. The stone chisel, and no doubt also the adze, are a compact basalt. The native mirror is made of the same stone, and wetted when it is to be used. Pumice and recent lava I had an opportunity of procuring. The nodules of zeolite are rather rare.

A very good general description of the volcano of Kirauca, at the foot of Mauna Roa, is contained in the Missionary Tour round Hawaii. It appears to be a very extensive sheet of boiling lava, having small cones of black rock interspersed in the vast basin, and the whole covered with fiery waves. It is probably larger than any of the commonly known craters. Tradition has appointed the goddess Pele to preside over it.

ISLAND OF GREAT LOO CHOO.

The island presents a surface diversified with rounded eminences of small elevation, and gentle declivities, for the most part in a state of cultivation. The middle ridges and rounded hummocks are covered with wood, generally the *Pinus Massoniana*, with the *Cycas*, or with a short and unproductive vegetation. In the ridges of these hummocks are extensive ranges of tombs, excavated in the faces of the rocks, of several feet in height. Where they approach the sea, these rocks are much undermined; in the harbour of Napakiang, they are very remarkable in this respect; and one has been named Capstan Rock, from its flattened top being circularly undermined so as to give it that form. It is washed by the waves, and appears to owe its shape to their influence. This hollowing out is not confined to those cliffs which are at the water's edge; it is also very conspicuous to the south of Abbey Point, where a long beach, now partly converted into a verdant flat, separates the sea from the rocks. These cliffs and precipices, whether in the interior or on the coast, are composed of a coral lime-stone, either compact or cellular, most commonly the latter, and presenting a very rugged surface. The principal of those coral ridges extends from the coast to the north-west of Nawha (or Napakiang) inland, and eastward or south-east to the town of Ishoomee, and an enclosed building called Eepang-kwang, or the Palace of the King, according to Captain Hall. At this place it attains its greatest height, about 800 feet above the level of the sea. This appeared to us to be the highest part of the island. The other ridges and hummocks are seldom elevated above half this height. Some of them, particularly to the south-east of Abbey Point, are formed of a bluish marl, in some places approaching to

clay. They may be traced running in broken lines nearly east and west, or a little on the south side of east and north of west.

The coral reefs along the coast are of two sorts ; one above low water mark, and in which the animals are dead, is dark, cellular, and rough, similar to what generally forms the rocky inland eminences ; the other is always covered by the sea, and generally presents an arborescent surface of brown or white colour, and is at this time occupied by the living animals. But even these have a darker appearance than is usual in growing corals among the islands nearer the equator, apparently from a quantity of mud and clay deposited among the crevices, and which seems to be continually supplied from the soil and the marly detritus of the island, washed down by rains and rivulets ; for I saw nothing that was entitled to the name of a river, unless we may dignify with that appellation a moderately-sized stream that comes down from the principal lime-stone ridge, a little to the west of the village of Ishoomee, and of the building called Eepang-kwang.

The soil of the island in the vicinity of Nawha is in general light, arenaceous, and marly. In a few places only does it approach to clay, and rarely is it of any considerable depth. The rivulets are few in number ; and I observed no moist plains or marshes, excepting a very few fields in which the water is retained by artificial means, chiefly among the blue marly eminences to the south-east of Abbey Point, already mentioned.

The plants which grow wild are made up of the floras of the torrid and temperate regions ; we have ferns and palms, compound and umbelliferous plants ; and the boerhaavia, sceevola, tournefortia, &c., growing in similar situations as in the low islands of Polynesia. Several rosaceæ, onagreæ, prunulaceæ, &c. associate the vegetation of Loo Choo with that of the temperate continents of Asia, and even of Europe. The remarkable genus clerodendron is perhaps peculiarly abundant here.

ISLANDS OF THE ARZOBISPO GROUP,
OF WHICH THE LARGEST IS PEEL ISLAND,

From lat. 26° 30' to 27° 45' N, ; long. 217° 48' W.

The Arzobispo Group, or Bonin Islands, are considerable, if we regard their number alone ; we saw five groups, each composed of several islets. If we take into account, however, the superficial extent of land, and still more of productive soil, they will be lessened in our estimation. They seem to be universally volcanic, if I may judge of the similarity of those I saw at a distance to those which I had an opportunity of examining, excepting some bare and bordering rocks of coral, raised most probably above the level of the sea by subterranean power. The hills are peaked, the shores precipitous, with deep water close to them ; but pointed pinnacles rise up from the bottom nearly to the surface for some distance, and endanger the navigation.

The mountain ridges, as well as the groups of islands, lie in a north and south direction, and appear to be only the more elevated tops of a subaqueous chain extending in the same direction ; for in sounding we always found it shallower on a line connecting the groups from north to south, than at the same distance from the shore on either side of this line.

Coral reefs border some places of the shore, and have not yet reached the water's level; and corals, with sand and shells, from the bottom at a little greater distance.

The rocks of the more extensive volcanic formation are generally a grey tufaceous basalt, often coloured with a greenish tint; it contains numerous nodules of chalcedony and of carnelian; zeolites often occur abundantly, particularly stilbite; olivine and hornblende are also not uncommon. The geodes were often found containing water; and although frequently covered with the sea, the liquid, when obtained by breaking the hollow stone, is said not to taste salt. I was not fortunate enough to see any of it.

Angular basaltic columns were not unfrequent, and in one place they were divided horizontally into joints at short distances, as at the Giant's Causeway. In the bed of the river at the bottom of the harbour in which we lay, there is a sort of tessellated pavement, composed of upright angular columns placed side by side, each about one inch diameter, and separated by horizontal fissures; it resembled the lower part of the Giant's Causeway in miniature.

The two men who had voluntarily remained here after the wreck of the William whaler in the month of September preceding our visit, informed us that they had felt the shocks of earthquakes several times, but never so strong as to throw them off their legs; and that one night in the month of January, the tide suddenly rose about twenty feet above its wonted level, overflowed their house, which was near the beach, and made them fly to the mountains for safety. They said they had observed some of the peaks, more especially after rainy weather, to vomit forth volumes of smoke like that which arises from a foundry, but never any light, nor have they seen any ashes falling. Scoriae are, however, pretty common near the surface. It is possible that these men mistook the light cloud formed near this elevated peak, by its cooling and condensing the moisture of the passing air, for the denser smoke of a volcano. We saw clouds forming in this way.

A luxuriant vegetation covers the larger of these islands, from the sea to their highest peaks. Trees constitute nearly the whole of this vegetation, and the tall slender trunks, crowned with the spreading bunches of leaves of the cabbage and fan-palms (*areca olearica* and *coryptia rotundifolia*), communicate a characteristic feature to the scenery. The *pandanus odoratissimus*, the *tamanu* of Tahiti, some species of laurel, the *terminalia*, shrubby species of *urtica*, the *didonea viscosa*, the *elaëocarpus serratus*, and several others new to us, are common. A considerable variety of herbaceous plants, and of ferns, also grow partly under the shade of the lofty trees, or freely exposed on the jutting rocks.

PORT CLARENCE, AND COAST BETWEEN IT AND KOTZEBUE'S SOUND.

Port Clarence is situated at the end of an irregular and deep incurvation of the coast, between Point Rodney and Cape Prince of Wales, and in lat. 65° 17' N., long. 166° 48' W. It is formed of two wide basins; the outer one separated from the sea, except at the entrance, by a low and long spit of alluvial formation, called Point Spencer; and the inner basin, called Grantley Harbour, being divided from the outer by a

similar spit on each side of the inlet. The shores of Port Clarence are mostly low, except on the north, and on the east side, near Cape Riley; the north, south, and east boundaries of Grantley Harbour are for the most part rocky and steep.

The long low spit which terminates in Point Spencer, separating the outer harbour from the sea, is continuous with the land to the southward, and leaves an entrance of three miles wide, between its north point and the base of the mountainous shore on the north side of the bay. The outer part of this spit is low, level, and interspersed with fresh-water lakes, said to rise and fall with the tide, and separated from the sea by a higher ridge. The inner part of the spit is formed of about six broad ridges, parallel to each other, and to the inner beach that looks to the sound. The whole spit is scantily covered with a short vegetation, and on the highest part of the ridges large quantities of drift-wood repose in various stages of decay; the decay of the wood is greater in proportion as the ridge on which it lies is farther removed from the inner beach, so that the trees upon the ridges near the middle of the spit are crumbling into dust. Such is the appearance of the spit for about a mile only from its point.

From the beach on the northern side of the outer harbour, to the bottom of the hills, a considerable flat, covered in great measure with alluvial soil, contains large lakes and lagoons. Smaller lakes are also formed on the southern shore, in the low land near the base of the spit just described.

The rocky cliff of Cape Riley, on the east shore of Port Clarence, is about two miles in extent, and gradually, but irregularly terminates in a low beach on each side. It is composed of a friable mica slate and fine talc slate, with intersecting veins of calcareous spar of a pearly lustre, mixed with grey quartz. The general line of dip is obscure, from the front being much covered with falling fragments, but appears to be inclined to the north-east. The shore of the inner harbour, where exposed in cliffs near the middle of the south side, is a similar mica slate, dipping more distinctly to the east, and contains alum slate. The shore on the north side also presents cliffs of similar formation and dip; the mica slate contains crystals of a blackish colour, and masses of chlorite rock. The bottom of the harbour, and the steep ascent from the banks of the river, for more than two miles up (as far as we saw), appeared on a near view to be a continuation of the same slaty formation.

The mountain of Cape Prince of Wales is remarkable for a covering of loose stones, and a mural ridge of bare rock, broken into irregular gaps and points. This wall commences at the base of the mountain on the north-east side, ascends the brow, and reappears in separate and less distinct ridges on the south and south-west side. Parts of it here stand up in tall and tapering fragments, which at a distance may be mistaken for close-branched trees, or stupendous statues.

From Cape Prince of Wales to Kotzebue's Sound the whole shore is low, and the depth of water so little as not to allow vessels to approach near it. A spit of low land, and most probably of recent formation, runs into the sea from Cape Prince of Wales in a northern direction.—C.

