

of the unequal functions of the two organs, appeared to be the rule, as is the case with many hermaphrodite flowers from the same causes.

Some fishes are only occasionally hermaphroditic, that is to say, among distinctly bisexual fishes hermaphrodites are occasionally observed. Among these belong the mackerel and the carp.

---

CONTRIBUTIONS TO THE HISTORY OF THE COMMANDER ISLANDS.

NO. 3.—REPORT ON THE MOLLUSCA OF THE COMMANDER ISLANDS, BERING SEA, COLLECTED BY LEONHARD STEJNEGER IN 1882 AND 1883: BY W. H. DALL.

I am informed by Dr. Stejneger that the coast of the Commander Islands, especially Bering Island, is largely rocky, composed chiefly of sandstone, which extends in rocky flats from the shore at the base level of erosion by the waves for quite a distance seaward; from small capes or projections a reef invariably extends seaward, often of volcanic rock. The shore is thus composed of a succession of small bays or bights, none of which afford a harbor, and only one or two an anchorage even for small craft. The beaches at the head of these bays are rocky, or composed of shingle with an occasional strip of sand, the latter especially where streams fall into the sea. There are several lakes at the northern part of Bering Island; the soil is covered with that moss-like coating of sphagnum, reindeer lichen, and *Empetrum* which is characteristic of those regions, with an admixture of the usual boreal herbage, dwarf willows, *Vaccinium*, sedges, and grasses.

These features, taken in connection with the geological character of the rocks, are not favorable to a profuse development of molluscan life of any description.

Upon the wave-worn rocks the stony alga, *Melobesia*, forms crusts, which, by the superposition of successive thin layers, forms masses sometimes 5 or 6 inches thick. In this the boring bivalves find a harbor and congenial quarters. The ponds and lakes afford two *Limnæas* and a small *Pisidium*.

The little black northern slug, *Limax hyperboreus*, is found under protecting chips or pieces of drift-wood near the shore. A few minute helices are its companions. A more exhaustive search would perhaps enlarge the list of Pulmonates, but the usually common and conspicuous genus *Succinea* is singularly absent and hardly likely to have been overlooked. It is quite possible that some of the land shells have been introduced from Kamchatka; the presence of *Patula floccula* is perhaps explainable on this hypothesis, which would account for its absence from the Aleutian Islands.

It is not probable that the Commander Islands have been connected with the mainland of Asia or with any of the Aleutians within recent geological time. The depth of water and the distance which separate

them are too great. Consequently, all the members of their land fauna and flora must be considered as immigrants brought by currents, floating wood or ice, migratory birds, and man. The foxes which inhabited the islands when first discovered undoubtedly reached them on floating ice-fields, as a certain kind of rat or marmot is known to have done one of the Western Aleutians, and as the polar bear almost annually reaches the island of St. Mathew.

Conchologically, next to nothing has been known about the Commander Islands. It is true one of the most remarkable of the mollusks of Northwest America, and the first mollusk described from that region was found by Steller at Bering Island; namely, *Cryptochiton stelleri* of later writers, which is fully described under its Kamchatkan name of "Keru" in his "Kamchatka," page 177. Since then a few references have been made to species collected by Wossnessenski from Bering Sea, part of which were probably obtained at the Commander group, and the presence of *Vitrina* is noticed in the "Voyage of the Vega," from whose collections Westerlund has described some mollusca elsewhere referred to. This appears to be all at present on record in regard to the molluscan fauna of the group, at least my search has not revealed anything else, though it is possible some isolated references have been overlooked. The references of Schrenck and Middendorff are of a general character, and they give no separate list for these islands.

### CEPHALOPODA.

#### *Octopus punctatus* GABB.

This widely distributed Pacific species was obtained, October 9, at Avatcha Bay, Kamchatka. The specimen is of moderate size. Collector's number, 2759. Mus. Cat. 40903.

#### *Gonatus amœnus* VERRILL.

A single not very well preserved specimen, collected June 6, is referred by Professor Verrill to this species. Bering Island; collector's number, 1163. Mus. Cat. 40904.

### GASTROPODA.

#### Nudibranchiata.

#### *Æolidia papillosa* (L.) BERGH.

One specimen at Bering Island in the spring of 1883, collector's number, 2349. Mus. Cat. 40905. Three specimens of *Lamellidoris billamellata* L. var. *Pacifica* Bergh, were also collected, October 1, at Avatcha Bay, Kamchatka; collector's number, 2733. Mus. Cat. 40906.

#### Pulmonata.

#### *Limax hyperboreus* WESTERLUND.

This small species, widely distributed about Bering Sea, was obtained at Bering Island; collectors' numbers, 1406, 1509, and 2469. Mus. Cat.



40997. One specimen, No. 1256, Mus. Cat. 40908, was collected at Petropavlovsk, Kamchatka.

**Vitrina exilis** MORELET.

Found at Bering Island; collectors' numbers, 1051 and 1509. Mus. Cat. 40909. Abundant on both sides of Bering Sea and on its islands.

**Hyalina radiatula** ALDER.

*H. electrina* GOULD; not *H. pura* ALDER, from types.

Found at Bering Island; collector's number, 1518. Mus. Cat. 40910. The *H. viridula* of Menke, published in the same year, is a greenish and rare mountain variety of this species; it seems, therefore, better to follow Jeffreys in preserving Alder's name, which was given to the typical form, for that, and to reserve Menke's name for the variety it was applied to, especially as the typical and normal form is not viridulous.

**Conulus pupulus** GOULD.

This variety of the ubiquitous *C. fulvus* was described by Dr. Gould from Petropavlovsk, and has been collected there by several travelers, including Dr. William Stimpson and the writer. It was found by Dr. Stejneger on Bering Island. Collectors' numbers, 1516 and 1517. Mus. Cat. 40911.

**Patula floccula** MORELET.

*Helix flocculus* MORELET. Journ. de Conchyl., vii, p. 8, July, 1858.

*Helix pauper* GOULD. Proc. Bost. Soc. Nat. Hist., vi, p. 423, Feb., 1859.

*Helix (Patula) ruderata*, var. *opuleus* WESTERLUND. Nachr. d. Deutsch. Mal. Ges., 1883, p. 50.

*Helix striatella* Anthony and its variety *Cronkhitei* Newcomb are widely distributed on the American side of Bering Sea and over the Aleutian Islands, in which area the present form has not been found. The writer and others have confounded the two until recently, when the writer has had an opportunity of making a careful study of by far the best existing series, including those collected by Dr. Stejneger. It is found on the Kamchatkan Peninsula and on Bering Island. Collectors' numbers, 1051, 1514, Mus. Cat. 40912. It was also collected at Bering Island by the Vega expedition. From the specimens of *ruderata* seen by the writer it seems separated, although a larger series might connect them. It is quite distinct from *striatella*. The colored flammules from which it takes its name, and which give it, when living, the aspect of a very diminutive *H. alternata* Say, disappear in dead shells and in shells which were collected living but have been long kept in cabinets. Specimens collected by the writer at Petropavlovsk in 1865, and which showed these markings vividly, are now entirely destitute of them. Even those kept in alcohol have lost them entirely. Nothing of the sort has been observed in the American *H. striatella*. Specimens, collector's number 1256, Mus. Cat. 40913, were also collected at Petropavlovsk, Kamchatka.

**Pupilla decora** GOULD.

*P. decora* GLD. Proc. Bost. Soc. Nat. Hist., ii, p. 263, Dec., 1847.

*P. borealis* MORELET. J. de Conchyl., vii, p. 9, July, 1858.

Found at Bering Island. Collectors' numbers 1051, 1514, and 1517, Mus. Cat. 40914. Dr. Reinhardt identifies this, which is certainly *borealis* MOR., with Gould's prior *P. decora*.

**Limnæa ovata** DRAPARNAUD.

*L. ovatus* DRAP. Hist. des Moll. terr., p. 50, pl. ii, figs. 30, 31. 1805. *L. ampla* MIGHELS.

It is to this form rather than to *auricularia* that the *L. ampla* of Mighels is related. From the polished globose, transversely striate, rather loosely rolled, and umbilicated specimens obtained September 2 from Lake Saramraja, on Bering Island, by Dr. Stejneger, the Aleutian form *L. var. atkaënsis* Dall differs in being more compact, less polished, with a taller spire, more turreted and less rounded whorls, the coarse malleation of nearly all the specimens, which are also a little more solid and have only a chink in the umbilical place. From *ovata*, *atkaënsis* leads to *sumassi* Baird and *ampla* Mighels. A large series shows a pretty gradual transition so far as the shells are concerned. Collector's number, 1502. Mus. Cat. 40915.

**Limnæa humilis** SAY.

Specimens which are provisionally referred to the above species were found in a pond near Ladiginsk with *Pisidium æquilaterale* PRIME, July 22, Bering Island. I have no doubt it is common to Eastern Siberia, and it may be identical with Westerland's *L. truncatula* var. *microstoma* DROUET, but at present I am unable to compare specimens. Collector's number, 1267. Mus. Cat. 40916.

The absence of *Succinea* and *Cochlicopa*, not to mention *Aplexa hypnorum*, from these isolated isles is almost as noteworthy as the existence there of large Limnæas. Why *Patula striatella* should be absent when other similar species occur is one of the problems for which we can offer no solution.

## GASTROPODA.

(Marine.)

Placophora.

**Trachyradsia aleutica** DALL.

Bering Island, rather common. Collector's number, 1497. Mus. Cat. 40917. This species was first described from the western Aleutian Islands, and has not yet been reported from either continent.

**Tonicella marmorea** FABRICIUS.

A single specimen from Bering Island. Collector's number, 2362. Mus. Cat. 40918.

**Schizoplax brandtii** DALL ex MIDD.

Not uncommon and of rather large size; from Bering Island. Collector's numbers, 1456, 1497, and 2465. Mus. Cat. 40919. Also dry specimens from the beaches.

**Cryptochiton stelleri** GRAY and MIDD.

Dead valves were picked up on the beaches which were of a much more reddish color than usual in this species. Collector's number, 2567. Mus. Cat. 40920.

## Conchophora.

**Acmæa pelta** ESCHSCHOLTZ.

From Copper Island, collector's number, 1007, Mus. Cat. 40921; and from Bering Island, rather common; collector's numbers, 2779 and 1496, Mus. Cat. 40922; also among the dead shells from the beaches of Bering Island.

**Piliscus commodus** LOVÈN ex MIDD.

*Pilidium commodum* MIDD.

*Capulacmæd* sp., SARS.

Bering Island. Collector's number, 2466. Mus. Cat. 40923.

**Crepidula grandis** MIDDENDORF.

Bering Island; rare. Collector's number, 2467. Mus. Cat. 40924.

**Litorinna sitkana** PHILIPPI.

Bering Island. Collector's numbers, 1791, 2464. Mus. Cat. 40925.

**Litorina sitkana** var. *subtenebrosa* MIDD.

Bering Island. Collector's numbers 2464 and 2779. Also Copper Island. Collector's number 1007. Mus. Cat. 40926.

**Lacuna vineta** MONTAGUE.

Bering Island, rare. Collector's numbers 1496, very young, and 2779, adult. Mus. Cat. 40927.

## LACUNA, subgenus LACUNELLA Dall.

Shell depressed, heliciform, few-whorled, thin, with a strong epidermis; margin of the aperture thin, with a narrow reflexed margin in the adult, continuous with the thin, sharp, unreflected arcuate columella; umbilicated. Operculum paucispiral.

**Lacunella refleza**, n. s. (pl. II, figs. 1-3).

Shell thin; light to dark chestnut brown, smooth except for faint lines of growth and wrinkles of the epidermis near the suture or in the umbilicus; whorls two and a half to three, the last very much the largest, inflated; suture distinct, the epidermis sometimes wrinkled close to it; nucleus polished; aperture wide, oblique, rounded, the upper end of the



columella and the anterior end of the outer lip approximated, united by a thin glaze of callus; interior polished, brown; base of the aperture rounded, columella arcuate; umbilicus small, narrow, marked by raised wrinkles of epidermis, which sometimes give it a carinated aspect from their abrupt cessation at the umbilical margin; base of the shell smoothly rounded; earlier whorls darker colored than the last. Alt. of shell, 10.0; of aperture, 7.0; max. lat. of shell, 13.8; of aperture, 7.0<sup>mm</sup>.

*Habitat*: Pribiloff and Aleutian Islands, Dall. Commander (Bering) Islands, Stejneger.

This group differs from the depressed *Laconæ* like *L. neritoidea* in its thin sharp columella, devoid of the excavated groove which gives the genus its name, and in the reflexed margins of the aperture. It was obtained by me in 1873-'74 in the western Aleutians and on St. Paul Island of the Pribiloff Group. The types from which the above description was drawn are from the latter locality. It was compared with forms in the cabinets of the British Museum, Copenhagen, Stockholm, Christiania, Bergen, Berlin, and the private collection of Prof. G. O. Sars, and nothing found resembling it.

There were two quite young specimens of this species in Dr. Stejneger's collection evidently identical with the above. Collector's number, 2779. Mus. Cat. 40928.

***Natica russa* GOULD.**

Bering Island. Collector's number, 1901. Mus. Cat. 40929.

***Margarita helicina* FABRICIUS.**

One young specimen from Bering Island. Collector's number, 2779. Mus. Cat. 40930.

***Trichotropis insignis* MIDDENDORFF.**

Rather common at Bering Island. Collectors' number, 2463. Mus. Cat. 40931.

***Cerithiopsis stejneri*, n. s. (pl. II, fig. 4).**

Shell small, thin, purplish, with white nucleus and columella, with seven whorls; nucleus smooth, partly immersed, about one turn in extent, followed by six strongly sculptured, rather rounded whorls; sculpture consisting of four rather deep channels, between which are three strong squarish revolving ridges about as wide as the channels; the channel next the suture nearly obsolete; the most anterior channel bordered anteriorly by an angular ridge, forming the periphery of the base above whose general surface it does not rise and against which the suture runs in the penultimate whorl; the three revolving ridges are nearly equal in size; they increase, if at all, in succession forward, and are crossed by less regular transverse riblets of about equal width; these squarish facets on the ribs, which, in the earlier whorls or in rubbed specimens, become rounded nodules; the pits of the reticulations are quite deep, and in rubbed specimens look like rounded punctures on the early whorls. The transverse riblets are less strong in the channels and

become evanescent in some specimens, and especially on the last whorl, though the facets persist. The riblets do not usually pass on to the base, which is rounded, inflated, and, except for the rather strong and not very regular transverse sculpture, is smooth or has no revolving sculpture; mouth rounded, canal very short, columella shorter than the aperture, slightly twisted, outer lip thin, sharp, regularly arched; the upper whorls show the three ridges with their facets or granules, the posterior decidedly smaller than the other two; suture distinct. Lon. of shell, 5.5; of last whorl, 2.5; of aperture, 1.6; max. lat. of shell, 2.0<sup>mm</sup>.

*Habitat*: Unalashka, Atka, and Amchitka Islands, of the Aleutian chain, Dall, 1871-4; Bering Island, one specimen, Stejneger, 1882, collector's number, 1496. Mus. Cat. 40932.

This species was first found by the writer in the Aleutian Islands, where it frequents the canals of the yellow incrusting "bread" sponges, which are very common between low and extreme lowest water marks, and resemble the adult form of the genus *Cliona*. I have never found it except by breaking up these sponges. One dead but perfect specimen was collected by Dr. Stejneger.

The species appears most like *C. pulchella* JEFFREYS, of Britain, but has fewer whorls, a rounded instead of an excavated base, is less delicate, and differs in small details of sculpture. None of the Californian forms are like it.

**Purpura lima** MARTYN.

Not uncommon. Dry shells and egg cases from Bering Island. Collector's number, 2779. Mus. Cat. 40933.

**Trophon truncatus** STRÖM.

*T. truncatus* Ström. G. O. Sars, Moll. Arct. Norv., fig. 9.

Bering Island. Collector's number, 2786. Also from Petropavlovsk, Kamchatka, 2629. Mus. Cat. 40934.

**Strombella callorhina** DALL, var. *stejnegeri* (pl. II, figs. 5, 6).

One fresh specimen from the beach at Bering Island. It is slightly more elongated than the original specimen from the *Callorhinus* rookery at St. Paul Island, Pribiloff Islands, and presents other characters, which, if constant, would separate it perhaps specifically. The shell has five and a half whorls (the nucleus is gone) and presents indications of about nine obscure irregular transverse ribs; the surface sculpture where preserved is fine and sharp, like that of *Chrysodomus kroyeri*; the epidermis pale brown, extremely thin, and dehiscent. The shell has a grayish green tint, perhaps partly from a confervoid growth, the aperture as in my figure of *Strombella callorhina*, the margin inside yellowish, the throat livid white, the columellar side with a touch of dull purple. Lon. of shell, 60.0; of last whorl, 40.0; of aperture, 28.5<sup>mm</sup>. Max. lat. of shell, 25.0; of aperture, 16.5<sup>mm</sup>. Mus. Cat. 40935.

It is a little singular that both the known specimens should come

from localities where the fur-seals are preserved for commercial purposes, and none from anywhere else.

**Chrysodomus liratus** MARTYN.

Bering Island. Collector's number, 2783. Mus. Cat. 40936.

**Chrysodomus spitzbergensis** REEVE.

Fine, strong specimens from Bering Island on the beaches. Mus. Cat. 40937.

**Buccinum cyaneum** var. **moerchianum** FISCHER.

*Folutoharpa moerchiana* Fischer.

A few dry and some living specimens from Bering Island. Collector's number, 2779. Mus. Cat. 40938.

These specimens were notably heavy, short, thick, dark, and dull colored, features due probably to the influences of the very exposed and stormy coast upon which they live, as observed in other mollusks elsewhere.

PELECYPODA.

**Pholas crispata** LINNÉ.

Dry valves from the beach, Bering Island. Mus. Cat. 40939.

**Pholadidea penita** CONRAD.

With the last; also living in large masses of *Melobesia*, which form accumulations almost like coral on the exposed coast. Collector's numbers, 1909, 2486. Mus. Cat. 40940.

**Saxicava rugosa** LINNÉ

Bering Island. Large dead valves on the beach, and living ones in situ in masses of *Melobesia*. Collector's number, 1791. Mus. Cat. 40941.

**Mya truncata**. LINNÉ.

Bering Island; valves from the beach. Mus. Cat. 40942.

**Siliqua patula** DIXON.

With the last. Mus. Cat. 40943.

**Mactra falcata** GOULD.

With the preceding. Collector's number 1711. Mus. Cat. 40944.

**Macoma** (*edentula* Brod. & Sby. var. ?) **Middendorffi**. DALL.

*Tellina edentula* Middendorff, Sib. Reise, p. 259, pl. xxi, fig. 1 only. 1850.

A fine living specimen of this rare and singular species from Bering Island. Collector's number 2572. Mus. Cat. 40945. There is some reason to suppose this specifically distinct from the original *edentula*.

**Tapes staminea** CONRAD.

Bering Island on the beaches. Mus. Cat. 40946.

**Cardium grönlandicum** CHEMNITZ.

With the last. Mus. Cat. 40947.



*Cardium blandum* GOULD.

Bering Island. Collector's number 2571. Mus. Cat. 40948.

*Pisidium aequilaterale* PRIME.

In ponds near Ladiginsk and the village, July 22 and 29. Bering Island. Identified by Mr. Prime from specimens sent for examination. Collector's numbers 1267, 1337. Mus. Cat. 40949.

*Modiolaria discors* LINNÉ.

With the next species. Mus. Cat. 40950.

*Modiola modiolus* LINNÉ.

Bering Island; valves on the beaches. Mus. Cat. 40951.

*Mytilus edulis* LINNÉ.

With the last, also living, and from Avatcha Bay, Kamchatka. Collector's numbers 1791, 2594. Mus. Cat. 40952.

## FAUNAL SUMMARY.

Species of Commander Islands.	Japan.	Kamchatka.	Arctic.	Aleutian.	California.
<i>Gonatus amœnus</i> .....			*	*	
<i>Aeolidia papillosa</i> .....					
<i>Limax hyperboreus</i> .....		*	*	*	
<i>Vitrina exilis</i> .....	*	*	*	*	*
<i>Hyalina radiatula</i> .....		*	*	*	
<i>Conulus</i> var. <i>pupulus</i> .....	*	*	*		
<i>Patula floccula</i> .....	*	*			
<i>Pupilla decora</i> .....			*	*	
<i>Limnæa ovata</i> .....		*		*	
<i>Limnæa humilis</i> .....					
<i>Trachyradsia aleutica</i> .....				*	
<i>Tonicella marmorea</i> .....	*	*	*	*	
<i>Schizoplax brandtii</i> .....		*		*	*
<i>Cryptochiton stelleri</i> .....		*	*	*	*
<i>Acmæa pelta</i> .....				*	*
<i>Piliscus commodus</i> .....	*	*	*	*	
<i>Crepidula grandis</i> .....	*	*	*	*	
<i>Litorina sitkana</i> .....	*	*	*	*	*
<i>Litorina</i> var. <i>subtenebrosa</i> .....	*	*	*	*	*
<i>Lacuna vineta</i> .....	*	*	*	*	*
<i>Lacunella reflexa</i> .....			*	*	
<i>Natica russa</i> .....		*		*	
<i>Margarita helicina</i> .....	*	*	*	*	
<i>Trichotropis insignis</i> .....		*		*	
<i>Cerithiopsis stejnegeri</i> .....				*	
<i>Purpura lima</i> .....		*	*	*	*
<i>Trophon truncatus</i> .....			*	*	
<i>Strombella</i> var. <i>stejnegeri</i> .....			*		
<i>Chrysodomus liratus</i> .....			*	*	*
<i>Chrysodomus spitzbergensis</i> .....		*	*	*	
<i>Buccinum</i> var. <i>mörchianum</i> .....				*	*
<i>Pholas crispata</i> .....	*				*
<i>Pholadidea penita</i> .....	*				*
<i>Saxicava rugosa</i> .....	*	*	*	*	*
<i>Mya truncata</i> .....	*	*	*	*	
<i>Siliqua patula</i> .....		*		*	*
<i>Mactra falcata</i> .....			*	*	
<i>Macoma middendorffi</i> .....				*	
<i>Tapes staminea</i> .....		*		*	*
<i>Cardium grønlandicum</i> .....		*	*	*	
<i>Cardium blandum</i> .....		*		*	
<i>Pisidium aequilaterale</i> .....				*	
<i>Modiolaria discors</i> .....	*	*	*	*	*
<i>Modiola modiolus</i> .....	*	*	*	*	*
<i>Mytilus edulis</i> .....	*	*	*	*	*

Out of forty-five species and varieties thirty-nine are common to the Aleutian chain and three of the remainder may probably turn up there in the future. Twenty-nine are common to Kamchatka, and six more are likely to reach that peninsula. Twenty-seven are Arctic species, all of which are common to the Aleutians, and, with one or two possible exceptions, to Kamchatka also. Seventeen species are common to North Japan, and fourteen to California, while only two are, for the time, taken as peculiar.

These figures show that the fauna of the Commander Islands, as far as known, is intimately related to the general Arctic fauna, and especially to the Aleutian fauna, somewhat less so to the Kamchatka fauna, but presents in itself nothing distinctive. While the faunal aspect of the mollusca is boreal, there is a number greater than might be expected of species common to Japan and California, of which the two Pholads are the most noteworthy, as they have not yet been indicated from the Aleutian Islands, though it seems hardly possible if found living at the one locality that they can be absent from the other.

The collection, though small, is valuable as closing a gap in our knowledge of the geographical distribution of the mollusca of the North Pacific, and the slight but still interesting confirmatory zoölogical evidence which it adds to the hydrographic determinations which have shown that the main current of the sea between Kamchatka and the Aleutian chain is a cold set of Arctic water southward, and that no perceptible warm northward tropical stream or branch of the Kuro Siwo can be traced zoölogically or hydrographically in this direction.

JULY 25, 1884.

---

#### NOTE ON THE STERNOPTYCHIDÆ.

By THEODORE GILL.

(See plate II, fig. 7.)

The genus *Sternoptyx* was established in 1781 by Hermann for a remarkable type of fishes which was taken for one of his families by A. Duméril, the first to recognize families in Ichthyology. The family was accepted or named over by several later naturalists. Dr. Günther, nevertheless, did not recognize any of his predecessors when he likewise proposed the name *Sternoptychidæ*, and simply referred to the synonymy of the family "Scopelini, part, Müll., Berl. Abhandl., 1844, p. 184." An important article on the family by Handyside has also been universally overlooked, even by Bleeker in his communications on the Fishes of Celebes,\* and by Dr. Günther the family is attributed to "pelagic or deep-sea fishes from the Mediterranean and Atlantic." An examination of specimens of the two typical genera *Sternoptyx* and *Argyropelcus* renders it evident that the type is of unusual interest, and hence I am led to make the present preliminary communication.

---

\* The new species *S. celebes* was described.