Department of the Interior:

U. S. NATIONAL MUSEUM.

PROCEEDINGS

OF THE

UNITED STATES NATIONAL MUSEUM.

Vol. VI.

1883.

PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1884.

ADVERTISEMENT.

The extension of the scope of the National Museum during the past few years, and the activity of the collectors sent out in its interests, have caused a great increase in the amount of material in its possession. Many of the objects gathered are of a novel and important character, and serve to throw a new light upon the study of nature and of man.

The importance to science of prompt publication of descriptions of this material led to the establishment, in 1878, of the present series of publications, entitled "Proceedings of the United States National Museum," the distinguishing peculiarity of which is that the articles are published in signatures as soon as matter sufficient to fill sixteen pages has been obtained and printed. The date of publication being plainly expressed in each signature, the ready settlement of questions of priority is assured.

The articles in this series consist: First, of papers prepared by the scientific corps of the National Museum; secondly, of papers by others, founded upon the collections in the National Museum; and, finally, of interesting facts and memoranda from the correspondence of the Smithsonian Institution.

The Bulletins of the National Museum, the publication of which was commenced in 1875, consist of elaborate papers (monographs of families of animals, &c.), while the present series contemplates the prompt publication of freshly acquired facts relating to biology, anthropology, and geology; descriptions of restricted groups of animals and plants; the settlement of particular questions relative to the synonymy of species, and the diaries of minor expeditions.

This series of publications was commenced in 1878, with volume I, under the title "Proceedings of the United States National Museum," by the authority and at the expense of the Interior Department, and under the direction of the Smithsonian Institution.

The present volume, constituting the sixth of the series, has been prepared under the editorial supervision of Dr. Tarleton H. Bean, curator of the department of fishes.

SPENCER F. BAIRD,
Director of the U. S. National Museum.

UNITED STATES NATIONAL MUSEUM,
Washington, June 9, 1884.

TABLE OF CONTENTS.

LIST OF ILLUSTRATIONS.

CUTS,

PLATES.

(Full explanations are given with the plates at the end of the volume.)

LIST OF CORRECTIONS.

Page 56, line 25, *Eumida* should be *Eumunida*.
Page 56, line 8, from bottom, *Eumida* should be *Eumunida*.
Page 58, line 13 from below, unable should read enabled.
Page 60, line 26, Tonkoj should read Tolstoj.
Page 69, line 12 from bottom, grallinaria should read gallinaria.
Page 71, line 15 should be omitted altogether.
Page 71, line 29, (Gurm.) should read (Gunn.).
Page 72, line 21, *albus* should read *ridgwayi*.
Page 73, line 3 from bottom, *albus* should read *ridgwayi*.
Page 77, line 7, to should be into.
Page 80, line 45 from bottom (third series of measurements), 245 should be 265.
Page 84, line 5, the natives should read they.
Page 118, line 25, Gryfalcon should read Gyrfalcon.
Page 122, line 12, *Kiltiwake* should read *Kittiwake*.
Page 122, line 23, Leache's should read Leach's.
Page 129, head line, No. 2 should read No. 9.
Page 144, line 7 from bottom, duties should read dates.
Page 161, line 2 from bottom, Editor should read J. K. G. (The editor of the Proceedings did not see the proofs of this article.)
Page 203, line 30, *Curanx* should read *Caranx*.
Page 206, line 31, *Chloroscomberus* should read *Chloroscombrus*.
Page 207, line 7 from bottom, *Selen* should read *Selene*.
Page 213, line 14 from bottom, cinera should read cinerea.
Page 222, line 8, aculata should read aculeata.
Page 222, line 26, branchials should read branchialis.
Page 243, line 2 from bottom, modiolria should read modiolaria.
Page 362, line 13, Macururus should read Macrurus.
Page 393, line 6 from bottom, Hydrostomus should read Hadrostomus.
Page 407, line 19, Ramphastos should read Rhamphastos.
Page 420, the last two lines should be omitted.
Page 421, last line, Pinnideds should read Pinnipeds.
Page 423, measurements, Halichœres should read Halichœrus.
Page 503, first column, line 26, Butaster should read Butastur.
Page 511, above line 7 from bottom, insert Haliæetus albicilla . . . . . 68.
Page 523, line 8 from bottom, Hydrostornus should read Hadrostomus.
Page 523, Rupornis, ruficafida should read Rupornis ruficauda.

PROCEEDINGS

OF THE

UNITED STATES NATIONAL MUSEUM.

1883.

Vol. VI, No. 1. Washington, D. C. June 18, 1883.

PRELIMINARY REPORT ON THE BRACHYURA AND ANOMURA DREDGED IN DEEP WATER OFF THE SOUTH COAST OF NEW ENGLAND BY THE UNITED STATES FISH COMMISSION IN 1880, 1881, AND 1882.

By SIDNEY I. SMITH.

This report is intended to be supplementary to my preliminary notice of the crustacea dredged in the same region in 1880 (these Proceedings, iii, pp. 413–452), and to include all the species of Brachyura and Anomura obtained off Martha's Vineyard at depths greater than 50 fathoms. The crustacea dredged off the mouth of Chesapeake Bay in 1880, and off the capes of the Delaware in 1881, will be the subject of a separate report, but the specimens from these dredgings are included in the following lists of specimens examined as far as the species to which they belong are contained in the present report.

A few of the species described as new in the preliminary notice above referred to were almost simultaneously described by A. Milne-Edwards in one of the reports of the Blake dredgings, under the supervision of Alexander Agassiz, in 1877, 1878, 1879 (Bull. Mus. Comp. Zool. Cambridge, vol. viii, No. 1, December 29, 1880), of which I had no knowledge whatever until after my paper was printed (January, 1881), and which was not published until after my last proof had been returned to the Public Printer (December 24, 1880). I have had much difficulty in identifying Milne-Edwards's species, but have adopted his names wherever it was possible to recognize his species. In determining some of these species I have been greatly aided by the kindness of Prof. Walter Faxon, who has sent me for examination some of the type specimens in the Museum of Comparative Zoology.*

The last season's dredging off Martha's Vineyard reveals the total, or almost total, disappearance of several of the larger species of crustacea which were exceedingly abundant in the same region in 1880 and 1881. The most remarkable cases are those of *Euprognatha rastellifera*, *Collodes robustus*, *Catapagurus Sharreri*, *Munida Caribæa?* Smith, and

*While the manuscript of this report was in the hands of the printer, the following work of Milne-Edwards was received: Recueil de figures de Crustacés nouveaux ou peu connus. 1ère livraison. April, 1883. A considerable number of Milne-Edwards's new species are provisionally figured in this work, but it does not seem to make any changes in the proofs of the following pages necessary, except under *Anoplonotus politus*, which was doubtfully referred to *Elasmonotus* in the original manuscript, but for which the new generic name has been inserted in the proof.—May 29, 1883.

Pontophilus brevirostris, all of which were exceedingly abundant in 1880 and 1881; but of the first two not a specimen was taken the past season, of the *Munida* only a single specimen, and that on the last trip, and of the other species only a very few specimens. *Lambrus Verrillii*, *Acanthocarpus Alexandri*, *Latreillia elegans*, *Homola barbata*, and *Anoplonotus politus*, which were each taken several times in 1880 and 1881, were none of them taken in 1882; they were far less abundant than the other species, however, and the non-occurrence of some of them was very likely accidental; but the disappearance of part of them at least was undoubtedly due to the same causes which occasioned the disappearance of the more abundant species. The disappearance of these species was undoubtedly connected directly with the similar disappearance of the tile-fish (*Lopholatilus*) from the same region, and on this account specially I give in detail, for many of the species enumerated beyond, the tables of specimens examined from the region explored by the Fish Commission; and to these I have usually added the specimens which I have examined from the collection made by Alexander Agassiz on the Blake in 1880. All the species mentioned above as having disappeared in 1882 were specially characteristic of the narrow belt of comparatively warm water (approximately 50° F.), in from 60 to 160 fathoms, which has a more southern fauna than the colder waters either side. Professor Verrill has suggested (Amer. Jour. Sci., III, xxiv, p. 366, 1882) that there was a great destruction of life in this belt, caused by a severe storm, in the winter of 1881–'82, which agitated the bottom-water and forced outward the cold water that even in summer occupies the great area of shallow sea along the coast, thus causing a sudden lowering of the temperature along the warmer belt inhabited by the tile-fish and the crustacea referred to.

In the following tables of specimens examined the latitude and longitude, depth, nature of bottom, &c., are copied from the list of dredging stations of the Fish Commission for 1880, 1881, and 1882, in the Bulletin of the Fish Commission, vol. ii, pp. 119 to 131, 1882, where further details in regard to temperature, &c., are given. In indicating the nature of the bottom, the Coast Survey system of abbreviations is used. In the column for the number of specimens examined, *l* is used to indicate large specimens; *s*, small specimens; and *y*, young. When the sexes were not counted separately the whole number of specimens examined is placed in the middle of the column; when the sexes were counted separately the number of males is put on the right, the number of females on the left, and the number of young in the middle, followed by the letter *y*. As a basis for ascertaining the breeding season, I have, in a great number of cases, noted the presence or absence of egg-bearing females; when the number of such females was counted it is entered in the appropriate column; when specimens carrying eggs were found, but not counted, a plus sign, +, is used; and when none of the specimens examined were carrying eggs a zero, 0, is used.

BRACHYURA.

MAIOIDEA.

Amathia Agassizii Smith, Bull. Mus. Comp. Zool., Cambridge, x, p. 1, pl. 2, figs. 2, 3, 1882.

Specimens examined.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.											
	°	′	″	°	′	″			1881.			
939	39	53	00	69	50	30	264	gn. S. M.	Aug. 4	1		
1032	39	56	00	69	22	00	208	yl. M.	Sept. 14	1	1 y.	
									1882.			
1113	39	57	00	70	37	00	192	gn. M.	Aug. 22	1		
1154	39	55	31	70	39	00	193	S. M.	Oct. 4	3		

In the original description above referred to it is stated that this species resembles *Amathia Carpenteri* Norman (*Scyramathia Carpenteri* A. M.-Edwards); it is, however, probably not closely allied or even congeneric with that species, but apparently closely allied to *Amathia crassa* A. M.-Edwards, and possibly identical with it. I was misled in regard to the armament of the carapax of *Scyramathia Carpenteri* by the woodcut given in the Depths of the Sea (no description of the species has yet appeared), for Milne-Edwards states that the species is closely allied to *Scyra umbonata* Stimpson, certainly a very different species from *Amathia Agassizii*, and has united them in his new genus *Scyramathia*.

As indicated above, all the specimens seen are males. One of these is much larger than the larger of the two original specimens described and figured in my report above referred to, but differs very little from it, although the spines of the horizontal series on the branchial region, above the bases of the cheliped and first ambulatory leg, are considerably longer, and there are two well-developed spines, instead of two or three small ones, on the lateral margin back of the anterior angle of the buccal area. Measurements of this specimen are given in the last column of the accompanying table of measurements. The other specimens show all gradations between this and the young specimens originally described.

Measurements in millimeters.

	Station—			
	1032.	939.	1113.	1154.
Sex	Young.	♂	♂	♂
Length of carapax, including rostral and posterior spines	15.5	21.5	26.3	53.5
Length of carapax from base of rostral to tip of posterior spines	10.0	14.0	18.0	42.5
Length of carapax, excluding rostral and posterior spines	9.1	12.1	16.5	40.5
Length of rostral horns or spines	5.7	8.0	9.0	12.0
Breadth of carapax, including lateral spines	11.5	16.0	19.5	39.5
Breadth of carapax, excluding lateral spines	6.8	9.0	12.3	32.0
Length of branchial spine	3.1	4.8	5.2	6.0
Length of cheliped	11.0	15.0	21.5	62.0
Length of chela	4.6	6.4	10.0	28.5
Breadth of chela	0.9	1.3	1.6	4.0
Length of dactylus	2.0	2.5	3.8	5.4
Length of first ambulatory leg	18.0	25.0	37.0	.....
Length of dactylus	3.5	4.0	6.7	.....
Length of second ambulatory leg	15.0	22.5	31.5	95.0
Length of dactylus	3.2	4.8	6.0	17.5

Amathia Tanneri, sp. nov.

Allied to the last species, but readily distinguished from it by the narrower carapax with longer and less diverging rostral horns and fewer and more nearly equal spines, and by having a single spine only on the base of the antenna.

Male.—The carapax, excluding the rostral horns and the spines, is about as broad as long. The rostral horns are nearly straight, much less divergent than in *A. Agassizii*, and, in the larger of the two specimens seen, much more than half as long as the rest of the carapax. The supraorbital spine and the postorbital process are as in *A. Agassizii*, but the basal segment of the antenna is unarmed except by a single spine at the distal end. There are four long and approximately equidistant spines on the mesial line of the carapax, the two anterior on the gastric region and smaller than the others, which are on the cardiac region, the posterior being near the posterior margin and projecting slightly backward over it. There are no prominent spines on the gastric region except the two median, but there is a minute tubercle or rudimentary spine either side about equidistant from the two median, and on the cardiac region there are no spines or tubercles whatever except the two median. There is a single long hepatic and a great branchial spine, as in *A. Agassizii*, but there are no other spines or tubercles on the branchial region except two, about as long as the cardiac spines, and about equidistant from each other and from the great branchial, the posterior gastric, and the anterior cardiac. The anterior angle of the buccal area projects in a dentiform process either side, as in *A. Agassizii*, and back of this the prominent margin of the pleural region is armed with three small tubercles or rudimentary spines. There are no spines or tubercles on the side of the branchial region above the basis of the cheliped and first ambulatory leg, and no tubercles whatever on the postero-lateral margins.

The chelipeds and ambulatory legs are essentially as in *A. Agassizii*.

The number and arrangement of the dorsal spines of the carapax appear to be nearly as in *A. hystrix* Stimpson, as figured by A. Milne-Edwards (Crust. Région Mexicaine, p. 134, pl. 28, fig. 1, 1878), except that the lateral spines of the gastric region are obsolete in *A. Tanneri;* but all the spines are very greatly longer in *hystrix*, which appears to be a very distinct species.

Measurements in millimeters.

	Station—	
	1038.	1043.
Sex	♂	♂
Length of carapax, including rostral and posterior spines	15+	28.0
Length of carapax from base of rostral to tip of posterior spines	11.0	18.0
Length of carapax, excluding rostral and posterior spines	10.2	16.2
Length of rostral horns or spines	4+	11.0
Breadth of carapax, including lateral spines	10.0	18.0
Breadth of carapax, excluding lateral spines	6.7	11.2
Length of branchial spine	1.9	4.0
Length of cheliped	12.0	20.0
Length of chela	5.5	9.0
Breadth of chela	1.1	1.8
Length of dactylus	2.0	3.5
Length of first ambulatory leg	21.0	35.0
Length of dactylus	3.7	6.2
Length of second ambulatory leg	16.0	27.0
Length of dactylus	3.0	5.0

Specimens examined.

Station No	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀
	OFF MARTHA'S VINEYARD.						
1038	° ′ 39 58	° ′ 70 06	146	S. Sh.	1881. Sept. 21	1 y.	
	OFF DELAWARE BAY.						
1043	° ′ 38 39	° ′ 73 11	130	S.	1881. Oct. 10	1	

Hyas coarctatus Leach.

Taken at a number of stations off Martha's Vineyard, in 86 to 158 fathoms, and also in much shallower water near Block Island and off No Man's Land. Four male specimens were taken off Chesapeake Bay in 1880, station 900, N. lat. 37° 19′, W. long. 74° 41′, 31 fath., sand—the farthest south the species has been noticed.

Collodes robustus, sp. nov.

Collodes depressus Smith, Proc. National Mus., iii, p. 414, 1881 (*non* A. M.-Edwards.)

A careful examination of one of the type specimens of *C. depressus* convinces me that the specimens which I have referred to that species

are really a distinct but closely allied and much larger species. Very small specimens, 10mm or less in length of carapax, resemble the *depressus* very much, but are distinguished from Milne-Edwards's figures and the type specimen referred to by the less regularly triangular outline of the carapax, the hepatic and branchial regions being much more protuberant; by the acute rostral horns, more widely separated at their tips; by the much longer interantennular spine, which is fully as long as in *Euprognatha rastellifera;* by the short and conical or even tuberculiform gastric and cardiac spines; by the spine of the first somite of the abdomen being directed backward instead of upward; and by the more slender chelæ.

Male.—In large males over 20mm in length of carapax, the carapax is a little over three-fourths as broad as long, and thickly covered, as well as nearly all other parts of the animal except the chelæ, with strongly curved hairs or setæ, which, in every specimen seen, persistantly retain a thick coating of soft mud. The rostral horns are slender and separated by a rounded sinus, at the bottom of which the interantennular spine, or true rostrum, which is much longer than the rostral horns and grooved longitudinally in front, projects downward and about as far forward as the rostral horns. The basal segment of the antenna is armed with a lateral and an inferior ridge, each divided into three to five short spiniform teeth. The postorbital processes are broad, but acutely triangular, and project as far as the tips of the eyes. The dorsal surface is thickly covered with granular tubercles, and there is a slight tubercular elevation, but little more prominent than the tubercles of the general surface, on the gastric region, and another on the cardiac, in place of the spines in the young. The hepatic region is divided obliquely near the middle by a deep sulcus into two lobes, of which the superior projects in a rounded prominence, which is very conspicuous as seen from above, while the inferior is crossed longitudinally by the pleurotergal suture and below it armed with a short series of small tuberculiform spines. The branchial regions are prominent, swollen, and evenly tuberculated.

The chelipeds are stout and approximately once and a half as long as the carapax; the merus is triquetral with the angles armed more or less with tubercles or tuberculiform spines; the whole outer surface of the carpus is similarly armed. The chela is approximately two-thirds as long as the carapax, naked, smooth, polished, and unarmed, except a very few tubercles on the inner surface and near the proximal ends of the upper and under edges; the body is nearly as long as the digits, thick and swollen; and the digits are compressed, somewhat grooved longitudinally, very slightly curved, gaping at the bases, and with the prehensile edges slightly and irregularly crenate. The ambulatory legs are hairy to very near the tips, but are otherwise unarmed and smooth throughout, and all the segments are subcylindrical; the first are about two and a half times as long as the carapax, the others successively

shorter, and the last considerably less than twice as long as the carapax; the dactyli are considerably curved, slender, and tapered near the acute chitinous tips.

The sternum is tuberculose, like the dorsal surface of the carapax, except upon the concave portion between the bases of the chelipeds, where it is smooth.

The first somite of the abdomen is tuberculose, like the carapax, and armed with a low tuberculiform prominence, in place of the spine in the young. The second somite is very short and scarcely wider than the first. The third is widest of all, and from it the abdomen is regularly narrowed to the seventh somite, which is anchylosed with the sixth, as in *Euprognatha rastellifera*, triangular, with the tip obtuse, and nearly as broad as long.

Female.—The females appear not to attain the adult sexual characters until the carapax is about 12^{mm} in length, apparently never attain as great size as the males, and as usual resemble the young, although they lose the gastric, cardiac, and abdominal spines fully as early as the males. The carapax is slightly more convex and the branchial regions somewhat less swollen than in the male. The chelipeds remain small and weak, the chelæ slender as in the young, and the ambulatory legs proportionally shorter than in the male.

The proportions of the carapax, chelipeds, and ambulatory legs in the young and adults of both sexes are well shown by the accompanying table of measurements.

Measurements in millimeters and hundredths of length of carapax.

	Station—									
	874	949	940	940	940	940	873	1036	950	940
Sex	♂*	♂	♂	♂	♂	♂	♀*	♀*	♀	♀
Length of carapax, including frontal teeth	9.7	12.5	14.8	23.3	25.7	27.0	8.2	10.7	13.3	18.3
Greatest breadth of carapax	6.6	9.1	10.8	17.9	20.7	21.2	5.8	7.0	10.3	14.1
Same in hundredths of length of carapax	68	73	73	77	77	78	71	68	70	77
Length of cheliped	11.0	16.0	18.0	34.0	38.0	40.0	9.5	11.0	14.0	19.0
Length of chela	4.8	6.2	7.8	14.8	17.6	18.5	3.5	4.5	5.5	7.9
Same in hundredths of length of carapax	49	50	53	64	66	68	41	42	42	43
Height of chela	1.2	2.1	2.7	6.6	7.5	8.0	0.9	1.1	1.4	2.1
Same in hundredths of length of carapax	12	17	18	28	29	30	11	10	11	12
Length of dactylus	2.7	3.6	4.4	8.0	9.1	10.2	2.1	2.6	3.2	4.7
Length of first ambulatory leg	20.0	28.0	34.0	58.0	65.0	68.0	15.0	19.0	24.0	32.0
Length of propodus	5.0	6.5	8.5	14.5	15.5	17.0	3.1	4.1	6.0	7.5
Length of dactylus	3.9	5.4	7.0	12.0	13.4	14.5	2.7	3.9	5.2	7.0
Length of fourth ambulatory leg	17.0	22.0	27.0	42.0	46.0	47.0	.....	15.5	20.0	25.0
Length of propodus	3.8	5.0	6.9	10.1	12.0	12.6	.....	2.9	4.8	6.7
Length of dactylus	3.8	5.0	6.3	9.2	10.0	10.2	.....	2.8	4.7	6.2

* Immature individuals.

The number and arrangement of the branchiæ are the same as in *Euprognatha rastellifera*, but there are well-developed epipods on all

three pairs of maxillipeds, those on the second being narrow, but as long as the merus of the endopod, so that the formula is:

	Somite—								
	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods	1	1	1	0	0	0	0	0	(3)
Podobranchiæ	0	1	1	0	0	0	0	0	2
Arthrobranchiæ	0	0	2	0	0	0	0	0	2
Pleurobranchiæ	0	0	0	2	1	1	0	0	4
									8+(3)

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD.							
	° ′ ″	° ′ ″			1880.			
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4	1	1	1
871	40 02 54	70 23 40	115	fne. S. M.	Sept. 4	8	1	0
872	40 05 39	70 23 52	86	S. G. Sh. sponges.	Sept. 4	1		
873	40 02 00	70 57 00	100	sft. M.	Sept. 13	3	3	0
874	40 00 00	70 57 00	85	sft. M.	Sept. 13	4	4	0
875	39 57 00	70 57 30	126	sft. M.	Sept. 13		1	0
878	39 55 00	70 54 15	142	sft. M.	Sept. 13	1	1	1
					1881.			
921	40 07 48	70 43 54	67	gn. M.	July 16	4	1	0
922	40 03 48	70 45 54	71	gn. M. S.	July 16	2		
940	39 54 00	69 51 30	134	hrd. S. sponges.	Aug. 4	34	9	5
941	40 01 00	69 56 00	79	hrd. S. M.	Aug. 4	8	9	9
949	40 03 00	70 31 00	100	yl. M.	Aug. 23	5	5	5
950	40 07 00	70 32 00	71	S. Sh. M.	Aug. 23	3	2	2
1036	39 58 00	69 30 00	94	S.	Sept. 14	2	1	0
1038	39 58 00	70 06 00	146	S. Sh.	Sept. 21	1		
1040	40 00 00	70 06 00	93	S. Sh.	.....		4	0
	OFF DELAWARE BAY.							
					1881.			
1043	38 39 00	73 11 00	130	S.	Oct. 10	5		
1046	38 33 00	73 18 00	104	S.	Oct. 10	1		
1047	38 31 00	73 21 00	156	S.	Oct. 10	1		
	OFF CHESAPEAKE BAY.							
					1880.			
896	37 26 00	74 19 00	56	S. Sh.	Nov. 16	7	1	1
899	37 22 00	74 29 00	57	S.	Nov. 16	11		

The type specimen of *C. depressus* which I have examined is from the Straits of Florida, and is labeled "Bache, Apr. 2, 5th cast, 54 fms., off Sombrero." This specimen gives the following measurements in millimeters and hundredths of the length of the carapax:

Sex	♂
Length of carapax	7.0
Breadth of carapax	5.2
Same in hundredths of length	74
Length of cheliped	8.0

Length of chela	3.3
Same in hundredths of length of carapax	47
Height of chela	1.2
Same in hundredths of length of carapax	17
Length of dactylus	1.9

Neither Stimpson nor Milne-Edwards mentions the presence of an interantennular spine in any of the species of *Collodes*, and both of them speak of it in *Euprognatha* as specially distinguishing that genus from its near allies; but in the two species which I have examined the spine is well developed, though less prominent, and not projecting forward at all in *C. depressus*.

Euprognatha rastellifera Stimpson.

Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 123, 1870.

A. M.-Edwards, Crust. Région Mexicaine, p. 183, pl. 33, fig. 2, 1878; Bull. Mus. Comp. Zool. Cambridge, viii, p. 7, 1880.

Smith, Proc. Nat. Mus., iii, p. 415, 1881; Bull. Mus. Comp. Zool. Cambridge, x, p. 4, 1882.

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD.							
	° ′ ″	° ′ ″			1880.			
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4	100+		+
869	40 02 18	70 23 06	192	fne. S.	Sept. 4	6		....
871	40 02 54	70 23 40	115	fne. S. M.	Sept. 4	1,000+		+
872	40 05 39	70 23 52	86	S. G. Sh. sponges.	Sept. 4	50+		+
873	40 02 00	70 57 00	100	Sft. M.	Sept. 13	500+		+
874	40 00 00	70 57 00	85	Sft. M.	Sept. 13	1,000+		+
877	39 56 00	70 54 18	126	Sft. M.	Sept. 13	20+		+
878	39 55 00	70 54 15	142	M.	Sept. 13	300+		+
					1881.			
920	40 13 00	70 41 54	63	gn. M.	July 16	7		....
921	40 07 48	70 43 54	67	gn. M.	July 16	1,500+		+
922	40 03 48	70 45 54	71	gn. M. S.	July 16	250+		+
923	40 01 24	70 46 00	96	S.	July 16	37		+
925	39 55 00	70 47 00	229	S. M.	July 16	5		....
940	39 54 00	69 51 30	134	hrd. S., sponges.	Aug. 4	----------		....
941	40 01 00	69 56 00	79	hrd. S. M.	Aug. 4	2,000+		+
949	40 03 00	70 31 00	100	yl. M.	Aug. 23	500+		+
950	40 07 00	70 32 00	71	S. Sh. M.	Aug. 23	150+		+
1036	39 58 00	69 30 00	94	S.	Sept. 14	1		....
1038	39 58 00	70 06 00	146	S. Sh.	Sept. 21	2		....
1040	40 00 00	70 06 00	93	S. Sh.	Sept. 21	20+		+
	OFF DELAWARE BAY.							
					1881.			
1043	38 39 00	73 11 00	130	S.	Oct. 10	10		....
1047	38 31 00	73 21 00	156	S.	Oct. 10	7		....
	OFF CHESAPEAKE BAY.				1880.			
896	37 26 00	74 19 00	56	S. Sh.	Nov. 16	3	1	+
899	37 22 00	74 29 00	57	S.	Nov. 16	6	4	+

I have also examined specimens taken by Alexander Agassiz on the Blake in 1880, at the following stations:

Station.	N. lat.	W. long.	Fathoms.	Specimens.
	° ′ ″	° ′ ″		
335	38 22 25	72 33 40	89	1♂
345	40 10 15	71 4 30	71	70♂ ♀
346	40 25 35	71 10 30	44	1♀

Among the vast number of specimens examined there are very few sexually immature individuals. Both sexes ordinarily attain maturity before the carapax is 6^{mm} in length, and the scarcity of immature specimens in the collections may be due to their small size causing them to be overlooked in the great mass of material brought up in the trawl. The largest females seen do not exceed 10^{mm} in length of carapax, and differ very little from the smallest in the form and proportions of chelipeds and ambulatory legs, though the carapax is a little broader in proportion and the spines with which it is armed are much lower, or reduced to tubercles, in the larger specimens. The males attain much greater size than the females, the carapax often exceeding 14^{mm} in length, and there is a very marked and constant increase in the size of the chelipeds, particularly in the height and the thickness of the body of the chelæ, well shown in the accompanying table of measurements. In both sexes there is considerable variation in the length of the spines of the carapax, even in specimens of the same size, and there is a marked decrease in the length of the spines with the growth of the individual. In large specimens the spines upon the orbital arches, upon the gastric, cardiac, and the summits of the branchial regions, and upon the basal segment of the abdomen, are usually reduced to low, and often inconspicuous, tubercles.

The number and arrangement of the branchiæ and epipods are indicated in the following formula:

	Somite—								Total.
	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	
Epipods	1	0	1	0	0	0	0	0	(2)
Podobranchiæ	0	1	1	0	0	0	0	0	2
Arthrobranchiæ	0	0	2	0	0	0	0	0	2
Pleurobranchiæ	0	0	0	2	1	1	0	0	4
									8 + (2)

The sixth and seventh somites of the abdomen of the male are anchylosed completely, as they are also in *Euprognatha rastellifera*, *Col-*

lodes depressus, *C. robustus*, and *Lispognathus furcatus*, though neither Stimpson nor Milne-Edwards mentions it, and Milne-Edwards even apparently figures them as separate in *E. rastellifera* and *C. depressus*.

Measurements in millimeters and hundredths of length of carapax.

	Station—									
	865	865	865	878	878	922	865	865	869	878
Sex	♂*	♂	♂	♂	♂	♂	♀	♀*	♀	♀
Length of carapax, including rostrum	3.2	5.1	5.6	6.8	11.3	14.4	5.8	6.0	7.2	9.5
Breadth of carapax, excluding spines	2.3	3.6	4.1	5.0	8.9	12.0	4.4	4.5	5.5	7.7
Same in hundredths of length of carapax	72	71	73	74	79	83	76	75	76	81
Length of cheliped	4.0	6.5	7.5	10.0	21.0	29.0	6.8	7.0	8.0	11.8
Length of chela	1.5	2.7	3.1	4.2	10.0	12.8	2.6	2.8	3.2	4.7
Same in hundredths of length of carapax	47	53	55	62	88	89	45	47	44	49
Height of chela	0.3	0.6	0.8	1.3	2.7	3.6	0.6	0.6	0.7	1.0
Same in hundredths of length of carapax	10	12	14	19	24	26	10	10	10	11
Length of dactylus	0.6	1.3	1.6	2.0	4.0	5.0	1.2	1.4	1.6	2.3
Length of first ambulatory leg	5.7	11.0	13.0	16.0	32.0	35.0	11.0	8.5	13.5	19.8
Length of propodus	1.5	3.1	3.5	4.4	9.5	10.0	2.8	2.0	3.3	5.3
Length of carpus	1.0	2.0	2.2	2.7	5.2	5.5	2.0	1.5	2.2	3.3
Length of fourth ambulatory leg	.....	8.0	9.0	10.8	20.0	22.0	9.0	6.2	9.5	14.0
Length of propodus	.....	2.3	2.5	3.2	5.8	6.0	2.5	1.6	2.5	4.0
Length of carpus	.....	1.7	1.8	2.1	3.7	4.1	1.7	1.0	1.8	3.0

* Immature specimens; the others all adult, the females with eggs, even in the case of the smallest. The first and fourth ambulatory legs in the immature female are apparently reproduced appendages, which may, perhaps, account for the retardation in the sexual development of the individual.

The specimens in the Fish Commission collections and in the Blake collection of 1880 appear to agree much more closely with those originally described by Stimpson and those figured and described by Milne-Edwards than they do with a few Caribbean specimens which I have examined and which were labeled by Milne-Edwards as this species and returned to the Museum of Comparative Zoology. These specimens, two males and five females, are from the Blake collection of 1878–'79, station 134, off Santa Cruz, 248 fathoms, and, though fully adult, are all very much smaller than any other adult specimens examined. They are also considerably smaller than the specimens described by Stimpson or Milne-Edwards. The carapax is slightly narrower than in the northern specimens, with the tubercles of the surface larger and all the spines longer and more slender; the postorbital process is slender and spiniform instead of dentiform; there is a small conical spine, much more acute and more prominent than in the northern specimens, on the eye, at the emargination of the cornea; and the ambulatory legs are more slender and armed with small spiniform tubercles which are much more conspicuous than in the northern specimens. In the males the chelæ are proportionally larger, with the bodies stouter and more swollen; and in both sexes the chelæ and other parts of the chelipeds are armed with larger and more scattered tubercles, many of which, especially on the carpus and merus, become spiniform and conspicuous. Some of these differences are well shown in the following measurements (in mil-

limeters and hundredths of length of carapax) of four of the specimens from off Santa Cruz:

	1.	2.	3.	4.
Sex	♂	♂	♀	♀
Length of carapax, including rostrum	5.3	5.6	5.4	6.0
Breadth of carapax, excluding spines	3.6	3.8	3.9	4.4
Same in hundredths of length	68	68	74	73
Length of cheliped	8.0	9.0	5.7	.....
Length of chela	3.4	3.5	2.6	.....
Same in hundredths of length of carapax	64	62	48	.....
Height of chela	0.8	1.0	0.5	.....
Same in hundredths of length of carapax	15	18	9	.....
Length of dactylus	1.6	1.7	1.2	.....

These Caribbean specimens are apparently specifically distinct, but a series of specimens from different parts of the West Indian region would perhaps show them to be a geographical or local variety.

Lispognathus furcatus A. M.-Edwards.

Lispognathus furcatus A. M.-Edwards, Bull. Mus. Comp. Zool. Cambridge, vii, p. 9, 1880.

? *Lispognathus furcillatus* A. M.-Edwards, Rapport sur la Faune sous-marine dans les grandes profondeurs de la Méditerranée et de l'Océan Atlantique (Arch. Missions Sci. et Littéraires, ix), pp. 16, 39, 1882 (no description).

To this species I refer, with considerable hesitation, two specimens dredged off Martha's Vineyard: Station 951, N. lat. 39° 57′, W. long. 70° 31′ 30″, 225 fath., mud, Aug. 23, 1881 (male); station 1096, N. lat. 39° 53′, W. long. 69° 47′, 317 fath., soft green mud, Aug. 11, 1882 (female carrying eggs).

The carapax, excluding the rostral and lateral spines, is about four-fifths as broad as long in the male, and slightly broader and much thicker and more swollen in the female. The rostral horns are acicular, very slightly divergent, and slightly ascending, and in the male nearly three-tenths as long as the rest of the carapax. The three erect gastric and the postorbital spines are subequal and very slender and acute, and the postorbital spine each side is situated slightly in front of a line from the middle to the lateral gastric. The cardiac spine is considerably stouter and a little higher than the gastric spines, and either side of it on the dorsal part of the branchial region there is a much smaller erect spine, and on a line between this and the lateral gastric there is a similar spine in the female, but only a minute spine or tubercle in the male. There are two or three minute spines or tubercles on the protuberant superior lobe of the hepatic region, and about as many more back of these on the side of the branchial region, while on the inferior hepatic lobe, opposite the middle of the buccal area, there is a much larger spine directed downward, and back of this a smaller one, near the base of the cheliped. The supraorbital spine is slender and about as long as the gastric spines, and in the male the interantennular is fully as long, stouter, and directed downward and curved slightly forward. The basal

segment of the antenna is irregularly armed beneath with small spines or teeth, and in the male with a slender spine at the distal end. The eyestalk is armed with a minute spine or tubercle in front, and above with a small tubercle at the emargination of the cornea. The exposed surface of the ischium and merus of the external maxillipeds is armed conspicuously with marginal and submarginal spines, of which one on the inner edge of the merus is very long.

The chelipeds in the male are stout and nearly twice as long as the carapax, including the rostral horns; the merus is a little shorter than the chela and triquetral, with all three of the angles thickly armed with very long and slender spines; the carpus is rounded externally, but armed like the merus; the chela is longer than the carapax, excluding the rostral horns, and naked and unarmed except by a few spines along the proximal part of the dorsal edge; the body is stout and swollen, and the digits slightly shorter than the body, nearly straight vertically but strongly curved laterally, very much compressed, grooved longitudinally on the sides and on the rather broad dorsal edge of the dactylus, and the prehensile edges crenately serrate and in contact throughout. In the female the chelipeds are only about once and a half as long as the carapax, including the rostral spines, much more slender than in the male, and armed with proportionally longer spines; and the chela is much shorter than the carapax, excluding the rostral horns; the body is scarcely at all swollen, and is armed with slender spines along both edges and with minute spines or tubercles on the sides, and the digits are proportionally longer and narrower than in the male.

The ambulatory legs are very long and slender, clothed to the tips of the dactyli with numerous curved setiform hairs which persistently retain mud and other foreign substances, and each is armed with a slender spine on the upper side of the distal end of the merus.

In the male the abdomen is much broader relatively to the sternum than in *Euprognatha rastellifera*, and has a low tuberculiform elevation on each somite. The first and second somites are narrow, the third broadest of all, the fourth and fifth successively a very little narrower, the fifth fully twice as broad as long, and the sixth and seventh consolidated as in *Euprognatha* and *Collodes*, together much broader than long and very broad and obtuse at the tip. The appendages of the first somite reach nearly to the tip of the abdomen, and their tips are stout and curved outward very strongly.

The eggs are numerous, nearly spherical, and approximately 0.6 mm in diameter in alcoholic specimens.

Measurements in millimeters.

	Station—	
	951.	1096.
Sex	♂	♀
Length of carapax, including rostral spines	12.0	12+
Length of carapax, excluding rostral spines	9.3	10.8
Breadth of carapax, including spines	7.6	9.6
Breadth of carapax, excluding spines	7.6	9.3
Breadth of front between orbits	2.0	2.1
Length of cheliped	23.0	19.0
Length of chela	10.0	8.0
Breadth of chela, excluding spines	3.1	2.1
Length of dactylus	4.6	4.0
Length of first ambulatory leg	41.0	38.0
Length of propodus	13.5	12.0
Length of dactylus	8.6	8.0
Length of second ambulatory leg	37.0	34.0
Length of propodus	10.8	9.9
Length of dactylus	7.0	6.8
Length of fourth ambulatory leg	31.0	30.0
Length of propodus	9.0	8.0
Length of dactylus	5.5	6.0

Lumbrus Verrillii Smith, Proc. National Mus., iii, p. 415, 1881.

Specimens examined.

Station No.	Locality. N. lat.	W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.							
	° ′ ″	° ′ ″			1880.			
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4		2	0
872	40 05 39	70 23 52	86	S. G. Sh. Sponges.	Sept. 4		3	0
					1881.			
940	39 54 00	69 51 30	134	hrd. S. Sponges.	Aug. 4		1	0
949	40 03 00	70 30 00	100	yl. M.	Aug. 23	2		
950	40 07 00	70 32 00	71	S. Sh. M.	Aug. 23	4	2	0

Measurements in millimeters and hundredths of length of carapax.

	Station—									
	950	949	950	950	949	949	950	940	950	872
Sex	♂	♂	♂	♂	♂	♂	♀ 2	♀	♀	♀
Length of carapax	15.7	16.7	17.3	20.5	20.9	25.0	17.7	18.5	20.4	32.8
Breadth, including lateral spines	19.3	20.0	20.9	25.0	26.0	31.2	20.7	22.3	25.0	41.0
Same in hundredths of length	123	120	121	122	124	125	120	121	123	125
Breadth, including lateral spines	17.0	17.3	18.0	22.0	22.0	27.2	17.8	19.5	22.0	35.3
Length of cheliped fully extended	39.0	42.0	43.0	55.0	59.0	.....	40.0	48.0	50.0	85.0
Same in hundredths of length of carapax.	248	252	249	268	282	.....	233	260	245	259
Length of merus of cheliped	14.5	15.3	15.5	20.0	22.0	.....	14.0	16.3	18.0	32.0
Length of propodus of cheliped	19.0	20.0	20.0	26.0	28.0	.....	19.0	19.0	23.0	39.0

The specimens taken in 1881 are much smaller than the type specimens taken in 1880; none of the females are fully adult, and the largest males, though adult, are apparently not fully grown. The largest of the males differ very little from the females originally described, except that the chelipeds are proportionally a little larger. In the smaller specimens of both sexes there are rather fewer small tubercles upon the carapax, and the teeth of the lateral margins of the carapax and angles of the chelipeds are, perhaps, smaller and less lacineated proportionally, but the differences are very slight, and there is no approach to *L. Pourtalesii* as figured by A. Milne-Edwards. The accompanying table of measurements shows the slight variations in the proportions of the carapax and chelipeds better than description. In some specimens the chelipeds are slightly unequal, but in none conspicuously so, and when the difference was noticeable in the specimens measured the measurements of the cheliped were made from the larger one.

CANCROIDA.

Cancer borealis Stimpson.

Taken off Martha's Vineyard, in 1880, 1881, and 1882, at a great number of the stations, in 51 to 317 fathoms, and also in shallow water; off Delaware Bay, 1881, stations 1047 and 1049, 156 and 435 fathoms; and off Chesapeake Bay, 1880, stations 896, 897, 899, and 901, 18 to 157 fathoms. Most of the deep-water specimens taken by the Fish Commission are small, but much larger specimens, among them several from 100 to 130 millimeters in breadth of carapax, were taken in 1880, by Alexander Agassiz, on the Blake, off the Carolina coast, in 142 to 233 fathoms. The largest of these specimens were from Blake station 314; N. lat. 32° 24′, N. long. 78° 44′, 142 fathoms.

Cancer irroratus has not been taken in any of the deeper dredgings off Martha's Vineyard, although it is a common littoral and shallow-water species on the whole New England coast, and was taken by Alexander Agassiz at several stations, in 65 to 178 fathoms, off the Carolina coast, even occurring with *C. borealis* at station 314, just mentioned.

Geryon quinquedens Smith.

Trans. Conn. Acad., v, p. 35, pl. 9, figs. 1, 2, 1879; Proc. National Mus., iii, p. 417, 1881; Bull. Mus. Comp. Zool. Cambridge, x, p. 6, 1862.

Specimens examined.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.								1880.			
881	39	46	30	70	54	00	325	M.	Sept. 13	1		
893	39	52	20	70	53	00	372	sft. bn. M. sml. St.	Oct. 2		1	0

Specimens examined—Continued.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD Continued.							
	° ′ ″	° ′ ″			1881.			
937	39 49 25	69 49 00	616	gn. S. M.	Aug. 4	4		
945	39 58 00	71 13 00	207	gn. M. S.	Aug. 9	1	1	0
946	39 55 30	71 14 00	247	gn. M. S.	Aug. 9		1	0
947	39 53 30	71 13 30	319	S. M.	Aug. 9	2	2	0
952	39 55 00	70 28 00	396	yl. M. S.	Aug. 23		1	0
994	39 40 00	71 30 00	368	M.	Sept. 8	1		
1029	39 57 06	69 16 00	458	yl. M. S.	Sept. 14	1		
					1882.			
1124	40 01 00	68 54 00	640	fne. S. gn. M.	Aug. 26	3	2	1
1125	40 03 00	68 56 00	291	S. M.	Aug. 26			
1140	39 34 00	71 56 00	374	sft. M. P.	Sept. 8	7	2	0
1142	39 32 00	72 00 00	322	S. M. P.	Sept. 8	1	4	0
1143	39 29 00	72 01 00	452	sft. M.	Sept. 8	1		
	OFF DELAWARE BAY.							
					1881.			
1049	38 28 00	73 22 00	435	M.	Oct. 10	2	1	

In the Blake dredgings of 1880 the species was taken at the following stations:

Station.	N. lat.	W. long.	Fathoms.	Specimens.
	° ′ ″	° ′ ″		
325	33 35 20	76 0 0	647	1 ♂
332	35 45 30	74 48 0	263	2 ♂
334	38 20 30	73 26 40	395	2 ♂
337	38 20 8	73 23 20	740	Fragments only.
343	39 45 40	70 55 0	732	3 ♀ with eggs.
309	40 11 40	68 22 0	304	1 ♂, 1 ♀ "
312	39 50 45	70 11 0	466	1 ♂

This species grows to be by far the largest brachyuran in our waters. The largest specimen which I have seen is from the Blake collection of 1880, and was taken off Cape Hatteras. This specimen, measurements of the carapax of which are given in the last line of the following table of measurements, is more than six inches across the carapax and two feet across the outstretched legs. Very large individuals differ considerably from the specimens originally described. In all the large specimens the teeth of the antero-lateral margin of the carapax become reduced to angular tubercles, and in some of the larger ones the fourth tooth becomes entirely obsolete. Specimens of the same size vary much, particularly the larger ones, in the prominence of the anterolateral teeth, so that the proportional breadth of the carapax, including the teeth or spines, varies much more than the breadth excluding the teeth or spines, as shown in the table of measurements. This variation is partially due to the wearing away of the teeth, which probably takes place rapidly on account of the softness of the exoskeleton, which is much less calcareous than usual, the branchial regions of the carapax being so soft as to be readily bent or indented with the finger.

Vol. VI, No. 2. Washington, D. C. June 18, 1883.

Measurements of the carapax in millimeters and lengths of carapax.

Station.	Sex.	Length of carapax.	Breadth, including teeth.	Breadth, excluding teeth.
		Mm.	*Mm. Length.*	*Mm. Length.*
1142	♂	11.7	15.5 = 1.32	13.9 = 1.19
947	♂	23.0	30.5 = 1.33	25.3 = 1.10
952	♂	33.0	42.0 = 1.27	36.3 = 1.10
1049	♂	35.3	44.4 = 1.26	39.0 = 1.10
947	♂	37.0	46.5 = 1.26	42.0 = 1.14
1140	♂	43.7	56.1 = 1.28	50.0 = 1.14
1140	♂	46.9	61.3 = 1.31	53.0 = 1.13
1140	♂	95.0	113.0 = 1.20	108.0 = 1.14
994	♂	97.0	114.0 = 1.18	105.0 = 1.08
937	♂	100.0	117.0 = 1.17	109.0 = 1.09
1029	♂	102.0	123.0 = 1.21	116.0 = 1.14
1140	♂	103.0	120.0 = 1.17	113.0 = 1.10
1143	♂	103.0	124.0 = 1.20	115.0 = 1.11
1140	♂	106.0	125.0 = 1.18	117.0 = 1.10
937	♂	106.0	126.0 = 1.19	115.0 = 1.08
1049	♂	114.0	132.0 = 1.16	124.0 = 1.09
937	♂	114.0	133.0 = 1.17	125.0 = 1.09
1140	♂	114.0	129.0 = 1.13	123.0 = 1.08
937	♂	115.0	134.0 = 1.17	125.0 = 1.09
1142	♀	11.2	15.5 = 1.38	12.3 = 1.10
1049	♀	11.7	15.4 = 1.32	14.0 = 1.20
1142	♀	11.7	15.5 = 1.32	13.9 = 1.19
1142	♀	15.2	22.2 = 1.46	17.3 = 1.14
1142	♀	15.6	21.1 = 1.35	17.5 = 1.12
947	♀	37.0	48.4 = 1.31	42.0 = 1.14
1142	♀	66.0	80.0 = 1.21	73.0 = 1.10
946	♀	69.0	85.0 = 1.23	78.5 = 1.14
1140	♀	95.0	110.0 = 1.16	104.0 = 1.09
332	♂	130.0	152.5 = 1.17	144.0 = 1.11

Bathynectes longispina Stimpson.

Bathynectes longispina Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 146, 1870 (young ♂); A. M.-Edwards, Crust. Région Mexicaine, p. 234, pl. 42, fig. 1, 1879 (young ♂); Smith, Proc. National Mus., iii, p. 418, 1881.

Bathynectes brevispina Stimp., loc. cit., p. 147, 1870 (large ♀); A. M.-Edwards, op. cit., p. 235, 1879 (= Stimpson).

Specimens examined.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.											
	°	′	″	°	′	″			1880.			
871	40	02	54	70	23	40	115	fne. S. M.	Sept. 4		2 y.	....
872	40	05	39	70	23	52	86	S. G. Sh. sponges.	Sept. 4		2 y.	....
874	40	00	00	70	57	00	85	sft. M.	Sept. 13	1 y.		....
879	39	49	30	70	54	00	225	S. bu. M.	Sept. 13		1 y.	....

Specimens examined—Continued.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD —Continued.							
	° ′ ″	° ′ ″			1881.			
940	39 54 00	69 51 30	134	hrd. S. sponges.	Aug. 4	1		....
1038	39 58 00	70 06 00	146	S. Sh.	Sept. 21	1		....
					1882.			
1097	39 54 00	69 44 00	158	Fne. S.	Aug. 11	1		....
1152	39 58 00	70 35 00	115	S.	Oct. 4	1		....
	OFF DELAWARE BAY.							
					1881.			
1043	38 39 00	73 11 00	139	S.	Oct. 10		2	0

Stimpson's *B. longispina* was based on very young males, the length of carapax in his measurement of a single specimen being equal to 14.5^{mm}, and the *B. brevispina* on a very large female in which the carapax was 49^{mm} in length. A. Milne-Edwards's specimens were evidently small, although he apparently translates the measurements given by Stimpson and does not indicate the exact size of the specimen figured. In the series of specimens which I have examined the largest are connected with the smallest by a complete series, and though none of the specimens are as large as the type of Stimpson's *brevispina*, the larger ones, both male and female, approach it closely enough in the length of the lateral spines of the carapax, etc., to make it clear that the forms described by Stimpson belong to the same species. The accompanying table of measurements will show this quite as well as any description.

In specimens shortly after being placed in alcohol, and before the colors had changed materially from those in life, the dorsum of the carapax was dull red, the color being almost wholly upon the tubercles and granules, while the ground between was grayish, though the spines and teeth of the margin were brighter red than the general surface from a slight deposit of color between the tubercles and granules. The ventral surface of the carapax, the antennulæ, antennæ, external maxillipeds, sternum, abdomen, and the proximal portions of the ambulatory legs were pale red or tinged with red. The chelipeds were specked and slightly mottled with red; the terminal third of the digits scarlet, somewhat obscured at the tips by blackish. The meral and carpal segments of the first three pairs of ambulatory legs, and the meral, carpal, and propodal segments of the posterior pair were specked and mottled with scarlet; the propodal segments of the first three pairs, except a narrow band at the distal end, and the whole of the dactyli of all four pairs were bright scarlet.

Measurements in millimeters and hundredths of length of carapax.

	Station—							
	871	879	874	1125	1038	940	1043	1043
Sex	Yng.	Yng.	♂y.	♂	♂	♂	♀	♀
Length of carapax, including frontal teeth	8.9	9.8	13.3	21.7	23.2	29.8	26.3	35.5
Length of carapax, excluding frontal teeth	8.6	9.5	12.8	21.0	22.4	28.7	25.7	34.0
Breadth of carapax in front of lateral spines	10.3	11.5	15.8	26.2	28.0	37.0	31.4	42.7
Same in hundredths of length first given	116.	117.	119.	121.	121.	124.	119.	120.
Breadth of carapax, including lateral spines	16.2	17.0	24.2	40.8	43.8	56.0	46.0	65.0
Length of lateral spines	3.3	3.0	5.0	8.7	9.3	10.8	7.3	12.0
Length of right cheliped	14.0	15.0	21.0	35.0	39.0	53.0	44.0	60.0
Length of chela	7.7	8.0	11.3	19.0	21.3	28.5	23.6	32.0
Height of chela	2.7	2.9	3.8	6.7	7.9	10.3	8.3	12.0
Length of dactylus	3.7	3.8	6.0	9.0	10.7	14.3	12.0	16.8
Length of left cheliped	13.5	15.5	18.0	34.0	.....	51.0	42.5	57.0
Length of chela	7.5	7.6	9.3	18.3	.....	27.5	23.0	31.0
Height of chela	2.5	2.8	2.5	6.0	.....	9.1	7.7	10.0
Length of dactylus	3.7	4.0	5.7	9.1	.....	14.7	12.0	17.0
Length of third ambulatory leg	22.0	25.0	35.0	52.0	60.0	72.5	64.0	75.0
Length of fourth ambulatory leg	14.0	15.0	21.0	33.0	38.5	46.5	41.0	55.0
Length of dactylus	4.4	4.6	.....	9.7	11.2	14.5	12.2	16.5
Breadth of dactylus	1.2	1.5	.....	3.7	4.3	5.4	5.0	7.0

OXYSTOMATA.

Acanthocarpus Alexandri Stimpson.

Although this species occurred in considerable abundance in the dredgings off Martha's Vineyard in 1880, being taken at seven out of the fourteen stations in between 50 and 200 fathoms, it was taken but once in 1881, station 944, 128 fathoms, and was not taken at all in 1882.

In the living specimens taken in 1881 the dorsal surface of the carapax and chelipeds was pale reddish orange, deepest in color upon the elevations of the carapax and upon the bases of the carpal spines of the chelipeds; while the carapax beneath, the sternum, abdomen, and the under surfaces of the chelipeds and ambulatory legs were white, very slightly tinged with reddish.

Myropsis quinquespinosa Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 157, 1870; A. M.-Edwards, ibid., viii, p. 21, 1880.

Station 941, N. lat. 40° 1′, W. long. 69° 56′.

A single very large male, which gives the following measurements:

	Millimeters.
Length of carapax, including frontal lobes and posterior spine	37.0
Length of carapax, excluding frontal lobes and posterior spine	34.0
Breadth of carapax, including lateral tubercles	31.4
Breadth of carapax, excluding lateral tubercles	31.0
Length of cheliped	75.0
Length of merus	32.5
Length of chela	34.8
Length of dactylus	21.0
Length of first ambulatory leg	56.0
Length of posterior ambulatory leg	36.0

In life the dorsal surface of the carapax and the chelipeds and ambulatory legs are pale orange red.

Cymopolia gracilis, sp. nov.

This species, of which only one specimen has been obtained, resembles *C. cursor*, A. Milne-Edwards (Bull. Mus. Comp. Zool. Cambridge, viii, p. 29, 1880), in the great length of the second pair of ambulatory legs, but is at once distinguished by the much smoother carapax without tubercles on the posterior margin, by the broad sinuses of the superior margin of the orbit, and by the conspicuously hook-shaped tips of the first pair of abdominal appendages of the male.

Male.—The front is deeply divided by a sharp median sinus, and is slightly and obtusely bilobed either side, with the inner lobes much more prominent than the lateral. The orbit is very broad and open above. The superior margin is armed with two small teeth, separated from each other and from the inner and outer angles of the orbit by rounded sinuses, of which the inner is very broad and nearly semicircular; the middle and outer successively smaller; the outer angle is triangular and a little less prominent than the outer suborbital lobe, which is dentiform and separated from it by a shallow sinus; and the inner suborbital process (which is also the dorsal wall of the efferent branchial passage) is narrow, rounded at the tip, reaches nearly as far forward as the lobes of the front, and is separated from the outer suborbital lobe by a very broad and rounded sinus. The antero-lateral margin is unarmed, except by a small dentiform tubercle on the anterior part of the branchial region in place of the sharp tooth in *C. cursor*. The dorsal surface of the carapax is naked, minutely granulated, and armed with a very few low and obtuse tubercles. There are three faintly indicated tubercles on the middle of the gastric region; two, the largest of all, surmount a transverse ridge on the anterior part of the cardiac region; on either side, and nearly in line with these, are two smaller ones on the branchial region, above and back of the dentiform marginal tubercle already referred to; and in front of these two small ones there is a slight but scarcely tuberculiform elevation.

The eyes are large, the greatest diameter equaling nearly a third the length of the carapax, reniform, and bear upon the upper side of the stalk, near the cornea, two or three minute elevations, which are much less conspicuous than the tubercles similarly situated in *C. cursor*.

The chelipeds are slightly longer than the breadth of the carapax, and the chelæ are slender, naked, and nearly smooth, and the long, compressed, and very slender digits hooked at the tips and serrate along the prehensile edges. The first ambulatory leg is nearly twice as long as the breadth of the carapax, very slender, naked, and nearly smooth, except a very few minute granular tubercles near the base of the merus, and the dactylus is nearly as long as the propodus, subcylindrical, regularly tapered and slightly curved. The second ambulatory leg is apparently more than twice as long as the first; the merus reaches nearly to the tip of the first leg, is tapered distally, and is armed with a few minute teeth near the distal end of the posterior edge

and along the anterior and dorsal surface with small granular tubercles which become obsolete distally, are much less conspicuous than in *C. cursor*, and not definitely arranged in several longitudinal lines as in that species; the carpus is about two-fifths as long as the merus, slender and unarmed; the dactylus and the distal part of the propodus are wanting. The third ambulatory leg is a little longer than the first, fully as slender, and very much like it in lack of ornamentation and in the proportions of the segments. The posterior ambulatory legs are shorter than the merus in the third, and very slender.

The abdomen is unarmed externally. The first pair of appendages reach to the second sternal somite, and the distal part of each appendage is straight to near the tip, which is curved outward and backward in a semicircular, blunt-pointed hook, and armed on the outer edge at the base of the hook with a conspicuous tooth.

Station 878, off Martha's Vineyard, 1880, N. lat. 39° 55′, W. long. 70° 54′ 15″, 142 fath., fine sand and mud; one specimen. The measurements in the first column of the accompanying table are from this specimen, while those in the second column are taken from one of the type specimens of *C. cursor*.

Measurements in millimeters and hundredths of length of carapax.

	C. gracilis.	C. cursor.
Sex	♂	♂
Length of carapax, including frontal teeth	5.0	6.5
Greatest breadth of carapax	7.0	8.7
Same in hundredths of length	140	134
Length of cheliped	7.3	.....
Length of chela	3.1	3.6
Height of chela	0.7	0.8
Length of dactylus	1.8	1.9
Length of first ambulatory leg	13.0	11.5
Length of merus	4.5	3.8
Length of propodus	3.1	3.2
Length of dactylus	3.0	3.0
Length of second ambulatory leg	.....	30.0
Length of merus	11.0	10.5
Length of carpus	4.2	4.7
Length of propodus	.....	9.0
Length of dactylus	.....	5.4
Length of third ambulatory leg	14.5	18.0
Length of merus	5.5	5.5
Length of propodus	3.4	5.5
Length of dactylus	3.1	3.7
Length of fourth ambulatory leg	5.0	5.5

In *C. cursor* the teeth of the superior margin of the orbit are much larger than in *gracilis* and the sinuses smaller and more triangular. The anterior-lateral margin projects in a dentiform tubercle on the hepatic region, and back of this on the anterior part of the branchial region there is an acute and prominent tooth directed somewhat forward, and a smaller but acute tooth, just back of its base.* The first pair of

* There is evident confusion in regard to the armament of the antero-lateral margin in Milne-Edwards's description above referred to, for he says, "Le bord latéral ne porte pas des dents, en avant du sillon post-hépatique les régions branchiales sont pourvues des quelques gros tubercules sur leur bord." I have examined four of the original specimens of *C. cursor* returned to the Museum of Comparative Zoology, and they all have the antero-lateral margin armed, as here described, but agree in all other respects with Milne-Edwards's brief description.

abdominal appendages of the male are fully as long as in *gracilis*, but the tips are slender and styliform instead of hooked.

Ethusa microphthalma Smith, Proc. National Mus., iii, p. 418, 1881.

Station 921, off Martha's Vineyard, N. lat. 40° 7′ 48″, W. long. 70° 43′ 54″, 67 fath. (1 ♂, 1 ♀); station 1047, off Delaware Bay, N. lat. 38° 31′, W. long. 73° 21′, 156 fath. (1 ♂). The original specimen was from station 878, off Martha's Vineyard, N. lat. 39° 55′, W. long. 70° 54′ 15″, 142 fath.

The female from station 921 is fully adult, but does not differ essentially from the immature female from which the species was originally described; in this fully adult specimen the antero-lateral angles of the carapax, however, project farther forward, reaching a little beyond the spines of the front, and the ambulatory legs are apparently proportionally longer and have proportionally slightly longer and narrower dactyli.

The two males differ very remarkably from one another, and are possibly distinct species. The one from station 921 is only slightly larger than the immature female (from station 878) and differs very little from it in the proportions of the carapax, the form of the front, or in the eyes, external oral appendages, or ambulatory legs, except that the first and second pairs are proportionally longer, with slightly longer and narrower dactyli. The chelipeds, however, are very unequal. The left is slender throughout, and like those of the female, while the right, though very little longer than the left, has a very stout and swollen chela. The right merus is much like the left, but considerably stouter; the carpus is much stouter than the left, and considerably swollen; and the chela is more than twice as thick as the left, smooth and naked throughout, the body longer than the digits and much swollen, and the digits tapered to the tip, the prehensile edges somewhat oblique and unarmed. The male from station 1047, though of about the same size as the other, has a narrower carapax, distinctly longer than broad, but with the front absolutely broader; the ambulatory legs are considerably shorter, and with slightly broader dactyli; and the chelipeds are equal, and like the left one of the other male, except that they are very slightly shorter, and with proportionally slightly shorter chelæ.

Measurements in millimeters.

	Station—		
	921	1047	921
Sex	♂	♂	♀
Length of carapax, including median frontal spines	14.8	15.0	22.0
Greatest breadth of carapax	15.0	14.1	22.6
Breadth between antero-lateral spines	7.7	8.0	10.0
Breadth between tips of inner angles of orbital sinuses	3.5	3.7	4.4
Length of right cheliped	23.5	20.0	29.0
Length of chela	10.0	8.4	12.2
Breadth of chela	4.5	2.1	2.7
Length of dactylus	5.0	4.5	7.3
Length of left cheliped	22.0	20.0	29.0
Length of chela	9.2	8.5	12.4
Breadth of chela	2.0	2.0	2.6
Length of dactylus	5.0	4.5	7.4
Length of second ambulatory leg	50.0	45.0	68.0
Length of propodus	12.0	10.5	15.3
Length of dactylus	14.4	12.0	20.5
Length of fourth ambulatory leg	19.5	19.0	25.0
Length of propodus	4.0	4.0	5.0
Length of dactylus	1.6	1.6	2.0

In life, the carapax, the proximal part of the abdomen, the chelipeds, and first and second ambulatory legs, are pale orange, the color deepest on the chelæ and the propodi and dactyli of the ambulatory legs; the rest of the animal is grayish white and more pubescent than the more brightly colored parts.

ANOMURA.

LATREILLIDEA.

Latreillia elegans Roux.

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂ ♀	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD.						
	° ′ ″	° ′ ″			1880.		
872	40 05 39	70 23 52	86	S. G. Sh. sponges.	Sept. 4	3	0
874	40 00 00	70 57 00	85	sft. M.	Sept. 13	fragm.	
					1881.		
940	39 54 00	69 51 30	134	brd. S. sponges.	Aug. 4	8 10	5
1027	40 00 00	69 19 00	93	fne. S.	Sept. 14	1	
	OFF DELAWARE BAY.						
1043	38 39 ..	73 11 ..	130	S.	1881. Oct. 10	1	0

HOMOLIDEA.

Homola barbata White ex Fabricius.

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD.							
	° ′ ″	° ′ ″			1880.			
872	40 05 39	70 23 52	86	S. G. Sh. Sponges..	Sept. 4	2		0
					1881.			
940	39 54 00	69 51 30	134	hrd. S. sponges.....	Aug. 4	3	1	1
949	40 03 00	70 31 00	100	yl. M	Aug. 23	1y.	1	1
	OFF CHESAPEAKE BAY.							
					1880.			
896	37 26 00	74 19 00	56	Sh. S..... ..	Nov. 16	1		....
899	37 22 00	74 29 00	57	S	....do ...		1	0
	OFF DELAWARE BAY.							
					1881.			
1043	38 39 00	73 11 00	130	S	Oct. 10		1	0
1046	38 33 00	73 18 00	104	S	....do ...	1	2	1

This species is also reported from the Straits of Florida and off Barbados, by A. Milne-Edwards (Bull. Mus. Comp. Zool. Cambridge, viii., p. 33, 1880).

Four specimens give the following measurements in millimeters:

	Station— 1046	1046	940	940
Sex	♀	♂	♂	♀
Length of carapax including frontal spines	20.3	22.0	24.5	26.0
Length of carapax excluding frontal spines	19.6	21.2	23.4	25.0
Breadth of carapax including spines	17.0	17.5	19.0	22.0
Greatest breadth anteriorly excluding spines	15.3	15.2	17.8	18.7
Greatest breadth posteriorly excluding spines	15.2	15.2	17.0	18.7
Length of cheliped	33.0	40.0	51.0	43.0
Length of chela	14.0	16.0	21.0	17.6
Height of chela	5.0	6.0	6.5	6.6
Length of dactylus	7.0	7.4	9.0	8.2
Length of third ambulatory leg	45.0	45.0	58.0	57.0
Length of propodus	11.7	11.8	15.5	14.7
Length of dactylus	8.8	8.6	11.2	11.0
Length of fourth ambulatory leg	28.0	30.0	34.0	35.0
Length of propodus	7.0	7.5	8.5	8.0
Length of dactylus	3.0	3.2	3.8	3.5

RANINIDEA.

Lyreidus Bairdii Smith, Proc. National Mus., iii, p. 420, 1881.

No specimens of this species have been taken since 1880.

PORCELLANIDEA.

Porcellana Sigsbeiana A. M.-Edwards, Bull. Mus. Comp. Zool. Cambridge, viii, p. 35, 1880.

Station 940, off Martha's Vineyard, N. lat. 39° 54′, W. long. 69° 51′ 30″, 134 fathoms.

A single male, which, as the following measurements show, is much larger than the specimens described by Milne-Edwards:

	Millimeters.
Length of carapax	13.0
Breadth of carapax	11.6
Length of right cheliped	25.0
Length of carpus	6.6
Length of chela	13.0
Breadth of chela	4.8
Length of dactylus	5.0
Length of left cheliped	26.0
Length of carpus	6.5
Length of chela	14.5
Breadth of chela	5.7
Length of dactylus	4.5

LITHODIDEA.

Lithodes maia Leach.

A fine specimen of this northern species was taken at station 1125, off Martha's Vineyard, N. lat. 40° 3′, W. long. 68° 56′, 291 fath., sand and mud. It gives the following measurements in millimeters:

Sex	♂
Length of carapax, including rostrum and posterior spines	83
Length of carapax, excluding rostrum and posterior spines	55
Breadth of carapax between tips of hepatic spines	47.3
Breadth of carapax between tips of branchial spines	76.4
Greatest breadth of carapax, excluding spines	53.5
Length of rostrum	26.5
Length of right cheliped	86
Length of right chela	33
Breadth of right chela	13.7
Length of dactylus of right chela	18.6
Length of left cheliped	88
Length of left chela	31
Breadth of left chela	8.8
Length of dactylus of left chela	19
Length of first ambulatory leg	150
Length of second ambulatury leg	155
Length of third ambulatory leg	153
Greatest expanse of ambulatory legs	325

Lithodes Agassizii Smith, Bull. Mus. Comp. Zool. Cambridge, x, p. 8, pl. 1, 1882.

Two very small, immature specimens of this interesting species were taken off Martha's Vineyard in 1881, station 1028, N. lat. 39° 57′, W. long. 69° 17′, 410 fath., yellow mud; and station 1029, N. lat. 39° 57′ 6″, W. long. 69° 16′, 458 fath., yellow mud. Another immature specimen and two adult females were taken by Alexander Agassiz on the Blake, in 1880; the immature specimen at station 305, N. lat. 41° 33′

15″, W. long. 65° 51′ 25″, 810 fathoms; the two females off the Carolina coast, stations 326 and 329, 464 and 603 fath.

The species is allied to *L. maia* and *L. antarctica* in having no scale and only a single spine at the base of the antenna, and in the general form and armament of the carapax and appendages, but differs from them both conspicuously in the rostrum, which is rather short and trispinous, with the lateral spines nearly as long as the rostral spine itself. The spines upon the carapax and appendages are more numerous and much more acute than in *L. maia*, and the marginal spines of the carapax are not very much larger than the dorsal. The two adults differ remarkably from each other, and from the immature specimens, in the number and length of the spines upon the carapax and legs, the spines being fewer and very much longer and more slender in the small specimens than in the adults, and more slender and more numerous in the smaller than in the larger of the two adult specimens.

Four of the five specimens seen give the following measurements in millimeters:

	Station—			
	1029.	305.	329.	326.
Sex	Young.	Young.	♀	♀
Length of carapax, including rostrum and posterior spines	17.5	25.+	115	139
Length of carapax, excluding rostrum and posterior spines	9.1	12.6	90	123
Breadth of carapax between tips of hepatic spines	13.5	18.+	87	64
Breadth of carapax between tips of branchial spines	13.0	18.+	87	117
Greatest breadth of carapax, excluding spines	6.6	9.0	77	110
Length of rostrum	7.3	9.+	17	8
Length of spines at base of rostrum	7.4	11.5	16	7
Length of anterior gastric spines	7.0	10.5	12	5
Length of anterior cardiac spines	6.3	8.0	10	5

PAGURIDEA.

Eupagurus pubescens Brandt ex Kröyer.

This species appears to be restricted to a very narrow region south of Cape Cod. It has not been taken in over 65 fathoms off Martha's Vineyard, though common in much deeper water north of Cape Cod. None of the specimens seen are large, and all the carcinœcia are composed of *Epizoanthus Americanus* or entirely overgrown with it.

Specimens examined.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.
	OFF MARTHA'S VINEYARD.									
	°	′	″	°	′	″			1881.	
918	40	20	24	70	41	30	46	gn. M.	July 16	4s.
919	40	16	18	70	41	18	53	gn. M.	July 16	2s.
921	40	07	48	70	43	54	67	gn. M.	July 16	2s.
985	41	00	00	70	49	00	26	S.	Sept. 7	20+
987	40	54	00	70	48	30	28	S.	Sept. 7	11
989	40	49	00	70	47	00	30	S.	Sept. 7	10+
990	40	44	00	70	47	00	34	gn. S. M.	Sept. 7	12

Eupagurus Kröyeri Stimpson.

Nearly all the specimens are small, and in carcinœcia composed of *Epizoanthus Americanus* or overgrown with it.

Specimens examined.

Station No.	Location. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	
											With eggs.
	OFF MARTHA'S VINEYARD.										
	°	′	″	°	′	″			1880.		
869	40	02	18	70	23	06	192	fne. S.	Sept. 4	30+	+
870	40	02	36	70	22	58	155	fne. S. M.	Sept. 4	30+	+
877	39	56	00	70	54	18	126	fne. S. M.	Sept. 13	40+	
878	39	55	00	70	54	15	142	M.	Sept. 13	50+	+
									1881.		
920	40	13	00	70	41	54	63	fn. M.	July 16	7	
923	40	01	24	70	46	00	98	S.	July 16	1	
924	39	57	30	70	46	00	164	S.	July 16	2	
939	39	53	00	69	50	30	264	gn. S. M.	Aug. 4	2	
945	39	58	00	71	13	00	207	gn. M. S.	Aug. 9	10+	
1025	39	49	00	71	25	00	216	gn. M.	Sept. 8	12	
1026	39	50	30	71	23	00	182	gn. M. S.	Sept. 8	5	
1032	39	56	00	69	22	00	208	yl. M.	Sept. 14	50+	+
1036	39	58	00	69	30	00	94	S.	Sept. 14	10+	
1038	39	58	00	70	06	00	146	S. Sh.	Sept. 21	34	+
									1882.		
1096	39	53	00	60	47	00	317	sft. gn. M.	Aug. 11	17	
1111	40	01	33	70	35	00	124	fne. S.	Aug. 22	30y.	
1124	40	01	00	68	54	00	640	fne. S. gn. M.	Aug. 26	3	
1125	40	03	00	68	56	00	294	S. M.	Aug. 26	1	
	BLAKE DREDGINGS; A. AGASSIZ.										
									1880.		
308	41	34	30	65	54	30	306	S. M. G.	.....	6	
306	41	32	50	65	55	00	524	fne. dk. gy. M.	.....	4	
311	39	59	30	70	12	00	143	S.	.....	2	

Eupagurus politus Smith. (Pl. 4, fig. 4.)

Eupagurus, sp., Smith, Proc. National Mus., iii, p. 428, 1881.

Eupagurus politus, Smith, Bull. Mus. Comp. Zool. Cambridge, x, p. 12, pl. 2, fig. 5, 1882.

The carapax is not suddenly narrowed at the bases of the antennæ, where the breadth is equal to the length in front of the cervical suture, and not rostrated, the median lobe of the front being broadly rounded and not projecting as far forward as the external angles of the orbital sinuses, which are acute and each usually armed with a short spine.

The eyestalks, including the eyes, are nearly four-fifths as long as the breadth of the carapax in front, stout, and expanded at the very large black eyes, which are terminal, not oblique, compressed vertically, and broader than half the length of the stalks. The ophthalmic scales are small, narrow, and spiniform at the tips.

The peduncle of the antennula is about as long as the breadth of the carapax in front, and the ultimate segment about a third longer than the penultimate. The upper flagellum is much longer than the ultimate segment of the peduncle, while the lower is only about half as long as

the upper, slender, and composed of ten to twelve segments. The peduncle of the antenna reaches slightly beyond the eye. The acicle is slender, slightly curved, and reaches to the tip of the peduncle, and inside its base there is a minute tooth, while outside there is a straight spine toothed or spined along its inner edge, acute at the tip and half as long as the acicle itself. The flagellum is nearly naked, and about three times as long as the carapax.

The exposed parts of the oral appendages are very nearly as in *E. bernhardus*.

The chelipeds are longer, much narrower, and more nearly equal in size than in *E. bernhardus*, and, as in that species, are almost entirely naked, but beset with numerous tubercles and low spines. The right cheliped is about as long as the body from the front of the carapax to the tip of the abdomen. The merus and carpus are subequal in length, while the chela is about once and a half as long as the carpus. The carpus and chela are rounded above and armed with numerous tubercles, which are smaller and more crowded on the chela than on the carpus, but the surface between the tubercles is smooth and polished. The dorsal surface of the carpus is limited along the inner edge by a sharp angle armed with a double line of tubercles, while the outer edge is rounded. The chela is very little wider than the carpus, and is narrowed from near the base to the tips of the digits, and both edges are rounded. The digits are rather slender, about half as long as the entire chela, slightly gaping, with acute and strongly incurved chitinous tips, and the prehensile edges armed with a very few obtuse tuberculiform teeth. The left chela is much more slender than the right, but reaches to or a little by the base of its dactylus. The carpus is slender, higher than broad, only slightly expanded distally, and with the narrow dorsal surface flattened, naked, nearly smooth, and margined either side with a single line of spiniform tubercles, while the rest of the surface is beset with low, squamiform, setiferous tubercles. The chela is about a third longer than the carpus, slender, about two and a half times as long as broad, and the dactylus about two-thirds the entire length. The dorsal and outer surface is tuberculose, and a low obtuse ridge extends from near the middle of the base along the propodal digit, which tapers from the base to the tip, while the dactylus is nearly or quite smooth except for a few fascicles of setæ, more slender than the propodal digit, and tapered only near the tip. The chitinous tips of the digits are slender, acute, and strongly incurved, and the prehensile edges are sharp, and armed with a closely set series of slender spines or setæ.

The ambulatory legs reach considerably beyond the right cheliped, and the second pair reach to the tips of the first pair. In both pairs the meri and propodi are approximately equal in length and longer than the carpi, while the dactyli are about once and a half as long as the propodi, slender, strongly curved, and distally strongly twisted. The two

posterior pairs of thoracic legs and the abdominal appendages are very nearly as in *E. bernhardus*.

In life the general color of the exposed parts is pale orange, the tips of the chelæ and of the ambulatory legs white, the eyes black.

The eggs are very large, and few in number as compared with the ordinary species of the genus, being 1.0mm to 1.1mm in diameter in alcoholic specimens, while in *E. bernhardus* they are only 0.45mm to 0.50mm in diameter.

Measurements in millimeters.

	Station—				
	1028.	878.	947.	990.	878.
Sex	♂	♀	♀	♂	♂
Length of carapax along median line	12.5	13.0	14.2	16.0	21.6
Breadth of carapax in front	7.0	7.1	7.9	8.7	11.6
Length of eyestalks	5.0	5.2	5.3	6.5	7.7
Greatest diameter of eye	2.9	3.0	3.0	3.2	4.0
Length of right cheliped	34.0	35.0	41.0	41.0	63.0
Length of carpus	8.3	8.8	10.0	11.0	16.5
Length of chela	13.5	13.7	16.3	16.8	25.0
Breadth of chela	7.0	6.9	8.0	8.0	11.3
Length of dactylus	7.2	7.0	8.8	8.9	13.0
Length of left cheliped	29.0	30.0	35.0	36.0	54.0
Length of carpus	7.8	7.7	8.9	9.0	13.3
Length of chela	11.0	11.0	13.6	13.5	20.1
Breadth of chela	5.1	5.0	5.6	5.7	7.5
Length of dactylus	7.0	7.1	8.7	9.0	13.0
Length of first ambulatory leg	44.0	45.0	50.0	52.0	77.0
Length of propodus	8.9	9.0	10.4	10.3	16.0
Length of dactylus	13.0	14.5	16.1	16.8	24.0
Length of second ambulatory leg	46.0	47.0	52.0	55.0	81.0
Length of propodus	10.0	9.9	11.0	11.2	17.5
Length of dactylus	14.3	15.1	17.2	18.1	26.0

The females apparently never attain as large size as the males, but they do not seem to differ from them in the relative proportions of any of the cephalothoracic appendages.

The accompanying list of specimens examined shows that this is one of the most uniformly distributed and abundant species in from 50 to 400 fathoms from Cape Cod to the Carolina coast. I have already examined specimens from more than three-quarters of the whole number of dredgings made by the Fish Commission during the past three years within this region and between these depths.

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD.						
	° ′ ″	° ′ ″			1880.		
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4	5	
869	40 02 18	70 02 06	192	fne. S. M.	Sept. 4	50+	+

Specimens examined—Continued.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	
											With eggs.
	OFF MARTHA'S VINEYARD —Continued.										
	°	′	″	°	′	″			1880.		
870	40	02	36	70	22	58	155	M. fne. S.	Sept. 4	75+	+
871	40	02	54	70	23	40	115	M. fne. S.	Sept. 4	20+	
872	40	05	39	70	23	52	86	S. G. Sh. sponges.	Sept. 4	30+	+
873	40	02	00	70	57	00	100	sft. M.	Sept. 13	10	
874	40	00	00	70	57	00	85	sft. M.	Sept. 13	15+	
876	39	57	00	70	56	00	120	sft. M.	Sept. 13	20+	
877	39	56	00	70	54	18	126	sft. M.	Sept. 13	100+	+
878	39	55	00	70	54	15	142	M.	Sept. 13	50+	+
879	39	49	30	70	54	00	225	S. bu. M.	Sept. 13	15	
880	39	48	30	70	54	00	252	M.	Sept. 13	10	
893	39	52	20	70	58	00	372	sft. bn. M. and sml. St.	Oct. 2	4	
894	39	53	00	70	58	30	365	sft. bn. M. and sml. St.	Oct. 2	10	
895	39	56	30	70	59	45	238	sft. bn. M.	Oct. 2	20+	
									1881.		
918	40	20	24	70	41	30	46	gn. M.	July 16	3 y.	
919	40	16	18	70	41	18	53	gn. M.	July 16	2 s.	
921	40	07	48	70	43	54	67	gn. M,	July 16	12 s.	
922	40	03	48	70	45	54	71	gn. M. and S.	July 16	7 l.	0
923	40	01	24	70	46	00	98	S.	July 16	12	1
924	39	57	30	70	46	00	164	S.	July 16	8	
925	39	55	00	70	47	00	229	S. and M.	July 16	3	
939	39	53	00	69	50	30	264	gn. M. and S.	Aug. 4	20 l.	2
940	39	54	00	69	51	30	134	brd. S. and sponges.	Aug. 4	28 l.	3
941	40	01	00	69	56	00	79	brd. S. and M.	Aug. 4	18 l.	4
943	40	00	00	71	14	30	157	M. S. and Sh.	Aug. 9	1	
944	40	01	00	71	14	30	128	M. S. and Sh.	Aug. 9	13	3
945	39	58	00	71	13	00	207	gn. M. and S.	Aug. 9	16	1
946	39	55	30	71	14	00	247	gn. M. and S.	Aug. 9	10	3
947	39	53	30	71	13	30	319	S. and M.	Aug. 9	48 l.	0
949	40	03	00	70	31	00	100	yl. M.	Aug. 23	34	5
950	40	07	00	70	32	00	71	S. Sh. and M.	Aug. 23	12	1
951	39	57	00	70	31	30	225	M.	Aug. 23	6	
990	40	44	00	70	47	00	34	gn. M. and S.	Sept. 7	2	
994	39	40	00	71	30	00	368	M.	Sept. 8	6	
997	39	42	00	71	32	00	335	yl. M.	Sept. 8	35	
*998	39	43	00	71	32	00	302	gn. M.	Sept. 8	110	
999	39	45	13	71	30	00	266	gn. M.	Sept. 8	4	
1025	39	49	00	71	25	00	216	gn. M.	Sept. 8	10	3
1026	39	50	30	71	23	00	182	gn. M. and S.	Sept. 8	25	
1027	40	00	00	69	19	00	93	fne. S.	Sept. 14	4 s.	
1028	39	57	00	69	17	00	410	yl. M.	Sept. 14	3	
1029	39	57	06	69	16	00	458	yl. M. S.	Sept. 14	1	0
1032	39	56	00	69	22	00	208	yl. M.	Sept. 14	18	
1035	39	57	00	69	28	00	120	S.	Sept. 14	5	
1036	39	58	00	69	30	00	94	S.	Sept. 14	6	
1039	39	59	00	70	06	00	130	S. and Sh.	Sept. 21	17 l.	10
									1882.		
1091	40	03	00	69	44	00	65	gy. S. brk. Sh.	Aug. 11	3	
1092	39	58	00	69	42	00	202	gy. S.	Aug. 11	24	+
1093	39	56	00	69	45	00	349	bu. M. S.	Aug. 11	4	
1096	39	53	00	69	47	00	317	sft. gn. M.	Aug. 11	14	
1097	39	54	00	69	44	00	158	fne. S.	Aug. 11	39	+
1098	39	53	00	69	43	00	156	fne. S.	Aug. 11	27	+
1108	40	02	00	70	37	30	101	gy. M. fne. S.	Aug. 22	19	+
1109	40	03	00	70	38	00	89	gy. S.	Aug. 22	58	8
1110	40	02	00	70	35	00	100	gn. M. fne. S.	Aug. 22	50+	10
1111	40	01	33	70	35	00	124	fne. S.	Aug. 22	40+	+
1112	39	56	00	70	35	00	245	gn. M. S.	Aug. 22	5	
1116	39	59	00	70	44	00	144	gn. M. S.	Aug. 22	15	+
1117	40	02	00	70	45	00	89	fne. S.	Aug. 22	5	
1118	40	03	00	70	45	00	70	fne. S.	Aug. 22	12	2
1119	40	08	00	68	45	00	97	S. brk. Sh.	Aug. 22	15	
1121	40	04	00	68	49	00	234	fne. S. St.	Aug. 26	16	+
1124	40	01	00	68	54	00	640	fne. S. gn. M.	Aug. 26	5	
1137	39	40	00	71	52	00	173	fne. S. P.	Sept. 8	1	
1138	39	39	00	71	54	00	168	fne. S. P.	Sept. 8	9	
1142	39	32	00	72	00	00	322	M. with S. and P.	Sept. 8	1♀	0

Specimens examined—Continued.

Station No.	Locality. N. lat.	W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	With eggs.
	OFF MARTHA'S VINEYARD —Continued.						
	° ′ ″	° ′ ″			1881.		
1152	39 58 00	70 35 00	115	S.	Oct. 4	8	
1154	39 55 31	70 39 00	193	S. and M.	Oct. 4	200+	
	OFF DELAWARE BAY.				1881.		
1043	38 39 00	73 11 00	130	S.	Oct. 10	2	
1045	38 35 00	73 13 00	312	gy. M.	Oct. 10	8	
1046	38 33 00	73 18 00	104	S.	Oct. 10	3	1
1047	38 31 00	73 21 00	156	S.	Oct. 10	9	
1049	38 28 00	73 22 00	435	M.	Oct. 10	1	
	OFF CHESAPEAKE BAY.						
896	37 26 00	74 19 00	56	S. Sh.	Nov. 16	3	
897	37 25 00	74 18 00	157	S. M.	Nov. 16	33	+
898	37 24 00	74 17 00	300	M.	Nov. 16	48	+
	BLAKE DREDGINGS; A. AGASSIZ.				1880.		
309	40 11 40	68 22 00	304	fne. S. M.		3	
310	39 59 16	70 18 30	260	fne. dk. gn. M.		2	
327	34 00 30	76 10 30	178	Glob. ooze.		1	
336	38 21 50	73 32 00	197	Bl. M.		5	

Catapagurus, A. M.-Edwards.

Catapagurus A. M.-Edwards, Bull. Mus. Comp. Zool. Cambridge, viii, p. 46, 1880.—Smith, ibid., x, p. 14, 1882.

Hemipagurus Smith, Ann. Mag. Nat. Hist. London, V, vii, p. 143, 1881; Proc. National Mus., iii, p. 422, 1881.

Catapagurus Sharreri, A. M.-Edwards. (Pl. 4, Fig. 5.)

Catapagurus Sharreri A. M.-Edwards, Bull. Mus. Comp. Zool. Cambridge, viii, p. 46, 1880.

Hemipagurus socialis Smith, Proc. National Mus., iii, p. 423, 1881.

Catapagurus socialis Smith, Bull. Mus. Comp. Zool. Cambridge, x, p. 16, 1882.

I have examined one of the type specimens of Milne-Edwards's species returned to the Museum of Comparative Zoology, and find it identical with my species as indicated above. This specimen is from 200 fathoms, off Barbadoes, station 296, and gives the following measurements in millimeters:

Sex	♂
Length from front of carapax to tip of abdomen	23.0
Length of eye-stalks	2.3
Greatest diameter of eye	1.7
Length of right cheliped	19.0
Length of chela	8.0
Breadth of chela	2.6
Length of dactylus	4.0
Length of left cheliped	31.0
Length of chela	7.5
Breadth of chela	1.3
Length of dactylus	2.8
Length of first ambulatory leg, right side	22.0

Specimens examined.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	
											With eggs.
	OFF MARTHA'S VINEYARD.										
	°	′	″	°	′	″			1880.		
865	40	05	00	70	23	00	65	fne. S. M.	Sept. 4	6	
870	40	02	36	70	22	58	155	fne. S. M.	Sept. 4	50+	+
871	40	02	54	70	23	40	115	fne. S. M.	Sept. 4	500+	+
872	40	05	39	70	23	52	86	S. G. Sh. Sponges.	Sept. 4	20+	+
873	40	02	00	70	57	00	100	sfr. . M.	Sept. 13	1	
874	40	00	00	70	57	00	85	sfr. . M.	Sept. 13	100+	+
876	39	57	00	70	56	00	120	sfr. . M.	Sept. 13	50+	+
877	39	56	00	70	54	18	126	sfr. . M.	Sept. 13	200+	+
878	39	55	00	70	54	15	142	M.	Sept. 13	50+	+
880	39	48	30	70	54	00	252	M.	Sept. 13	2	
									1881.		
919	40	16	18	70	41	18	53	gn. M.	July 16	2	
920	40	13	00	70	41	54	63	gn. M.	July 16	2	
921	40	07	48	70	43	54	67	gn. M.	July 16	12	+
922	40	03	48	70	45	54	71	gn. M. S.	July 16	48	+
923	40	01	24	70	46	00	98	S.	July 16	5	+
925	39	55	00	70	47	00	229	S. and M.	July 16	9	+
939	39	53	00	69	50	30	264	gn. S. M.	Aug. 4	1	
940	39	54	00	69	51	30	134	hrd. S. sponges.	Aug. 4	1000+	+
941	40	01	00	69	56	00	79	hrd. S. M.	Aug. 4	200+	+
949	40	03	00	70	31	00	100	yl. M.	Aug. 23	15	
1027	40	00	00	69	19	00	93	fne. S.	Sept. 14	37	
1035	39	57	00	69	28	00	120	S.	Sept. 14	200+	
1036	39	58	00	69	30	00	94	S.	Sept. 14	50+	
1038	39	58	00	70	06	00	146	S. and Sh.	Sept. 21	60+	+
									1882.		
1092	39	58	00	69	42	00	202	gy. S.	Aug. 11	2	
1097	39	54	00	69	44	00	158	fne. S.	Aug. 11	3	
1111	40	01	33	70	35	00	124	fne. S.	Aug. 22	13	
1119	40	08	00	68	45	00	97	S. brk. Sh.	Aug. 26	7	
1151	39	58	30	70	37	00	125	S.	Oct. 4	10	
1152	39	58	00	70	35	00	115	S.	Oct. 4	12	
	OFF DELAWARE BAY.										
									1881.		
1043	38	39	00	73	11	00	130	S.	Oct. 10	3	
1047	38	31	00	73	21	00	156	S.	Oct. 10	10	
	OFF CHESAPEAKE BAY.										
									1880.		
899	37	22	00	74	29	00	57	S.	Nov. 16	1	
	BLAKE DREDGINGS; A. AGASSIZ.										
									1880.		
311	39	59	30	70	12	00	143	gy. S.		6	
313	32	31	50	78	45	00	75	fne. gy. S.		2	
314	32	24	00	78	44	00	142	fne. gy. S.		1000+	+
315	32	18	20	78	43	00	225	fne. gy. S.		4	
316	32	07	00	78	37	30	229	P.		1	
327	34	00	30	76	10	30	178	Glob. ooze.		8	
344	40	01	00	70	58	00	129	fne. S. M.		40+	+
345	40	10	15	71	04	30	71	gn. M. brk. Sh. S.		5	

Vol. VII, No. 3. Washington, D. C. June 18, 1883.

Catapagurus gracilis Smith.

Hemipagurus gracilis Smith, Proc. National Mus., iii, p. 426, 1881.

Catapagurus gracilis Smith, Bull. Mus. Comp. Zool. Cambridge, x, p. 19, 1882.

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	No. of specimens. With eggs.
	OFF MARTHA'S VINEYARD.						
	° ′ ″	° ′ ″			1880.		
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4	1	
870	40 02 36	70 22 58	155	fne. S. M.	Sept. 4	4	
871	40 02 54	70 23 40	115	fne. S. M.	Sept. 4	30+	+
874	40 00 00	70 57 00	85	sfr. M.	Sept. 13	30+	+
877	39 56 00	70 54 18	126	sfr. M.	Sept. 13	3	
878	39 55 00	70 54 15	142	M.	Sept. 13	10	
					1881.		
919	40 16 18	70 41 18	53	gn. M.	July 16	1	
920	40 13 00	70 41 54	63	gn. M.	July 16	4	
921	40 07 48	70 43 54	67	gn. M.	July 16	24	+
940	39 54 00	69 51 30	134	hrd. S. and sponges.	Aug. 4	2	
949	40 03 00	70 31 00	100	yl. M.	Aug. 23	12	
1038	39 58 00	70 06 00	146	S. Sh.	Sept. 21	1	
	OFF CHESAPEAKE BAY.						
					1880.		
896	37 26 00	74 19 00	56	S. Sh.	Nov. 16	1	
899	37 22 00	74 29 00	57	S.	Nov. 16	1	
	BLAKE DREDGINGS; A. AGASSIZ.						
344	40 01 00	70 58 00	129	fne. S. M.		1	
345	40 10 15	71 04 30	71	gn. M. brk. Sh. S.		3	

Parapagurus pilosimanus Smith, Trans. Conn. Acad. New Haven, v, p. 51, 1879; Proc. National Mus. Washington, iii, p. 428, 1881; Bull. Mus. Comp. Zool. Cambridge, x, p. 20, pl. 2, fig. 4–4^d, 1882.

(Pl. 5, Figs. 3–5; Pl. 6, Figs. 1–4*a*.)

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth of fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.
	GLOUCESTER FISHERIES.							
	Off Nova Scotia, 42° 41′ N., 63° 6′ W.		250		1878.	1	1	0
	OFF MARTHA'S VINEYARD.							
	° ′ ″	° ′ ″			1880.			
880	39 48 30	70 54 00	252	M.	Sept. 13	2	1 y. 1	1
893	39 52 20	70 58 00	372	sft. bn. M. and sml. St.	Oct. 2	2	1 y.	

Specimens examined—Continued.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	Where collected.	No. of specimens.		With eggs.
	OFF MARTHA'S VINEYARD—Continued.											
	°	′	″	°	′	″			1880.			
894	39	53	00	70	58	30	365	sft. bn. M. and sml. St.	Oct. 2	1	3	0
									1881.			
938	39	51	00	69	49	15	317	gn. S. M.	Aug. 4	3	1	0
947	39	53	30	71	13	30	319	S. M.	Aug. 9	148	245	191
994	39	40	00	71	30	00	368	M.	Sept. 8	1		
997	39	42	00	71	32	00	365	yl. M.	Sept. 8	1		
998	39	43	00	71	32	00	302	gn. M.	Sept. 8		1	0
1029	39	57	06	69	16	00	458	yl. M. S.	Sept. 14		1 y.	
									1882.			
1124	40	01	00	68	54	00	640	fne. S. gn. M.	Aug. 26	10		
1140	39	34	00	71	56	00	374	fne. S. sft. M. P.	Sept. 8	1		
	OFF CHESAPEAKE BAY.											
									1880.			
898	37	24	00	74	17	00	300	M.	Nov. 16		4	
	BLAKE DREDGINGS; A. AGASSIZ.											
									1880.			
306	41	32	50	65	55	00	524	fne. dk. gy. M.			1 y.	
309	40	11	40	68	22	00	304	dk. gy. S. M.			4	
322	33	10	00	76	32	15	362	Glob. S.			2	

The large number of specimens which have been obtained since this species was first described enables me to supplement to a considerable extent the original description, drawn from a single specimen from which the oral appendages were not removed.

The labrum, metastome, mandibles, and the first maxilla are essentially as in *Eupagurus bernhardus*. The lobes of the protognath of the second maxilla are very nearly as in *Eupagurus bernhardus;* the endognath is a little longer than in that species, reaching nearly as far forward as the distal lobe of the protopod; the scaphognath is very different from that of *Eupagurus bernhardus*, the anterior part being very much larger and narrowed to a triangular tip reaching much beyond the middle of the endognath, while the posterior part is elongated, somewhat ovate in outline, about two-thirds as long as the anterior, and very little more than half as broad as long. The lobes of the protopod and the endopod of the first maxilliped are nearly as in *Eupagurus bernhardus* except that the endopod is united with the exopod for a considerable distance from the base; the endopod itself, however, is very different, being a simple, unsegmented lamella, shorter than the endopod, broad and truncated at the extremity and setigerous along the outer and terminal edges. Just back of the base of the exopod the edge of the protopod is setigerous and projects laterally in a slight prominence apparently representing the epipod. The second and third (external) maxillipeds are essentially as in *Eupagurus bernhardus*.

The branchiæ are the same in number and arranged in the same way as in *Eupagurus bernhardus*, as indicated in the following formula:

	Somite—								
	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods	0	0	0	0	0	0	0	0	0
Podobranchiæ	0	0	0	0	0	0	0	0	0
Arthrobranchiæ	0	0	2	2	2	2	2	0	10
Pleurobranchiæ	0	0	0	0	0	0	1	0	1
									11

But, as stated in the original description, they are trichobranchiæ, not phyllobranchiæ as in ordinary Paguroids. In the original specimen, and in all those not preserved with special care, the branchiæ are flaccid and the papillæ of which they are composed are collapsed, apparently cylindrical throughout, and without definite arrangement along the stem of the branchia; but in specimens carefully preserved in strong alcohol the papillæ in the thicker parts of the branchiæ are seen to be slightly flattened toward their bases in the direction of the axes of the branchiæ, and to have a definite arrangement in four longitudinal series, showing, in a transverse section of the branchia, two papillæ either side of the central axis in place of the thin lamella attached by one edge to either side of the lamelliform central stem of the phyllobranchia of ordinary Paguroids. Toward the tips of the branchiæ the papillæ become truly cylindrical as in *Homarus* or *Astacus*, and in some of the smaller branchiæ, as in the arthrobranchiæ of the external maxillipeds, the papillæ upon one side of the branchia are very small or rudimentary; but in all cases the ultimate divisions of the branchiæ are apparently strictly trichobranchial in structure, the blood vessels on either side of each papilla giving off capillary branches in opposite directions to the surface of the papilla. The structure is essentially as in *Astacus*, and the difference is not apparent without close examination. From ordinary Paguroids, like *Eupagurus bernhardus*, however, it is widely different, but this difference is partially bridged by the structure of the branchiæ in *Sympagurus pictus* about to be described, although there the branchiæ are essentially phyllobranchiæ.

In the chelipeds the merus, carpus, and chela are very densely clothed, except at the tips of the digits, a space on the under side and at the base of the chela, and the inner side of the merus, with a very fine and soft pubescence usually loaded with fine mud when the specimens are first taken.

Individuals differ considerably in the form and proportions of the chelipeds. In one large male, measurements of which are given in the last column in the accompanying table of measurements, the right cheliped is only very slightly longer and scarcely stouter than the left, and the chela differs from that of the left only slightly in form. The defective development of the right cheliped in this specimen probably resulted

from the loss and reproduction of the limb, but in other specimens there are considerable differences in the form of the right chela which are apparently not the result of loss and reproduction, though it may be possible that all the cases of considerable variation in the form of the chelæ are due to this cause. The right chela is, in both sexes, usually very broad, half or more than half as broad as long, but in some specimens, as shown in the second column of the table of measurements, it is much narrower, only about three-eighths as broad as long.

The appendages of the second abdominal somite of the male are frequently very distinctly unequal in size, the right being longer than the left, but in many specimens they are exactly alike. The appendages of the first somite are apparently perfectly symmetrical in all the specimens examined.

The females appear to be a little smaller than the males, but apparently do not differ in the form or proportions of any of the cephalothoracic appendages. There are four well-developed biramus appendages on the left side of the abdomen as in the species of *Eupagurus*, and the third, fourth, and fifth somites are each furnished with a diffuse dorsal tuft of long hairs. The eggs are nearly spherical and larger than in *Eupagurus bernhardus*, being nearly a millimeter in diameter in alcoholic specimens.

In life the general color of the naked and exposed parts is pale, dull orange, darker at the tips of the ambulatory legs, without any of the conspicuous red markings characteristic of *Sympagurus pictus*.

All of the carcinœcia seen are formed by colonies of *Epizoanthus paguriphilus* Verrill, which at first invest spiral shells which are finally absorbed by the basal cœnenchyma of the growing polyps. In some of the very small specimens the investing walls of the polyp are so thin that the form and markings of the inclosed shell are distinctly visible through them, but in all the larger specimens the shell is completely absorbed.

Measurements.

	Station—				
	947.	947.	894.	947.	647.
Sex	♂	♂	♀	♀	♂
Length front to tip of telson	62.0	65.0	38.0	60.0	60.0
Length of carapax along dorsal line	23.3	23.0	15.0	18.8	22.5
Breadth of carapax at bases of antennæ	13.0	13.3	9.0	11.3	13.0
Length of eyestalks	6.4	6.7	4.7	6.0	6.3
Greatest diameter of eye	1.2	1.3	1.0	1.1	1.2
Length of right cheliped	68.0	66.0	41.0	48.0	50.0
Length of carpus	20.0	18.0	11.0	12.5	13.0
Length of chela	29.0	27.5	17.9	20.0	19.0
Breadth of chela	15.0	10.5	10.8	12.0	7.2
Length of dactylus	15.5	14.3	10.3	11.0	10.5
Length of left cheliped	51.0	52.0	30.0	35.0	49.0
Length of carpus	12.5	13.0	7.0	9.3	13.0
Length of chela	16.0	17.2	9.9	11.3	15.7
Breadth of chela	7.0	7.6	4.5	5.5	7.0
Length of dactylus	9.3	9.8	6.1	6.8	9.1
Length of first ambulatory leg, right side	98.0	100.0	58.0	63.0	96.0
Length of propodus	23.0	23.0	13.0	14.2	23.2
Length of dactylus	31.0	33.0	17.5	18.3	31.5

Sympagurus, gen. nov.

The single species of the genus here proposed is readily distinguished from *Parapagurus* by the shortness of the peduncles of the antennulæ and the well developed eyes, in which respects it agrees essentially with *Eupagurus*. It differs essentially from *Parapagurus* in having phyllobranchiæ, which are the same in number and arranged in the same way as in *Parapagurus* and *Eupagurus*, but differ much from the branchiæ of *Eupagurus* and the ordinary Paguroids in having the lamellæ long, narrow, attached by one end to the narrow stem of the branchia and arranged in two loosely packed longitudinal series either side of the axis of the branchia. At the extremity of the branchiæ, however, the lamellæ become very narrow, and at the extreme tips apparently papilliform as at the tips of the branchiæ of *Parapagurus*. The oral, thoracic, and abdominal appendages are essentially as in *Parapagurus*, the sexual appendages of the first and second somites of the abdomen of the male are, however, much smaller and less perfectly developed.

Sympagurus pictus, sp. nov. (Pl. 5, Figs. 2, 2*a*; Pl. 6, Figs. 5–8.)

The carapax is divided by a deep, cervical suture, which is arcuate as in *Parapagurus pilosimanus*, but is narrowed anteriorly much more than in that species, the breadth at the bases of the antennæ scarcely equaling the length in front of the cervical suture. The anterior margin projects in a prominent triangular rostrum with a distinct longitudinal carina, and either side is considerably oblique, with only a slight prominence between the base of the eyestalk and the peduncle of the antenna.

The eyestalks, including the eyes, are about two-fifths as long as the carapax along the dorsal line, stout, and expanded at the very large black eyes, which are terminal, not oblique, compressed vertically, and from two-fifths to nearly a half as broad as the length of the stalks. The ophthalmic scales are small, spiniform, and acute as in *Parapagurus pilosimanus*.

The peduncle of the antennula is a little longer than the breadth of the carapax in front, the second segment reaches to the tip of the eye, and the ultimate segment is about half the entire length. The upper flagellum is about as long as the ultimate segment of the peduncle, while the lower is only about half as long, slender, and composed of seven or eight segments. The peduncle of the antenna reaches slightly by the eye and the ultimate segment is nearly twice as long as the penultimate. The acicle is slender, sparsely setigerous, and reaches to the tip of the peduncle, and outside its base there is a dentiform process, but no tooth or spine inside. The flagellum is nearly naked and about four times as long as the carapax.

The oral appendages are all nearly as in *Parapagurus pilosimanus*, except that, in the second maxilla, the endognath is broader at the base, the anterior lobe of the scaphognath is shorter and broader, though still triangular at the tip, and the posterior lobe is shorter,

broader, and approximately triangular; while, in the first maxilliped, the endopod and exopod are a little shorter and the latter rounded at the extremity.

The chelipeds are densely pubescent, as in *Parapagurus pilosimanus*, and resemble those of that species closely until the pubescence is removed, when they are seen to be different in form and armament. The right cheliped in fully grown specimens is about three times as long as the carapax along the dorsal line. The carpus is slightly longer than the merus, obscurly angulated along the inner dorsal edge, and the dorsal surface covered with small tubercles which are acute and almost spiniform along the inner edge. The chela is at least once and two-thirds as long as the carpus, much less than half as broad as long, compressed vertically, convex, and only slightly tuberculous above and below, but armed along the edges with sharp tubercles, which are most conspicuous along the inner edge and particularly on the dactylus, where they become spiniform. The digits are longitudinal, not turned to the right as in *Parapagurus pilosimanus*, about as long as the body of the chela, regularly tapered toward the strongly hooked tips, and the prehensile edges armed with irregular, low, and obtuse tubercles. The left cheliped is about two-thirds as long as the right, very slender, and clothed with pubescence like the right. The carpus is scarcely longer or stouter than the merus, and angulated and armed with a few sharp tubercles along the inner dorsal edge. The chela is about once and two-thirds as long as the carpus, scarcely stouter, rounded and unarmed, with the digits much longer than the body, slender, slightly curved downward at the tips, not gaping, and the prehensile edges sharp and armed with a closely set series of minute spines.

The ambulatory legs reach to or a little by the right cheliped, are smooth and nearly naked, except near the tips, and unarmed, except a small dentiform tooth at the distal end of the dorsal edge of the carpus. The dactyli are longer than the propodi, slender, laterally compressed, strongly curved toward the acute tips, and setigerous along the dorsal edge and on the inner side. The fourth and fifth pairs of legs and the sterna of all the thoracic somites are as in *Parapagurus pilosimanus*.

The appendages of the first and second abdominal somites of the male arise in the same way as in *Parapagurus pilosimanus*. The appendages of the first somite are like those of *Parapagurus pilosimanus* in form, but are very much smaller, being scarcely 3½ millimeters in length in the largest specimen examined, and project only a little way below the coxæ of the posterior thoracic legs. The appendages of the second somite are very unequally developed; the right is nearly as in *Parapagurus pilosimanus* in form, but is much smaller, being only 7 millimeters long in the largest male examined, and the terminal lamelliform segment is a little broader in proportion, being about a fourth longer than the basal portion and a fourth as broad as long, and is apparently less deeply grooved; while the left is very much smaller, only 4.8 millime-

ters long in the specimen just referred to, and the terminal lamella smaller even than the basal portion, very narrow, and scarcely at all grooved.

The appendages of the left side of the third, fourth, and fifth somites of the abdomen of the male, the four ovigerous appendages of the left side of the abdomen of the female, and the uropods in both sexes, are as in *Parapagurus pilosimanus* and *Eupagurus bernhardus*. The telson is about as broad as long, but bilaterally unsymmetrical, the left side being longer than the right, and the posterior margin oblique, with a slight anal emargination a little to the right of the center.

The carcinœcium of the specimen from station 895 is formed by *Epizoanthus Americanus* Verrill, but the carcinœcia of all the other specimens examined are formed by the base of a single polyp of *Urticina consors* Verrill (Amer. Jour. Sci., III, xxiii, p. 225, 1882).

Measurements.

	Station—		
	939.	924.	1114.
Sex	♂	♂	♀
Length from front to tip of telson	27.0	50.0	54.0
Length of carapax along dorsal line	10.0	18.0	20.0
Breadth of carapax at bases of antennæ	5.5	9.8	11.0
Length of eye-stalks	4.0	7.0	8.0
Greatest diameter of eye	1.9	2.8	3.1
Length of right cheliped	23.6	54.0	60.0
Length of carpus	6.0	13.0	13.5
Length of chela	10.0	22.0	24.0
Breadth of chela	4.6	10.0	10.5
Length of dactylus	5.1	11.0	12.0
Length of left cheliped	18.5	35.0	40.0
Length of carpus	4.7	8.8	10.0
Length of chela	7.0	12.5	14.5
Breadth of chela	2.6	4.5	5.0
Length of dactylus	5.0	9.0	10.0
Length of first ambulatory leg, right side	32.0	60.0	69.0
Length of propodus	7.5	13.7	16.0
Length of dactylus	9.7	16.8	19.2

In the large male from station 924, the appendage of the right side of the second somite of the abdomen is 7^{mm} long, and its terminal lamella 4^{mm} long and 1^{mm} broad; while the appendage of the left side is 4.8^{mm} long, and its terminal lamella only 2.3^{mm} long and 0.5^{mm} broad.

In life the front part of the carapax is orange red bordered with white along the margin. The eye-stalks and the peduncles of the attennulæ and antennæ are white, except the undersides of the eye-stalks, which are vermilion. The flagella of the antennulæ and antennæ are pale orange. A large spot of vermilion covers nearly the whole of the outer surface and extends over upon the inferior edge of the meri of the ambulatory legs, and the inferior edges of the carpi and propodi and the tips of the dactyli are marked with the same color, while the rest of the surface is white. The posterior part of the carapax and the abdomen are translucent whitish specked above with orange red, and the telson and uropods are similarly but more thickly specked with the same color. The eyes are black.

Specimens examined.

Station No.	Locality. N. lat.			W. long.			Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂ ♀	With eggs.	Dry or alc
	OFF MARTHA'S VINEYARD.											
	°	′	″	°	′	″			1880.			
895	39	56	30	70	59	45	238	sft. M.	Oct. 2	1 s.		Alc.
									1881.			
924	39	57	30	70	46	00	164	S.	July 16	2 l., s.		Alc.
939	39	53	00	69	50	30	264	gn. M. S.	Aug. 4	2 s. 1 s.	0	Alc.
									1882.			
1114	39	58	00	70	38	00	171	gn. M.	Aug. 22	1 l. 1 l.	0	Alc.

GALATHEIDEA.

Munida Caribæa? Smith. (Pl. 3, Fig. 11.)

Munida Caribæa? Smith, Proc. National Mus., iii, p. 428, 1881.

Munida, sp. indet. Smith, Bull. Mus. Comp. Zool. Cambridge, x, p. 22, pl. 10, fig. 1, 1882.

? Munida Caribæa Stimpson, Ann. Lyceum Nat. Hist. New York, vii, p. 244 (116), 1860.—A. M.-Edwards, Mus. Comp. Zool. Cambridge, viii, p. 49, 1880 (*Caribæa*).

In my preliminary notice of two years ago I referred this species doubtfully, as indicated above, to Stimpson's species described from a single very small specimen which is no longer extant. Almost simultaneously Milne-Edwards published ten new species of the genus from the Blake dredgings in the Caribbean region, and referred specimens of still another to Stimpson's *Caribæa*, but without describing them at all. It seems best to restrict Stimpson's name to the species called *Caribæa* by Milne-Edwards, whatever that may be, but it is quite impossible to determine from Milne-Edwards's descriptions alone whether the species which I have called *Caribæa* belongs to either of the eleven species enumerated by him and, until it is possible to settle this point satisfactorily, the species may be conveniently designated *Munida Caribæa?* Smith, as above.

The species attains greater size than any of the specimens taken in 1880, measurements of some of the largest of which were given in my preliminary notice of two years ago. The specimens from the same station are usually approximately alike in size, those from one station being nearly all small, while those from another, even near by and on the same day, are nearly all large. The largest specimens are from station 1043, off Delaware Bay, and six of these give the following measurements in millimeters:

	1.	2.	3.	4.	5.	6.
Sex	♂	♂	♂	♂	♂	♂
Length	52.0	51.0	47.0	57.0	57.0	62.0
Length of carapax including rostrum	26.3	25.5	24.9	28.3	29.3	30.0
Length of rostrum	9.4	9.5	8.4	9.2	10.4	9.5
Breadth of carapax in front of cervical suture	12.2	11.7	11.8	13.4	13.4	14.4
Greatest breadth excluding spines	14.3	13.8	13.0	16.2	16.1	18.1
Length of cheliped	83.0	87.0	78.0	117.0	110.0	107.0
Length of merus	33.0	36.0	32.0	49.0	46.0	45.0
Length of carpus	7.1	6.8	7.0	8.3	8.5	8.4
Length of chela	38.3	40.0	36.0	55.0	51.5	49.0
Length of dactylus	18.5	18.5	17.0	23.1	21.4	21.3
Length of first ambulatory leg	49.0	50.0	49.0	64.0	63.0	66.0
Greatest diameter of eye	4.3	4.2	4.0	4.6	4.5	4.7

The specimens from which the last four columns of measurements were taken have the chelæ modified, as usual in the old males of the species of the genus, by the proximal curvature and expansion of the digits, particularly the propodal, so as to leave them gaping at base; while the specimen from which the second column of measurements was taken has the chelæ slender and unmodified as in the female.

Specimens examined.

Station No.	Locality. N. lat.	W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	With eggs.
	OFF MARTHA'S VINEYARD.						
	° ′ ″	° ′ ″			1881.		
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4	2	
871	40 02 54	70 23 40	115	M. fne. S.	Sept. 4	150+	
872	40 05 39	70 23 52	86	S. G. Sh. & sponges.	Sept. 4	15	
873	40 02 00	70 57 00	100	sft. M.	Sept. 13	3	
874	40 00 00	70 57 00	85	sft. M.	Sept. 13	6	
877	39 56 00	70 54 18	126	sft. M.	Sept. 13	1	
878	39 55 00	70 54 15	142	M.	Sept. 13	6	
921	40 07 48	70 43 54	67	gn. M.	July 16	440+	+
922	40 03 48	70 45 54	71	gn. M. S.	July 16	1,300+	+
923	40 01 24	70 46 00	98	S.	July 16	8	
939	39 53 00	69 50 30	264	gn. M. S.	Aug. 4	1	
940	39 54 00	69 51 30	134	hrd. S. sponges.	Aug. 4	80+	+
941	40 01 00	69 56 00	79	hrd. S. M.	Aug. 4	500+	+
944	40 01 00	71 14 30	128	M. S. Sh.	Aug. 9	15	
949	40 03 00	70 31 00	100	yl. M.	Aug. 23	500+	+
1038	39 58 00	70 06 00	146	S. and Sh.	Sept. 21	8	
1040	40 00 00	70 06 00	93	S. and Sh.	Sept. 21	7	
1151	39 58 30	70 37 00	125	S.	Oct. 4	1♂	
	OFF DELAWARE BAY.						
					1881.		
1043	38 39 00	73 11 00	130	S.	Oct. 10	154	18
1046	38 33 00	73 18 00	104	S.	Oct. 10	10	4
1047	38 31 00	73 21 00	156	S.	Oct. 10	2	
	OFF CHESAPEAKE BAY.						
					1880.		
896	37 26 00	74 19 00	56	S. Sh.	Nov. 16	3	
899	37 22 00	74 29 00	57	S.	Nov. 16	72	

The Blake dredgings of 1880 extend the range southward considerably beyond the above, as the following record of the occurrence of the species in these dredgings shows:

Station.	N. lat.	W. long.	Fathoms.	Specimens.
	° ′ ″	° ′ ″		
311	39 59 30	70 12 00	143	1
314	32 24 00	78 44 00	142	50+
315	32 18 20	78 43 00	225	1
333	35 45 25	74 50 30	65	100+
335	38 22 25	73 33 40	89	31
336	38 21 50	73 32 00	197	6
344	40 01 00	70 58 00	129	1

Munida valida, sp. nov. (Pl. 1.)

A large species with the general appearance of *M. Bamffia*, but at once distinguished from it, and from *M. tenuimana*, and *Caribæa?* Smith as well, by the short and obtusely rounded epimera of all the abdominal somites.

Excluding the rostrum, the carapax is about three-fourths as broad as long; including the rostrum, about four-sevenths as broad as long, the rostrum being more than a fourth the entire length. The rostrum and the spines at its base are shorter and stouter than the *M. Bamffia*, and the latter are about three-fifths as long as the rostrum, strongly divergent and directed somewhat upward, while the rostrum is horizontal. The number and position of the spines on the dorsal surface and along the lateral margins of the carapax are very nearly as in *M. Bamffia*, except that there are no spines along the raised posterior margin. The orbital part of the anterior margin is more oblique than in *M. Bamffia*, and the antennal spine is not, as in that species, at the antero-lateral angle, but the margin between the antennal and hepatic spines is only a very little more oblique than the orbital margin, and the antero-lateral angle is really formed by the hepatic spine. The carapax is apparently wider and less convex than in *M. Bamffia*, the sutures of the dorsal surface are deeper, and the transverse rugæ are apparently fewer and more conspicuous.

The eyes are about as large as in *M. Bamffia*, but not so strongly compressed.

The basal segment of the antennula is armed with a slender spine arising from the prominence on the outer margin and directed forward, a larger spine on the outer edge of the distal end, and between these two a long spine, two-thirds as long as the segment itself, directed obliquely upward, while at the distal end of the inner side there is only an inconspicuous dentiform spine in place of the very long and slender spine found there in *M. Bamffia*, *tenuimana*, and *Caribæa?* Smith. The flagella of the antennæ are subcylindrical, slender, nearly naked, and not far from twice as long as the entire length of the body.

The merus of the external maxilliped is not distinctly tapered dis-

tally, and the ventral edge is armed with a slender spine at the distal end and a larger one a little way from the proximal end.

The chelipeds are equal, and in the male about two and a half times as long as the carapax, and resemble those of *M. Bamffia* very closely. In the male, the merus is nearly as long as the carapax, the carpus about two-fifths as long as the merus, and the chela much longer than the merus, much more slender, with the digits fully three-fourths as long as the body, slender, straight, and the prehensile edges in contact throughout. Although the single male seen is very large, there is no sign whatever of the expansion of the chela at the base of the digits, due largely to a curvature in the basal part of the propodal digit, which seems to be characteristic of the old males of all the species of the genus.

The dorsal surface of the abdomen is sculptured very much like the carapax, and the second and third somites are each armed with a series of small spines along the anterior edge above the facet, but there are no similar spines on the succeeding somites. The epimera of the second to the sixth somite are short, and obtusely rounded below, but those of the second and fifth are broader than the others. The telson and uropods are as in *M. Bamffia*.

As in all the other species of the genus which I have seen, the appendages of the first abdominal somite are shorter than those of the second, and composed of a slender protopod and a single thin lamella, which is much shorter than the protopod, broad, obtuse at the distal extremity, with a few marginal setæ, and rolled together anteriorly into a spoon-shaped appendage; while the protopod in the second pair of appendages is much longer than in the first, and bears a narrow, setigerous, and somewhat twisted lamella, with a minute rudiment of a second lamella at its base. The appendages of the third, fourth, and fifth somites are alike, and in each the protopod (apparently) is expanded into a broad oval lamella, margined with long setæ along the outer edge and at the tip, and bearing, on the inside near the tip, a small styliform appendage, composed of two segments. In the female the appendages of the second somite, though apparently not ovigerous, are about half as long as those of the third, with the protopod about as long as the endopod, which is composed of two subequal segments, and all the segments bear numerous long plumose setæ; the appendages of the third, fourth, and fifth somites are ovigerous, alike, nearly equal in size, and the two distal segments are subequal in length, and each about as long as the protopod.

I have seen only two specimens, from which the following measurements, in millimeters, were taken:

	1.	2.
Sex	♂	♀
Length, tip of rostrum to top of telson	83.0	70.0
Length of carapax, including rostrum	43.0	39.0
Length of rostrum	11.8	10.8
Breadth of carapax at cervical suture	20.0	18.0
Greatest breadth	24.0	22.0
Length of cheliped	110.0	75+
Length of merus	41.0	29.0
Length of carpus	16.0	14.0
Length of chela	48.0	28+
Length of dactylus	21.0	.....
Length of first ambulatory leg	77.0	62.0
Greatest diameter of eye	5.2	5.0
Length of telson	10.0	9.7
Breadth of telson	16.0	14.0

Station—	N. lat.	W. long.	Fathoms.	Specimens.
	° ′	° ′		
1112	39 56	70 35	245	1♂
1124	40 01	68 54	640	1♀

Eumunida, gen. nov.

The single species of the genus here proposed has the general appearance of *Munida*, but is at once distinguished from it and all the allied genera by the five-spined front, the position and structure of the peduncles of the antennæ, the absence of branchiæ at the bases of the external maxillipeds, the very broad and transversely segmented telson, and the absence of appendages upon the first five somites of the abdomen of the male.

The carapax is strongly contracted below anteriorly, so that the peduncles of the antennæ are near together and immediately beneath the well-developed eyes. The proximal segment of the peduncle of antennula is slender, subcylindrical, but with a small protuberance near the base where the auditory organ is situated, and unarmed. The peduncle of the antenna is highly developed and armed with numerous spines, of which one is articulated by a broad base to the second segment and evidently represents the antennal scale. The oral appendages and thoracic legs are similar to those of *Munida*, but there are neither branchiæ nor epipods at the bases of the external maxillipeds, though in other respects the branchial formula is the same. The telson is short and broad, more or less membranaceous, and divided by a transverse articulation, so that the distal part may be folded beneath the basal part. The female has well-developed appendages, all apparently ovigerous, upon the second to the fifth somite of the abdomen, but there are no appendages whatever on any of the first five somites in the adult male.

Eumunida picta, sp. nov. (Pl. 2, Fig. 2; Pl. 3, Figs. 6–10; Pl. 4, Figs. 1–3*a*.)

The carapax at the posterior part of the branchial region is about as

broad as the length, excluding the rostrum, but is rapidly narrowed anteriorly, and at the bases of the antennæ is scarcely half as broad. Back of the cervical suture the dorsal surface is regularly convex transversely, but the anterior part of the elevated gastric region is flat or slightly concave, and the orbital margins are perpendicular and hidden from above by the bases of the supraorbital spines. The anterior edge of the front is slightly arcuate and armed with five slender, acute, and subcylindrical spines, a median with two supraorbital each side; the median, or rostrum proper, is about half as long as the rest of the carapax, straight and horizontal; the supraorbital spines each side are approximately parallel with the rostrum, but directed slightly upward so that their tips are a little above the plane of the rostrum, are separated from the rostrum more widely than from each other, and the inner is nearly three-fourths as long as the rostrum while the outer is scarcely half as long as the inner. Immediately back of the outer of these spines there is a prominent and acute spine directed forward, and on a line between this and the hepatic spine of the lateral margin there are two much smaller spines on the steep side of the gastric region back of the orbit. The lateral margin is arcuate in outline and armed with seven acute spiniform teeth directed forward and decreasing successively in size posteriorly; the anterior, or antennal, is separated from the base of the antenna by a considerable space and is nearly as long as the outer supraorbital spine, the second is on the hepatic region, and the remaining five are all on the branchial region, the posterior one being very small in adult specimens and nearly or quite obsolete in young specimens 15^{mm} in length. The dorsal surface is marked with transverse rugæ, is sparsely clothed with minute hairs, and, except the spines already mentioned, is unarmed. The cervical suture is well marked and the gastro-hepatic distinct. The infero-lateral region is of nearly the same form as in the typical species of *Munida* and terminates anteriorly in an acute spine a little in front of the first lateral spine.

The eyes are black, smaller than in the typical species of *Munida*, nearly globular, and are borne on short stalks, the whole length being scarcely more than a fourth greater than the diameter of the cornea.

The peduncle of the antennula reaches to about the tip of the rostrum; the segments are all approximately equal in length, nearly naked, entirely unarmed, slender, and subcylindrical, though the proximal segment is considerably stouter than the others, and has a conspicuous protuberance over the auditory organ. The upper flagellum is about as long as the distal segment of the peduncle, swollen toward the base, and tapered to a very slender tip. The lower flagellum is very slender throughout and shorter than the upper. The peduncle of the antenna reaches to about the tip of the second segment of the peduncle of the antennula, and is armed with numerous spines; the first segment is exposed at the antero-lateral angle of the carapax and projects anteriorly in a sharp tooth; the second segment is very short, armed externally

with a stout dentiform spine directed forward, and above bears a slender spiniform appendage curved slightly upward and outward, and a little longer than the fourth segment; the third segment projects below the fourth segment in a slender spiniform process reaching by the fourth segment; the fourth segment is nearly as long as the diamete of the eye, beyond which it reaches considerably, and is armed at the distal end by a long spine projecting beneath and beyond the ultimate segment, and above and on the outer side by two small teeth; the ultimate segment is little more than half as long as the fourth, about once and a half as long as broad, and armed at the distal end with three long and approximately equal and equidistant spines. The flagellum is nearly as long as the whole body, slender, slightly compressed vertically, sparsely armed with minute setæ, and, at long intervals, with a few very long and slender setæ.

The mandibles and maxillæ are very nearly as in *Munida Bamffia*, but the proximal lobe of the protognath of the first maxilla is broader and less prolonged and more obtusely rounded anteriorly.

The proximal lobe of the protopod of the first maxilliped projects very little anteriorly, and the distal lobe is fully twice as long as broad. The endopod projects considerably beyond the protopod, is less curved than in *Munida Bamffia*, scarcely at all tapered distally, and clothed with slender setæ along the inner edge and at the obtuse tip. The basal portion of the exopod is longer than the endopod, from a sixth to an eighth as broad as long, sparsely setigerous along the edges, and bears a slender flagellum slightly less than half as long as the basal part, and obscurely multiarticulate distally. The epipod is small, about half as long as the endopod, tapered to the tip, and setigerous distally.

The second maxilliped resembles closely that of *Munida Bamffia*, but the endopod is shorter and stouter, the merus being scarcely more than twice as long as broad, and the basal part of the exopod is a little shorter, scarcely narrowed distally, and somewhat less setigerous.

The ischium and merus in the external maxilliped are approximately equal in length, the ischium unarmed at the distal end, but with the inner angle dentate as usual; the merus is only very slightly expanded on the inner side, and bears only a small spine near the distal end; the propodus is narrow, with a very slight expansion on the inner side; and the dactylus is considerably smaller than the propodus, and subcylindrical. The basal part of the exopod does not reach the distal end of the merus. There are no maxillipedal arthrobranchiæ, as there are in the species of *Munida*.

The chelipeds are not far from three times as long as the carapax, including the rostrum, and are apparently not much shorter proportionally in the females and young than in the adult males. The merus is subcylindrical, considerably longer than the carapax, including the rostrum, and is armed with four longitudinal series of spines, of which those forming the two series on the inner side are much larger than

those of the outer series, and these larger still than those of the lower series, which are quite small; there are eight to twelve of the larger spines in each series, and the surface between the spines, and also on the carpus and the body of the chela, is roughened with small squamiform and sparsely setigerous elevations. The carpus is short and armed with three distal spines on the inner side, and with a few small spines and tubercles on the outer side. The chela is just about as long as the merus and no stouter; the body is subcylindrical, considerably longer than the digits, and armed along the inner side with two series of spines corresponding with the two inner series on the merus, but the spines are much smaller and more crowded; the digits are slender, nearly straight laterally, but curved slightly downward at the tips, and the prehensile edges are irregularly dentate.

The first pair of ambulatory legs reach about to the middle of the carpi of the chelipeds; the dorsal edge of the merus is compressed and armed with a series of about ten large spines; the antero-inferior angle is armed with a similar series of much smaller spines, and there is, in addition, a large spine on the posterior side below the articulation with the carpus; the carpus is short and crested above with a series of spines like the merus, and the posterior side in both carpus and merus is roughened like the surface of the chelipeds; the propodus is about as long as the merus, slender, compressed laterally, with a few long setæ on the upper edge and a series of short spiniform setæ below, but without true spines or teeth; the dactylus is nearly half as long as the propodus, broad, strongly compressed, terminates in a strong chitinous tip, and is armed below with a closely set series of setiform chitinous spines decreasing in size proximally. The second pair are like the first, except that the merus is unarmed below. The third pair are considerably shorter than the second, reaching scarcely to the tips of the propodi of the second pair, and there is a series of small spines along the middle posterior side of the merus, but in other respects they are like the third pair.

The posterior pair of thoracic legs are much shorter than in the typical species of *Munida*, being only about as long as the meri of the third pair of ambulatory legs; the merus and carpus are about equal in length, and each is considerably longer than the ischium; the chela is little more than half as long as the carpus, but swollen distally, so as to be much broader, and the prehensile edge of the propodus and the articulation with short, stout, and strongly curved dactylus is terminal and nearly transverse, the propodal digit being reduced to a slight angular projection. The chela and distal end of the carpus are densely clothed with long setæ.

The consolidated sternal plates between the bases of the chelipeds and true ambulatory legs are marked by a deep longitudinal median sulcus on each somite, are separated from each other by conspicuous sulci, and the plate between the bases of the chelipeds is armed each

side with a small spiniform tooth projecting forward, and the plane of the plate is much below the very narrow sternal plate at the bases of the external maxillipeds. The sternum of the last thoracic somite is entirely membranaceous, without any calcified plate or bar between the bases of the posterior legs.

The abdomen is broad, evenly rounded above, and without longitudinal carinæ; the epimera are all very short; and the sterna of all the somites are almost entirely membranaceous, like that of the last thoracic somite. The dorsum of the first somite rises in a sharp and very narrow transverse ridge back of the facet which slides beneath the carapax, and is inclosed either side by the anterior projection of the epimera of the second somite. The epimeron of the second somite is truncated below, but projects forward in a sharp angle at the side of the carapax, and above the angle is armed with a large, curved, and acute spine, directed forward above the lateral margin of the carapax. The epimera of the third, fourth, and fifth somites are truncated, with the angles more or less rounded, and those of the sixth obtuse. The second and third somites are each marked above by two transverse ciliated rugæ, the fourth and fifth each by three similar but less conspicuous rugæ in adults, or only two in the young, and the sixth somite and all the epimera are marked by broken and irregular rugæ or squamiform elevations. The sixth somite is much longer than the fifth, about a third as long as broad, and the postero-lateral edge outside the articulation of the uropod is oblique and nearly straight.

The telson in full-grown specimens is only as long as the sixth somite, and twice as broad as long, but in young specimens is proportionally longer and narrower. The whole appendage is thin and slightly calcified; the lateral margins are deeply incised about the middle and the incisions connected by a transverse membranous articulation, so that the distal part is readily folded beneath the proximal. The distal part is notched at the middle of the posterior edge and longitudinally divided by a membranous line, so that it appears to be formed of two transverse elliptical plates, each nearly twice as broad as long, and of which the posterior and lateral edges are thickly ciliated. The inner lamella of the uropod is fully as long as the telson, about two-thirds as broad as long, elliptical, the inner and distal edges armed with spines, which are small on the inner and very minute and crowded on the distal edge, and the entire margin, except near the base, is ciliated with numerous long hairs. The outer lamella is longer and broader than the inner, narrowed and somewhat excavated on the inner edge near the base, and margined with hairs like the inner.

There are no appendages whatever on any of the first five abdominal somites in any of the adult males examined. In young specimens, 15^{mm} or less in length, in which the sexual characters are not manifest, but which are possibly immature males, or more probably immature females, there are, however, on the second to the fifth somite, rudimentary, very

Vol. VI, No. 4. Washington, D. C. June 20, 1883.

minute, and naked appendages, obscurely divided into a large proximal and a small distal segment. In the adult female the appendages of the second to the fifth somite are similar, approximately alike in size, apparently all ovigerous, and each appears to be composed of only two segments, of which the distal is about half as long as the proximal. None of the specimens seen are carrying eggs.

Five specimens give the following measurements in millimeters:

	Station—				
	1152.	1152.	1043.	1097.	1097.
Sex	Young.	♂	♂	♀	♀
Length, tip of rostrum to tip of telson	15.0	23.5	43.0	24.0	40.0
Length of carapax, including rostrum	8.5	13.0	23.7	13.4	22.1
Length of rostrum	2.5	4.5	8.1	4.6	8.0
Breadth at bases of antennal spines	4.1	6.0	11.0	6.2	10.2
Greatest breadth, including spines	5.5	8.5	15.6	9.0	14.5
Length of cheliped	27.0	34.0	68.0	40.0	57.0
Length of merus	10.5	15.0	30.0	18.0	24.0
Length of carpus	1.5	2.5	5.2	2.6	4.3
Length of chela	11.0	15.0	30.0	18.0	24.5
Length of dactylus	4.7	6.4	14.0	7.5	11.4
Length of first ambulatory leg	13.5	20.0	38.0	21.0	35.0
Diameter of eye	1.3	1.7	3.0	1.8	3.0
Length of telson	1.4	2.1	4.0	2.2	4.0
Breadth of telson	2.0	3.7	8.0	3.9	8.0

Specimens examined.

Station No.	Locality. N. lat.	W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.							
	° ′	° ′			1881.			
1038	39 58	70 06	146	S. Sh.	Sept. 21	1	1 y. 1	0
					1882.			
1097	39 54	69 44	158	fine S.	Aug. 11		2	0
1098	39 53	69 43	156	fine S.	Aug. 11	1	1	0
1152	39 58	70 35	115	S.	Oct. 4	2	1 y.	
	OFF DELAWARE BAY.							
					1881.			
1043	38 39	73 11	130	S.	Oct. 10	1		

In the specimen from station 1152, after preservation in alcohol for a short time, the coloration had apparently not changed very materially, and was very striking. The whole dorsal surface of the carapax and abdomen was light red, lightest on the abdomen and darkest on the rostrum and spines of the carapax. The chelipeds and three pairs of ambulatory legs were very intense bright red, except the digits of the chelæ

and the distal extremities of the ambulatory legs to very near the bases of the propodi, which parts were white, the color stopping on each of these appendages very suddenly at the point where they cease to be armed with spines. All the other specimens show more or less distinct indications of the same coloration.

Anoplonotus politus, gen. et sp. nov. (Pl. 2, Fig. 1; Pl. 3, Figs. 1–5*a*.)

Excluding the rostrum, the carapax is nearly as broad as long; including the rostrum, seven to eight tenths as broad as long, the rostrum being rather less than a fourth of the entire length. The rostrum is vertically flattened, though obscurely carinated longitudinally above, horizontally triangular, but not acute at the tip, and slightly curved downward distally. There are no spines or tubercles upon the carapax, but the gastric region is somewhat protuberant and separated from the branchial regions by a broad sulcus each side, and from the prominent cardiac region by a still deeper sulcus which extends either side as a shallow sulcus across the branchial region, which is again crossed by a narrower sulcus in front, but the cardiac region is not conspicuously separated from the branchial region either side of it. The orbital portion of the anterior margin is narrow and advanced considerably in front of the antero lateral angles, which are formed by the hepatic regions and are nearly right-angular. The lateral margins are slightly curved, and the greatest breadth is a little back of the middle. The surface of the carapax is granulose, particularly along the sides, where the granules are arranged in transverse lines.

The small eyes are partially beneath the rostrum, and scarcely reach its middle; there is a slight protuberance on the outer side of the stalk near the base; and the eye itself is semitranslucent in the alcoholic specimens; its diameter is rather less than that of the stalk and about half the whole length, and the cornea is apparently entirely without facets.

The basal segment of the peduncle of the antennula is a little shorter than the rostrum, about three-fourths as broad as long, somewhat swollen on the outer side, and armed with two teeth at the distal extremity. The second and third segments are slender, subequal in length and each scarcely as long as the basal. The upper flagellum is about as long as the distal segment of the peduncle, the basal portion swollen and composed of numerous short segments, while the distal portion is very slender and composed of about five elongated segments. The lower flagellum is little more than half as long as the upper, slender throughout, and composed of about three segments. The peduncle of the antenna arises just outside the peduncle of the antennula and at some distance from the antero-lateral angle of the carapax, scarcely reaches the tip of the rostrum, and its three distal segments are slender. The flagellum is very slender, and reaches to about the tips of the chelipeds.

The mandibles are of essentially the same form as in *Munida;* the molar area is transverse to the body of the mandible, narrow, naked, and separated from the broad and edentulous ventral process by a deep excavation; and the palpus is slender, triarticulate, and armed with few and short setæ. The protognathal lobes of the first maxilla are approximately equal in size, rather broad at the ends, and armed as usual with slender spines upon the distal, and numerous setæ upon the proximal lobe. The endognath is much shorter than the distal lobe of the protognath, slender, tapered to an obtuse point, and armed with two series of small setæ, one at the tip and the other below the middle. The protognathal lobes of the second maxilla are approximately equal in size, and each lobe is divided into two lobules very unequal in width, the two middle lobules being approximately a third as wide as the anterior and posterior, though all four of the lobules are of about the same length. The endognath is a little longer than the distal lobe of the protognath, tapers to a slender tip, and is armed with a very few setæ along the middle of its length. The anterior portion of the scaphognath is a little shorter than the endognath, broad, slightly narrowed anteriorly, but broad and obtusely rounded at the tip, while the posterior portion is short, transversely truncated behind, broader than long, and somewhat triangular in outline, with the angles rounded.

The tips of the lobes of the protopod of the first maxilliped are rounded and nearly alike, but the distal lobe is considerably longer than the proximal, being about twice as long as broad. The endopod is about as long as the distal lobe of the protopod, narrow, tapered to an obtuse tip, very strongly curved, the outer edge margined with slender setæ distally, and proximally with a very few setæ near the inner edge. The exopod is lamellar, a little longer than the endopod and much broader, being about a fifth as broad as long, rapidly narrowed at the extremity, and margined with slender setæ along the outer edge. The epipod is about as broad but scarcely as long as the distal lobe of the protopod, triangular at the extremity, and ciliated at the tip and along the outer edge. The endopod of the second maxilliped is of nearly equal breadth from the base to the dactylus; the ischium is scarcely longer than broad; the merus nearly three times as long as broad and about as long as the three terminal segments taken together; the carpus and propodus are subequal in length; the dactylus is shorter and much narrower than the propodus, and rounded at the tip; and all the segments are more or less armed as usual with setæ of different forms, and at the distal end of the inner edge there is a single slender spine or spiniform setæ in addition to a few short setæ. The exopod is much larger than the endopod; the unsegmented basal portion is nearly uniform in breadth for about the proximal two-thirds of its length, where it expands in an obtuse prominence opposite the carpus of the endopod, but from this prominence it tapers to the articulation with the slender flagellum; except near the tip both edges are margined with short setæ, and the

prominence of the inner edge bears in addition a submarginal series of six to eight long setæ; the flagellum is about half as long as the basal part, distinctly articulated near the middle, and the terminal fourth of the whole length very obscurely multiarticulate and furnished with long setæ.

The external maxillipeds, when extended, reach a little by the tip of the rostrum; the ischium is nearly twice as long as broad and triquetral, with the dorso-internal angle sharply and regularly dentate; the merus is slightly shorter than the ischium, nearly as broad as long, expanded distally and armed with two obtuse teeth on the inner side and with a single tooth outside the articulation of the carpus; the three distal segments are slender and together about equal in length to the ischium and merus, the propodus being about as long as the merus, and the carpus and dactylus successively a little shorter. The epipod and exopod are well developed, and the basal part of latter reaches considerably by the merus.

The chelipeds are equal and about three times as long as the carapax, the merus being about as long as the carapax, and the chela considerably longer. In the females and young males the chelipeds are very slender and subcylindrical throughout, with the chela scarcely, if at all, stouter than the carpus, and with the digits straight and very slender. In the large males the chelipeds are very much stouter; the body of the chela is expanded and vertically flattened distally, and the digits gape widely at the base, the proximal half of the propodal digit being strongly curved and unarmed, while the distal part of the prehensile edge is straight and minutely serrate like the corresponding part of the dactylus, with which it is in contact when the digits are closed; the basal part of the dactylus is only slightly curved, but is armed with an obtuse tubercle on the prehensile edge near the base; and the whole prehensile edges of both digits are more or less hairy.

The three pairs of ambulatory legs are slender and subequal in length, about as long as the body, and the dactyli are slender, strongly curved, more than half as long as the propodi, and unarmed. The posterior legs are very small and slender and of essentially the same form as in *Munida*. There are no epipods at the bases of any of the thoracic legs.

The abdomen is considerably shorter and much narrower than the carapax, and its dorsal surface is nearly smooth and devoid of carinæ, except on the edges of the sixth somite, as described beyond, though there is a slight transverse sulcus on the middle portion of the second somite, which is also raised sharply above the small facet which slides under the carapax. The epimera of the second somite are broad; the third and fourth somites are short, and their epimera very narrow and acute; the fifth somite is a little longer than the fourth, and its epimera broader and more obtuse than those of the fourth; while the sixth somite is slightly longer than the fifth, and the postero-lateral margins

of its epimera are excavated to fit accurately the outer edges of the bases of the uropods, and are margined with a narrow carina.

The telson is approximately two-thirds as long as broad, narrowed posteriorly, with the posterior angles rounded and the posterior edge slightly emarginate in the middle. The telson is stiffened by eight distinct calcified plates; a broad median basal plate, with a small one either side at the base of the uropod and a small median one behind it and between a pair of broad lateral plates, still behind which there is a second pair which meet in the middle line and form the tips and lateral angles.

The lamellæ of the uropods are about as long as the telson, a little longer than wide, the inner slightly longer than the outer, and each widest near the extremity, which is broadly rounded in outline, while the outer edge is nearly straight.

In the male the first and second pairs of abdominal appendages are well developed and of nearly the same form as in the species of *Munida*. Those of the first pair are about as long as the protopods of the second pair, with the protopod somewhat triquetral and naked except a few setæ along the distal part of the inner edge, and with the single terminal lamella slightly shorter than the protopod but much broader, very thin, margined with setæ distally and along the outer edge, and the edges rolled together on the anterior side. In the second pair the protopod is slender and naked, and bears a narrow, lanceolate lamella a little shorter than the protopod and clothed with numerous setæ along both edges and on the proximal part of the anterior side, and at its base a minute second lamella much narrower than the other, scarcely as broad as long, and naked. The appendages of the third, fourth, and fifth somites are rudimentary, very minute, and almost wholly naked; they are scarcely an eighth as long as the appendages of the second somite, very slender, and with a single terminal lamella smaller than the protopod. In the female there are no appendages upon the first somite of the abdomen, and the appendages of the second somite are very minute, slender, and tipped with a few small setæ. The appendages of the third, fourth, and fifth somites are well developed, uniramous, and ovigerous; they increase in size successively from the third to the fifth, and each appendage is composed of a slender protopod and a shorter terminal portion composed of two segments of which the terminal is the longer.

The eggs in the alcoholic specimens are approximately spherical, 1.50^{mm} to 1.75^{mm} in diameter, and very few in number, the two largest egg-bearing specimens carrying less than thirty eggs each, while the three smaller specimens carry nine, three, and two each, though a very few eggs may have been lost from these last specimens.

Three specimens from station 941 give the following measurements in millimeters:

	1.	2.	3.
Sex	♂	♂	♀
Length, tip of rostrum to tip of telson	22.0	17.5	17.5
Length of carapax, including rostrum	12.2	9.4	9.3
Length of rostrum	3.0	2.3	2.2
Breadth of carapax at anterior angles	7.0	5.4	5.3
Greatest breadth of carapax	9.0	7.3	7.0
Length of cheliped	35.0	31.0	28.0
Length of merus	12.0	11.0	10.0
Length of carpus	5.0	4.3	3.8
Length of chela	15.9	13.3	11.5
Greatest breadth of chela	4.0	2.1	1.3
Length of dactylus	6.5	5.2	4.6
Length of first ambulatory leg	22.0	19.0	17.5
Length of telson	3.3	2.5	2.5
Breadth of telson	4.5	3.6	3.5
Diameter of eye	0.6	0.5	0.5

Specimens examined.

Station No.	Locality. N. lat.	Locality. W. long.	Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens. ♂	No. of specimens. ♀	No. of specimens. With eggs.	Dry or alcoholic.
	OFF MARTHA'S VINEYARD.				1880.				
871	40 02 54	70 23 40	115	fne. S. M.	Sept. 4		1	0	Alc.
873	40 02 00	70 57 00	100	sft. M.	Sept. 13	1	1	1	Do.
874	40 00 00	70 57 00	85	M.	Sept. 13		1	0	Do.
					1881.				
940	39 54 00	69 51 30	134	hrd. S. and sponges.	Aug. 4	2	1	1	Do.
941	40 01 00	69 56 00	79	hrd. S., M.	Aug. 4	13	3	3	Do.

In the manuscript sent to the printer I referred this species to *Elasmonotus* with considerable hesitation, though it agreed very well with the brief diagnosis given by Milne-Edwards (Bull. Mus. Comp. Zool. Cambridge, viii, p. 60). The recently published figures of *E. Vaillantii* (Recueil de figures de Crustacés nouveau ou peu connus, April, 1883), however, seem to show that my species is generically as well as specifically distinct from *Elasmonotus*, being distinguished by the short and broad merus of the external maxilliped, the absence of spines, teeth, or carinæ upon the carapax and abdomen, and by the greater breadth of the carapax, if the measurements given by Milne-Edwards, are correct.* The species here described is apparently also distinguished generically by the small and non-segmented exopod of the first maxilliped, and specially by the rudimentary character of the appendages of the third, fourth, and fifth somites of the abdomen. The number

and arrangement of the branchiæ, as indicated in the following formula, is the same as in *Munida:*

	Somite—								
	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods	1	0	1	0	0	0	0	0	(2)
Podobranchiæ	0	0	0	0	0	0	0	0	0
Arthrobranchiæ	0	0	2	2	2	2	2	0	10
Pleurobranchiæ	0	0	0	0	1	1	1	1	4
									14+(2)

*There is a perplexing disagreement in Milne-Edwards's characterization of his species between the descriptions of the proportions of the carapax and the accompanying measurements. *E. brevimanus* and *abdominalis* are each said to have the carapax narrower ("plus étroite") than *E. longimanus*, though the measurements given show *E. brevimanus* to be very much, and *E. abdominalis* slightly, broader than *E. longimanus*.

NEW HAVEN, CONN., *December* 28, 1882.

EXPLANATION OF PLATES.

All the figures on Plates I and II; Figs. 4 and 5, Plate IV; Figs. 4, 4*a*, 4*b*, and 5, Plate V; and Fig. 5, Plate VI, were drawn by J. H. Emerton. All the other figures were drawn by the author.

PLATE I.

Munida valida Smith. Dorsal view of male, from station 1112, natural size.

PLATE II.

FIG. 1.—*Anoplonotus politus* Smith. Dorsal view of a male, from station 941, enlarged two diameters.

FIG. 2.—*Eumunida picta* Smith. Dorsal view of a male, from station 1043, natural size.

PLATE III.

FIG. 1.—*Anoplonotus politus*. First maxilla of the right side, seen from below, of a male from station 941, enlarged twelve diameters.

FIG. 2.—Second maxilla of the right side of the same specimen, enlarged twelve diameters.

FIG. 3.—First maxilliped of the right side of the same specimen, enlarged twelve diameters.

FIG. 4.—Second maxilliped of the right side of the same specimen, enlarged twelve diameters.

FIG. 5.—External maxilliped of the right side of same specimen, enlarged eight diameters.

FIG. 5*a*.—Ischium and merus of the same appendage, seen from above, enlarged eight diameters.

FIG. 6.—*Eumida picta*. First maxilla of the right side of a male, from station 1098, seen from below, enlarged eight diameters.

FIG. 7.—Second maxilla of the right side of the same specimen, enlarged eight diameters.

FIG. 8.—First maxilliped of the right side of the same specimen, enlarged eight diameters.

FIG. 9.—Posterior thoracic leg of the same specimen, enlarged eight diameters.

FIG. 10.—Appendage of the fifth somite of the abdomen of a young specimen, 15^{mm} long, from station 1152, enlarged twenty-four diameters.

FIG. 11.—*Munida Caribæa*? Smith. First maxilliped of a male, from station 1043, enlarged eight diameters.

PLATE IV.

FIG. 1.—*Eumida picta*. Extremity of the abdomen of a male, from station 1098, dorsal view, enlarged three and a half diameters.

FIG. 2.—Extremity of the abdomen of a young male, from station 1152, enlarged four diameters.

FIG. 3.—Peduncle of right antenna of a male, dorsal view, from station 1152, enlarged eight diameters; *a*, acicle, or articulated spine, of the second segment, representing the antennal scale; *b*, third segment, projecting anteriorly in a long spine.

FIG. 3*a*.—The same, side view; *a*, as in last figure.

FIG. 4.—*Eupagurus politus* Smith. Lateral view of left side of a male, from station 922, natural size.

FIG. 5.—*Catapagurus Sharreri* A. M.-Edwards. Lateral view of left side of a male in a carcinœcium, formed by *Adamsia sociabilis* Verrill, from station 940, enlarged two diameters.

PLATE V.

FIG. 1.—*Eupagurus bernhardus* Brandt. Outline of transverse section through the lower part of the anterior arthrobranchia of the thirteenth somite (penultimate thoracic), showing the form of the lamellæ, enlarged eight diameters; *a*, afferent, and *b*, efferent vessel.

FIG. 2.—*Sympagurus pictus* Smith. Outline of similar section of the corresponding branchia of a female, from station 924, enlarged eight diameters, and lettered as in the last figure.

FIG. 2*a*.—Extremity of the same branchia, side view, enlarged eight diameters.

FIG. 3.—*Parapagurus pilosimanus* Smith. Outline of similar section of the corresponding branchia of a male, from station 880, enlarged eight diameters, and lettered as in Figs. 1 and 2.

FIG. 3*a*.—Extremity of the same branchia, side view, enlarged eight diameters.

FIG. 4.—*Parapagurus pilosimanus*. Lateral view of the left side of the originally described male specimen, taken on a trawl-line off Nova Scotia, half natural size.

FIG. 4*a*.—Dorsal view of the carapax and anterior appendages of the same specimen, natural size.

FIG. 4*b*.—Dorsal view of the chelipeds of the same specimen, half natural size.

FIG. 5.—Dorsal view of a male in the carcinœcium (*Epizoanthus paguriphilus* Verrill), from station 947, natural size.

PLATE VI.

FIG. 1.—*Parapagurus pilosimanus*. First maxilla of the right side, seen from below, of a male from station 880, enlarged six diameters.

FIG. 2.—Second maxilla of the right side of the same specimen, enlarged six diameters.

FIG. 3.—First maxilliped of the right side of the same specimen, enlarged six diameters.

FIG. 4.—Appendage of the right side of the first somite of the abdomen of the same specimen, seen from behind, enlarged four diameters.

FIG. 4*a*.—Appendage of the right side of the second somite of the abdomen of the same specimen, seen from behind, enlarged four diameters.

FIG. 5.—*Sympagurus pictus*. Dorsal view, from life, of a male in the carcinœcium (*Urticina consors* Verrill), from station 924, one-half natural size.

FIG. 6.—First maxilla of the right side of a female, from station 1114, enlarged six diameters.

FIG. 7.—Second maxilla of the right side of the same specimen, enlarged six diameters.

FIG. 8.—First maxilliped of the right side of the same specimen, enlarged six diameters.

FIG. 9.—*Eupagurus bernhardus*. First maxilliped of the right side of a male, from station 119 (Halifax, Nova Scotia), enlarged six diameters.

CONTRIBUTIONS TO THE HISTORY OF THE COMMANDER ISLANDS.

NO. 1.—NOTES ON THE NATURAL HISTORY, INCLUDING DESCRIPTIONS OF NEW CETACEANS.

By LEONHARD STEJNEGER.

Prof. SPENCER F. BAIRD,
Secretary Smithsonian Institution,
Director U. S. National Museum:

DEAR SIR: As announced in my letter from San Francisco, the steamer "Alexander" started on the 5th of April at noon. The wind was very unfavorable, most of the time blowing from the west, and very often with a force of 40 miles an hour or more. Up to the 24th my observations show twice only a direction of wind from a different quarter. As we were compelled to make about *one thousand* miles under sail, our progress was necessarily slow, so that on the 23d of April we found ourselves only in longitude 145° west, and latitude 50° 35′ north, about 500 miles southwest from Sitka, and as many miles southeast from Kodiak. On the 30th of April we passed the Aleutian chain between Seguam and Amlia, in fog and sleet, and Bering Sea received us with a veritable hurricane from the east-northeast. After having stopped at the village of Copper Island the anchor was dropped in the morning of the 7th of May at Gavan, the harbor of Bering Island, where I landed with as much of my baggage as could be taken on shore before the cargo had been discharged in Petropaulski. Ere long I was comfortably lodged and began my work.

At first I was much confined to my station on account of the meteorological observations. Not until the obliging agent of the Alaska Commercial Company, Mr. G. Chernick, had been instructed how to take and record these observations, could I think of making longer excursions. Many thanks are due to him for his kind assistance. Thus I was unable to cross the northern part of the island, consisting chiefly of flat swamps and tundras, of lakes, a moderately high plateau, and a chain of interesting table mountains of about the same height, while the southern, mountainous and larger, two-thirds of the island remained a complete *terra incognita* to me. I therefore planned an expedition with the purpose of exploring the secrets of this region, the more as it was especially there that Steller had made his observations. But I had to wait until the sealing season was over, for all hands now were occupied in this, their chief, and one may safely say, only work.

Meanwhile I resolved to go to Petropaulski on the 16th of June to establish a meteorological station, and to hire and train an observer. Besides, it was my desire to study as much of the natural history of Kamtschatka as the surroundings and the limited time would permit.

The season was unfavorable, as the vegetation was already so luxuriant as to make it difficult to move outside of the roads, and the mosquitos were plentiful enough to make it extremely painful to lay in wait for birds or to creep around searching for spiders, beetles, and snails. However, if the stay was not very profitable to the collection, it was not entirely without results, for I gained a great deal of valuable experience which will be of use to me during my proposed visit to Kamtschatka next year. What rendered my sojourn there especially attractive and instructive was the daily intercourse with the experienced and meritorious explorer of Eastern Asia, Dr. Benedict Dybowski, who, of course, better than any one else, could give me all desirable information. On the 15th of July I found myself again on Bering Island.

The following weeks were occupied chiefly by observations on the rookery, about 15 miles distant from the village, and I could not begin to think about the expedition towards the south before the middle of August.

Every one suggested that the most practicable way would be to go around the island in a boat, as traveling overland with dogs would be difficult and expensive, and, on the other hand, several places of interest would be inaccessible by this route, which, besides, would offer little or no opportunity for carrying the necessary outfit and the objects of natural history I might possibly collect during the journey. The prospect of finding a skeleton of a sea-cow at any one of these places, seldom or never visited by the natives, was a very probable one, and as such a skeleton alone would be enough to load a boat even larger than ours, I resolved to hire six Aleuts, to man the boat of Mr. Grebnitzky, kindly placed at my disposal. Mr. Osche, in the service of the Alaska Company, who during a sojourn of several years had traversed the island in all directions on his hunting expeditions, and had thereby gained an extensive knowledge of the island and its products, joined the expedition as a volunteer; an assistance the more valuable, as without it I should hardly have been able to realize my intention.

The special object of the expedition was to study the general natural history of the southern part of the island, to collect specimens of all kinds, as far as circumstances would permit; but especially to search for remains of the sea-cow. I also proposed to survey the island for further explorations, and to collect material for a more correct and detailed map than the one in existence. Besides I wished to identify the places mentioned by Steller in his narrative, in order to compare his description with the localities as they present themselves to-day, and to restore the original names. I also desired to visit the spots where Bering's vessel was wrecked, where the ill-fated expedition wintered and where Steller made his observations on the sea-cow.

The "circumnavigation" took place between August 21 and the 1st of September. It was attended by all the disagreeable consequences of fog and rain, of wind and surf, and the few skins which could be

obtained under these circumstances were almost spoiled at our return. The personal inconveniences during a 12 days' journey on the ocean, along an open coast without harbors or anything like a shelter; of being kept wet by continuous fogs and rains; of sleeping under an old sail, are serious; but no naturalist would ever count them should the result of his work be in inverse proportion to his troubles.

Unfortunately, I cannot so report, because the animal life, contrary to my expectations, was much poorer with regard to species than in the northern part, although the number of individuals was considerably larger. In fact, the only addition to my list of birds observed on the island was a single species, *Rissa brevirostris* Brandt, a species strangely limited in its distribution on the island.

I inspected a large colony of *Rissa kotzebui* Bp., situated on the western shore, about 18 miles from Cape Manati, the southwestern point of the island, where thousands and thousands of this black-legged Kittiwake were now feeding their almost full-grown young ones. Among them a single red-legged bird, quite lonely, and apparently without any young, had placed itself on a narrow shelf of the rocky wall. It was the first and the only one I saw, and I was fortunate enough to shoot it. *R. kotzebui* was observed in countless numbers along the western shore; but as soon as we had doubled Cape Manati we met as large or still larger flocks of *R. brevirostris*, among which not a single black-legged individual could be detected. I minutely surveyed a breeding colony on this side, and the result was the same, not a single black-legged one was seen. And thus the red-legged form completely excluded the other along the eastern shore, except at Cape Tonkoj, where the coast trends towards the northwest. Here on the cape a larger flock of Kittiwakes was sitting on the shore so closely packed that only the legs of the outer row could be seen; they were all red. I shot, however, and of the ten lying on the ground, seven were red-legged, while three belonged to the black-legged species. The young of *Rissa brevirostris* also has dark legs, but I need not expressly state that I did not make any mistake in this respect.

On the other side of the last-mentioned cape the old acquaintance received us as exclusively as along the western shore. Thus, the genus *Rissa* occupies the whole shore-line of the island, of which *kotzebui*, however, has usurped nine-tenths, leaving to *brevirostris*, as an exclusive possession, but one-tenth, or about 12 miles.

We found, however, another animal, which I much regretted not to have been able to skin and to carry with me. But, as it was a *Balænoptera*, 50 feet long, I was compelled to leave it where it was found. I spent a day on the spot in order to take the necessary measurements, and to make such investigations as the far-advanced decomposition of the carcass would allow, as a matter of course. I need not state that while this business was to some extent a veritable pleasure to the naturalist, it was not agreeable at all to the civilized man. Further on I shall give some details of the examination.

But now as to the sea-cow. We found the remains of one, and I will here give an extract from my journal concerning this event.

August 27, 1882, *Cape Tolstoj*—Mr. Osche went out hunting, while I was occupied in searching for fossils. From the extreme point of the cape I took some bearings of the other capes visible from here, and was just looking over my collections of stones when Mr. Osche returned with the cheerful message that he had found what he thought to be a skeleton of a sea-cow. Immediately we seized the spades and set out for the place. Having removed some spades full of soil, I soon became convinced that his supposition was right, but at the same time it was evident that the skeleton was in such a bad state of preservation that it would hardly be of any use. It was situated in a sand-bank 12 feet high, about equally distant from the base and from the top of the shore, close to a rivulet, which here had cut its bed through the bank and carried away the whole caudal portion of the skeleton. The distance from the sea was 500 feet in a straight line, and the height above high tide not less than 10 to 12 feet. The head of the skeleton pointed towards the west. It was lying horizontally on the back, slightly bent towards the left; most of the bones were in their natural position. The top of the sand-bank was covered with thick sod, and both above and below the skeleton the bank consisted of moist and rather fine sand, of the same kind daily washed up on the beach and deposited in horizontal and alternating blue and brown layers, the latter color greatly predominating. The color of the sand near the bones was blackish, sometimes iridescent. In spite of the miserable condition of the bones, I finished the exhumation in order to ascertain whether all parts were in their proper place. This caused us much pain and labor, not only because the sand had to be removed from the very top, but especially because the fine particles of the upper and dry layers were whirled by the strong breeze into our eyes.

Altogether, fourteen dorsal vertebræ with their ribs, the cervical vertebræ, the skull and sternum, two scapulæ, two humeri, and one cubitus were dug out; the other cubitus could not be found, nor any trace of a metacarpal bone. While all the other parts were found *in situ*, the sternum was lying outside, close to the right extremity, while the left one, consisting of a scapula and humerus only, was placed within the throat, close to the spine.

As stated above, the bones were in a miserable state of preservation, being decomposed in a very high degree, and so brittle as to be incapable of bearing their own weight, falling into many pieces when lifted out, even with the greatest care. Even the ribs, which are so hard that they present the appearance of ivory, were entirely rotten. Some bones had the consistency of flesh, while other parts would glide away between the fingers like soft soap. All the bones were of a dark reddish-brown color.

The impossibility of securing anything of value under such circum-

stances is self-evident. I therefore selected only a few of the best preserved bones, namely, the first and seventh ribs of the right side, and the os occipitis, in order to show the state of preservation. They form No. 1601 of my catalogue.

We did not return, however, without having our boat trimmed with bones of *Rytina*, mostly ribs, from the same skeleton, and two skulls, one being very fragmentary.

Of plants I collected only those not met within the northern portion, which are only a few species. The topographical part of my work was more successful than the zoological.

I had the opportunity of mapping this part of the island and can give a tolerably correct representation of this, the most western link of the Aleutian chain. It differs considerably from the old charts, which show deep gulfs where the coast line is actually straight, and land where we gaily sailed our boat.

I also visited the place of Bering's death, and the winter quarters of the ill-fated party, and spent two days in digging and surveying. The ruins of the house were measured and described, but my intention of making a sketch-map and some landscape sketches of the surroundings, was completely frustrated by the never-ceasing rain. The remains found were very scanty; some small glass beads and plates of mica, probably for trading purposes; a few iron grape-shot, fragments of a brass plate with Russian armorial ensigns, bolts, and sheaves from the vessel, &c. I have kept these relics, as perhaps the National Museum will be interested in receiving the only remains of this expedition.

I omit further details here, for this letter is intended to contain zoological data only. Besides, I have no copy of Steller's journal; and, finally, because I propose to revisit the place in order to complete my observations and to take the sketches above mentioned.

I am unable to send you at present a full description of the islands, as my sojourn here has scarcely exceeded three months. The following pages will contain merely some disconnected sketches of those things I consider to be new or of special interest. You will see, besides, that they are, with a few exceptions, limited to the land fauna, as this, of course, has been the main object of my studies and observations. The collections of marine animals are as yet insignificant.

My stay here has as yet been too short, of course, to allow of exhaustive generalizations with regard to the zoological relations of the islands, the more as I have been able to identify with certainty only a small portion of the animals which I have collected. But I do not hesitate to state that the character of the land fauna is palæarctic, as it has been supposed to be. Such being the case, you will not find it surprising that the faunal character of the island agrees more or less with that of Kamtschatka.

Although I am not prepared at present to give the reasons for my hypothesis, I still should like to remark that several facts show that

the islands during the period previous to which they received their present fauna and flora were totally covered by the sea, and that since that time they have not been connected with the mainland on either side. From this it would follow that none of the species occurring here are true indigenes. They evidently immigrated, especially and more regularly from the west, from Asia, by means of prevailing winds, currents, and the driftwood carried by these, and more accidentally from the east, from America. That the inhabitants, more independent of those circumstances, likewise show nearer relationship to the Asiatic fauna is partly due to the shorter distance, this being only 100 miles from the nearest cape of Kamtschatka, Cape Kronotski (which by the Russian man-of-war Vestnik this year has been found to be situated 20 miles more to the westward than given in the charts), while the nearest island of the Aleutian chain, Attu, is twice as far off; and partly to the effort of the Asiatic fauna to extend beyond its own limits. It is a well-known fact that the Asiatic fauna is in a continuous and comparatively rapid motion towards the west, especially in northern Europe. But it seems to me that a similar movement takes place in the eastern part of Asia, only in an opposite direction, the proof of which I find in the not inconsiderable number of exclusively palæarctic forms in Alaska, especially among the birds. I here enumerate only *Cyanecula*, *Saxicola*, *Phyllopneuste*, *Pyrrhula*, *Parus obtectus*, Cab., etc.

It is true that the zoögeographical regions overlap each other near their borders, but it is a remarkable fact that America contributes but very little to the fauna. Thus it is probable that ere long we will detect still more Asiatic forms in Alaska, and that hereafter it will be necessary to register as residents such species which at present are known only as temporary or casual intruders.

The occurrence of species peculiar to the islands (and I have no doubt that the final revision of the material collected by me will make known several new ones) will not invalidate what I have stated above with regard to the want of indigenous animals and plants. Their origin is due merely to variability in connection with isolation and time.

As to the plants I shall be very brief, as I am not a botanist. I limit myself to the remark that I find the general character of the flora very much like that of the treeless regions of Northern Europe, the most discrepant features being the splendid *Rhododendrons* (*kamtschaticum* and *chrysanthum*) and the Saranna lily (*Fritillaria saranna*). Still closer, of course, is the resemblance to the plants of Kamtschatka, especially to those in greater altitudes. The plants of both islands are, I think, identical, but the manner of their immigration very likely has caused the occurrence of some species in one island which are absent in the other. Thus I have from Copper Island a small but very conspicuous *Viola* with yellow flowers (much resembling the yellow variety of *V. tricolor*), a plant which I found also in Petropaulski, but not here on Bering Island.

The islands are completely destitute of trees, unless one might be tempted to term so the shrubs of *Salix*, *Sorbus*, and *Betula*, from 6 to 8 feet high, some of which obtain a proportionally great thickness close to the ground. Thus, for instance, I have a section of a birch with a diameter of 2 inches.

The vegetation, especially in the valleys, is very luxuriant, in most places of a man's height or more. This exuberance is especially due to the rich soil in connection with the extreme moisture, for the temperature during the three months, during which the plants have now been growing, was not high. My observations show a mean of+42°.7 F. for June, 48°.2 for July, and 54° for August. The minimum temperatures for the same months are 31°.3, 39°.4, and 44°.6, respectively. In higher latitudes the length of the day and the intensity of the light produce the same effect, but as we live here in latitude 55°, under a sky generally overcast, we do not find the same conditions as we should there.

Of land and fresh-water invertebrates I have collected only some specimens of worms, mollusks, and arthropods. The worms are represented only by a species of *Lumbricus* and by two *Hirudineæ*.

The mollusks are more numerous, including one bivalve and two or three pond snails, seven land snails, and one slug. Among the land snails there are several extremely small *Helices*, scarcely larger than a pin's head, some of which I suspect to be new. They are surely not the young of the larger kinds, of which I possess young ones also of the same size. As a rule, all these animals are of small size, except a medium-sized *Limnæus*, and with the same exception they are not very numerous.

Of myriapods I have found only a few species, while the spiders have yielded a richer harvest.

As a rule the winged insects seem to be more numerous, with regard to both individuals and species, which is also the case near Petropaulski. In the first place, the mosquitos make themselves very conspicuous. Although not quite in such large numbers as in Kamtschatka, where the furious attacks of their legions sometimes prohibited me from securing a bird I had shot, and usually a valuable one, even here on the island they seriously interfere with the duties of a collecting naturalist. The diurnal lepidoptera seem to be very scarce. I have seen only a single one, early in the spring, on the 21st of May; it was a butterfly, much like if not identical with *Vanessa urticæ* L., but unfortunately the chase was unsuccessful. My lookout for some specis of *Argynnis*, *Erebia* or *Tieris* has been completely in vain. The *Noctuina* are not very numerous either, while the *Geometridæ* and *Microlepidoptera* are more common.

The beetles are not numerous, including up to date only one or two *Curculionidæ*, one or two *Elateridæ*, one *Silpha*, some *Staphylinidæ*, *Dytiscidæ*, *Gyrinidæ*, *Carabicidæ*, and a *Cicindela*, which I have seen at only a single place, although it is a conspicuous species.

Vol. VI, No. 5. Washington, D. C. June 22, 1883.

Of crustaceans the fresh-water ponds have yielded a *Branchipus*, some *Gammaridæ*, one *Daphnia*, and one or two other almost microscopical species, which, I think, belong to *Cyclops*.

I can hardly write anything about the fishes inhabiting the rivers and lakes. It will be better to postpone this topic until next year, and I shall limit myself to a mere enumeration of the species observed by me up to date, viz, *Gasterosteus pungitius* L., and *G. cataphractus* (Pall.), *Salmo callarias* (Pall.), (called *Goletz* by the natives here), *Oncorhynchus lycaodon* (Pall.), (Russian, *Krasnaja Riba*), *O. sanguinolentus* (Pall.), (Russian, *Kisutch*), *O. proteus* (Pall.), (Russian, *Gorbuscha*), and the "*Bajdarsik*" of the natives, which I have not yet been able to make out. "*Sik*" is the Russian name of *Coregonus*, but I do not believe that it belongs to that genus, as the mouth extends beyond the eye. Probably it is the same species called *Coregonus* by Nordenskjöld (Vega Expedition, American edition, page 618), as I do not know any other one to which to refer this name; the three other species of which he speaks are *callarias*, *lycaodon*, and *proteus*.

In my next report I hope to be able to add another Salmonoid to the list of the species known (as I suspect the occurrence of such a one).

Batrachians and reptiles are wanting altogether on the island, as might be expected. Dr. Dybowski and I have been searching very eagerly for a *Salamandrilla*, as we suspected the "*Kragani*," of which the natives told us, to be such an animal. It turned out, however, to be a large *Dytiscus*.

The ornithologist starting for Bering Island will probably prepare himself beforehand for hunting and collecting two large, rare, and interesting birds, viz, *Thalassaëtus pelagicus* (Pall.) and *Phalacrocorax perspicillatus* Pall., as Pallas, on Steller's authority, gives Bering Island as their proper habitat, where they occurred in abundance. You will not be more disappointed than I am in learning that there is no hope whatever of getting a specimen of the latter, and very little of obtaining any of the former from Bering Island.

It is not to be doubted that the *Phalacrocorax perspicillatus* does not occur on the islands at present. The natives, however, remember very well the time when it was plentiful on the rocks, especially on the outlying islet Are Kamen. About thirty years ago, they say, the last ones were seen, and the reason they give why this bird has become exterminated here on the island is that it was killed in great numbers for food. They unanimously assert that it has not been seen since, and they only laughed when I offered a very high reward for a specimen.

When Pallas gives Bering Island as the habitat of the *Thalassaëtus* I feel tolerably sure that he has misunderstood Steller's words, or that Steller, if he really has reported its occurrence, met with only a straggler from

Kamtschatka. The former supposition seems to me to be more probable, for the reason that Steller, in his description of Bering Island, does not mention this eagle.* He, however, speaks of an eagle in the following terms: "Von seltnern, an der sibirischen Küste nicht gesehenen Vögeln habe ich dort [Bering Isld] einen besondern Seeadler mit weissem Kopf und Schwanz . * * * angetroffen * * * jener nistet auf den höchsten Felsen, und sie haben im Anfang des Junius Junge, die ganz mit weisser Wolle bedeckt sind." This is the same bird of which he speaks in his "Beschreibung von dem Lande Kamtschatka" (1774), pp. 193–194, as follows: "Eine Art unbekannter und sehr schöner Adler, so aber in Kamtschatka viel seltsamer vorkommen als in America und den Inseln im Canal, dahero auch solche bis diese Stunde noch nicht erhalten können. Es ist derselbe so gross als der *Haliætus*, ganz schwarz, ausgenommen den Kopf, *Uropygium*, schwarze Füsse† und Schenkel, welche so weiss als Schnee sind. Er macht sein Nest auf hohen Felsen, aus Reisern im Diameter von einen Faden einen Schuh dicke und legt seine Eyer gegen den Anfang des Junii, zwey an der Zahl. Die Jungen sind ganz weiss, ohne einige Flecken; und stiesen die beyde Eltern, da ich auf Bärings Eilande das Nest besahe, dergestalt auf mich zu, dass ich mich kaum ihrer mit dem Stock erwehren konnte. Ohnerachtet ich den *Pullo* keinen Schaden zugefüget, verliesen die Alten dennoch das Nest und baueten sich ein anderes an einen Felsen wohin niemand möglich zu kommen."

I think there can be little doubt that the bird thus described is a *Haliætus leucocephalus* (Linn.) in spite of the white "thighs," which perhaps is only a *lapsus calami* of the person copying the original manuscript, this being, as we know, only a rough draught of Steller's, in common with the "black feet." The following are my special reasons: 1. The habitat given by Steller agrees exactly with that of *H. leucocephalus*, while *T. pelagicus* is common in Kamtschatka, and does not occur at all in America; 2. "White head" can only be said about *leucocephalus* and not of *pelagicus*, which has merely the forehead white; 3. If Steller had intended to describe the *pelagicus* he would not have overlooked the white shoulders, a much more conspicuous feature than the white forehead; 4. Even if Steller's manuscript contained the words "thighs white" it would be of little importance, as it seems that he did not kill the bird and only made the description from the living animal. In *pelagicus* the whole abdomen is white. The supposition here advanced seems the more plausible, as a pair certainly belonging to this species still breeds in the neighborhood of the place where Steller and his comrades wintered. Besides, *T. pelagicus* inhabits exclusively the dense and large forests, and is not known to rear its young ones in such treeless localities as those of Bering Island. When it occurs here, it is, at

*Neueste nord. Beitr., II (1793), p. 229.

†This is completely senseless. I conjecture it to be a misprint for "Schwanzfedern."

present at least, only as a lonely straggler from Kamtschatka, usually a young bird, and there is no reason why this should have been different during Steller's time. I have seen such a young bird here, shot on the island, obtained by Mr. Grebnitzky, and forwarded by him to the Academy in St. Petersburg. It was in the same plumage as the young specimen in the National Museum. The measurements are as follows: Total length 910^{mm}; chord of culmen from forehead to tip 85^{mm}, from cere to tip 68^{mm}; radius of curvature of culmen from cere to tip 41; bill from tip to mouth 84, to hind angle of nostrils 62, and from this point to fore angle of eye 40^{mm}; height of upper mandible at upper border of cere 37, and its breadth at the lower border of cere 27^{mm}; gonys, 29; wing, 630; tail feathers, 340^{mm}; from feathering on front of tarsus to base of middle claw 142; chord of the latter 34, and of its hind claw 44^{mm}.

It will be seen from the above statement that the bald eagle is an inhabitant of the island, but I can affirm that it is very scarce at present in proportion to what it must have been only a few years ago, judging from the many abandoned nests and from reports of the residents.

But it seems as if a third species of sea eagles should be added, not only to the fauna here, but even to the list of known birds, for I have never seen a young *Haliœetus* with the whole lower surface almost white, and the upper side with dark tips and edgings on a whitish bottom, such as my No. 1055. This, a young ♀, still with black tail, was shot on the 15th of May, measuring in total length 890^{mm} (35 inches), with a stretch of wings of 2.220^{m} (87.40 inches); iris, faint yellowish white; bill, horny brown; cere, yellow with horny brown shadings on the back; feet, bright golden yellow.

Compared with the young of *H. leucocephalus* of the same age, it has, quite in contrast with the white color of the body, the tail feathers, under tail-coverts, and axillaries still darker colored. The size is not inconsiderably less than that of the bald eagle, as the specimen in question represents the largest size of its kind, being not larger than an old male of the said species. The bill is fully equal in size to that of a young *leucocephalus*, and the feet likewise; but the body, tail, and wings are smaller.

I have little doubt that this bird if more mature would have assumed an almost uniform white plumage below, with white tail, a supposition corroborated by the statement of Mr. Grebnitzky, that he himself once has observed here, on the island, an eagle with a white lower surface and tail.

That we do not deal in our case with an albino is evident not only from the color of the eyes, but the character of the whole plumage would also contradict such a theory. The white color does not appear as an irregularity, and the dark colors are deep and distinct.

Upon the whole, I reach the conclusion that the present bird is sufficiently distinct from *H. leucocephalus*, and, consequently, also from *H.*

albicilla (L.). There are two other species, however, of which I know only the names, viz, *H. leucoryphus* (Pall.) and *H. leucogaster* (Gm.); but Dr. Dybowski, who is well acquainted with the former, asserts that this is quite a different bird, while Dr. Henry Guillemard, who has been collecting in Central Africa and is quite familiar with the latter, corroborated the same statement upon seeing my bird during a day's visit here. Both received the impression that the species is a new one.

Did I not have the hope that Mr. Ridgway would take the trouble to compare this specimen with those in the National Museum, and describe it if he should come to the same conclusion, I should not hesitate to give it a name. But as the collection of birds will be placed in such good hands as his, I think it advisable to wait for his decision.

In this connection I will merely mention some other forms which I suspect to have been hitherto more or less unknown, or wrongly known, likewise leaving to Mr. Ridgway the labor of having them compared, described, and named if he should find them to be actually new.

In the first place I call your attention to the four larks, Nos. 1020 and 1117 from Bering Island, and 1242 and 1249 from Petropaulski, where I found this species, in one place at least, tolerably common. The lengths are respectively, 186, 187, 183, and 173^{mm}; iris, dark brown; bill, pale flesh color; culmen and tips of both mandibles, blackish brown; feet, light reddish brown; tarsal joint, dark grayish; toes below, livid; nails, blackish gray. It is much like the common European *Alauda arvensis* L., but it appears to me to have lighter and clearer colors. The size agrees very well with that of birds from Northern Europe.

No. 1251 is another passerine bird, thought to be new. It is a kind of willow-warbler, common in Petropaulski, but not observed here on the islands. My only specimen is a male, shot on the 5th of July, 1882. Total length, 149^{mm}; iris, hazel; feet, clear yellowish brown.

The loud song, consisting of the syllables *witshe-witshe-witshe-witsh*, and somewhat resembling the sound made by whetting a scythe, was heard, especially towards night, from all sides when walking through the high grass and willows covering the swampy slopes of the mountains with a thicket almost impenetrable both to foot and eye. You would very seldom get a glimpse of the watchful songster, when, clinging to the middle of the upright stalk of some high orchid or grass, he did his best in the singing-match with one of his own kind or a *Calliope kamtschatkensis* or a *Carpodacus*. But no sooner would you move your gun to secure the longed-for specimen than he silently disappears, as completely and suddenly as if he possessed Dr. Fortunatus's cap. The only way to obtain a specimen is to watch patiently near one of his favorite bushes, with the gun ready. For hours I have thus sat in the wet swamp, almost desperate from the bites of the numberless bloodthirsty mosquitos, which I did not dare to wipe off, fearing to drive away the silent bird, who perhaps was watching my immovable figure until he was satisfied as to his safety. Curious, but still cautious, he

would come nearer, slipping between the stems and branches nearest to the ground, uttering a very low, thrush-like *tak; tak; tak; tak*, and with the tail straight upright, very much like a long-tailed *Troglodytes* both in color and conduct. And if I kept absolutely quiet he sometimes would proceed close to my feet, looking curiously at me with his pretty dark eyes. But before the challenge of a neighbor had attracted his attention and provoked his reply, which he usually began with a short trill, it would not have been advisable to move a muscle.

Then comes the time to lift your gun very slowly, stopping as often as he suspiciously stops his song, until the "crack" puts an end to it forever, and you hold in your hand a crushed specimen, unfit for preparation, when you have to shoot from too short a distance, or return without anything, while, after a longer shot, you cannot find the plain-looking little bird amidst the immense vegetation in the dim light of the vanishing day and tortured by the intolerable mosquitos. You will understand from your own rich experience how much pleasure it gave me when I, at last, obtained a tolerably good specimen. Should it prove to be a valid species, I would be obliged if the name of its first discoverer, Dybowski, be affixed to it.

The family of sand-pipers is very well represented here on the island, and my collection therefore contains not less than nineteen species, or nearer one-third than one-fourth of the total number of species collected, a number liable to be not inconsiderably increased before the list embraces all the species occurring here as residents or visitors. I must confess that there are several species among my birds which I have not been able to identify, although I have no hope that all these will prove to be new. Thus the most common limicoline bird here is an *Arquatella* (Nos. 1031, 1039, 1044, 1048, 1085, 1107, 1108, 1262, 1344, 1345, 1468, etc.), about which I feel quite sure that it is a very well known species, but as to these birds it is more difficult to determine the species from memory alone than in almost any other group that I know of.

But there are in my collection two species, the common forms of which I have been well acquainted with, showing some differences from these, if I am not quite mistaken. The one is the snipe, which, having only fourteen tail-feathers, comes nearer to the European *Gallinago gallinaria* (Müll.) than to the American *G. wilsonii* (Temm.). But I do not think that the former has the crissum and the under tail-coverts so dark brownish as my specimens, nor is the pattern of their greater wing-coverts quite identical. Snipe-hunting without a dog is exceedingly difficult here. For this reason I have at present only five specimens to send of this bird, which, in suitable localities, is by no means uncommon.

The other one is a form of *Pelidna alpina*, which seems remarkable for its pure colors and the absence of any dark spot on the lores. I cannot unite it with *P. chinensis* Swinh., which has been identified by Taczanowski with *P. schinzii* (Brm.), and consequently must be much smaller than my birds.

Finally, I have referred five birds (Nos. 1637, 1641, 1646, 1652, and 1659), with much doubt, to the genus *Tringites* Cab., on account of the very short bill, this being considerably shorter than the head, and the long toes exceeding the tail by their whole length when stretched backwards. The feathering of the bill seems to me likewise to be more protracted than in other *Tringinæ*, although not to such a degree as given for the American *T. rufescens* (Vieill.). Besides, there are no black mottlings on a white ground on the wing, only some faint whitish mottlings at the base of the remiges as it is often seen in *Tringæ*. A conspicuous feature is the fine black bristles before and below the eyes, almost encircling them, and, upon the whole, more developed than in other genera. The color, except the rusty crown, is to a certain degree like the plumage of the snipe, and the bill, being somewhat widened, grooved, and furrowed at the tips, and having a very long nasal groove, also remotely resembles that of the bird mentioned.

The total number of species collected during these months amounts to sixty-one, without counting those collected in Petropaulski; and, besides these, I have observed about ten species of which no specimens have yet been secured. Among the latter is *Sterna longipennis* Temm., of which a specimen was shot during my stay in Petropaulski, but on my arrival I found it in such a state of decomposition that it was quite impossible to preserve it. This species bred on the island, but only in four pairs. I looked in vain for your *Sterna aleutica*. Upon the whole, the poverty of representatives of the subfamilies *Sterninæ* and *Larinæ* is very noticeable; thus, for instance, I have met with only one species of the genus *Larus*, *L. glaucescens*, Licht., being not so numerous, however, as one might expect.*

Of the seventy or more species obtained or observed here during the four months (of which one was spent on the trips to Petropaulski) from the middle of May to the middle of September, about one-third consists of circumpolar birds, one-third Pacific birds, while the remaining third is palæarctic, or consists of East Asiatic forms. Only a few species can be regarded as American, viz, *Haliæetus leucocephalus* (L.), also occurring in Kamtschatka, and a *Branta*,† which I have provisionally identified as *leucopareia* (Brandt). During my absence in Kamtschatka a specimen was shot in the neighborhood of the village, and —— eaten! Fortunately, however, the head and upper part of the neck had been

* The species of *Larus* observed on Toporkof Island by Dr. Kjellman and Dr. Stuxberg belongs here. From the translation of a portion of Professor Nordenskjöld's narrative of the Vega expedition in Henry Elliott's monograph of the Seal Islands, p. 113, it would seem as if they also had found this bird there "by the millions." The American edition by Leslie, p. 617, shows, however, that they expressly restrict this statement to *Fratercula cirrhata* in accordance with fact.

† Sundevall (Tent. meth. disp. Av., p. 145, 1872) has substituted for *Branta* Scop. *Brenthus* "Antiq.," a name accepted by some later authors, for instance Dr. Richenow (Orn. Centralbl., 1882, p. 36), but *Brenthus* is preoccupied for a genus of *Coleoptera* since 1826.

cut off for my inspection, and with some difficulty I succeeded in skinning and preserving it. Besides the six downy young ones, a specimen was captured alive, and I hope to keep it safe from the numberless (about 600) old dogs of the village until it has assumed its full plumage. Whether the *Anorthura* belongs to *alascensis* Baird, or to *fumigatus* Temm., or whether these two are identical is beyond my present knowledge. On the other hand, I am very doubtful as to the groups to which *Hierofalco candicans* (Gm.) belongs. *Acanthis exilipes* (Coues) I regard as circumpolar, as I think it hardly practicable to separate the palæarctic form from the American one.

It is not my intention to give at present any list of the birds, but merely a brief enumeration of the more interesting species of the old world not mentioned above:

Fringilla montifringilla L.
Leucosticte brunneinucha (Brdt.).
Euspiza aureola (Pall.).
Anthus sp.
Motacilla kamtschatica "Pall." (Auct.).*
Phyllopneuste borealis Blas.

Cuculus canorinus Cab.—I have one specimen from Petropaulski, one from Copper Island, and one from Bering Island. In the former the stomach was filled with the remains of *Bombus*, in the latter two with a plenty of *Gammaridæ!* The cry is exactly like that of the European species.

Charadrius fulvus Gm.
Eudromias mongolicus (Pall.).
Ægialitis alexandrinus (L.).
Totanus glareola (L.).
Totanus nebularius (Gurm.).
Tringoides hypoleucos (L.).
Actodromas temminckii (Leisl.).
Actodromas damacensis (Horsf.).
Actodromas subminutus (Midd.).
Nettion falcatum (Pall.).

* This form is usually quoted as *M. alba* var. *kamtschatica* Pall., Zoogr. Ross.-As., but I recollect very well that Pallas (*op. cit.*) does not give such a name. It has usually been identified with *Motacilla japonica* Swinh. (= *M. lugens* Temm. et Schleg., Faun. Jap.), but until we have learned whether the "black cheeks" of the latter is a mistake or not, I think it will be safest to keep the Kamtschadalian bird separate under the above name, as its cheeks are white with only a well-defined black stripe through the eye. The specimen from Petropaulski proves the identity of the birds here from the island with those of Kamtschatka. I now think that the birds in the National Museum, collected in Siberia by Mr. W. H. Dall and Dr. Bean, as also the specimen seen by Mr. Turner on Attu and the bird from California, all referred to *M. ocularis* Swinh., belong rather to *M. kamtschatica*, being young, or in winter plumage, with gray back. *M. ocularis* seems to be an inland bird, not at all occurring on the Pacific coast.

Of course the relations of the constituents of the ornis, as given above, are based only on a rough judgment, but it is thought that the zoögeographical affinities of the islands are tolerably well expressed. It is to be expected that the additions which the fauna is likely to receive during the following eight months will raise the percentage of the circumpolar birds.

The ornis, however, is characterized not only by what it possesses but also by what it lacks. Thus I had expected to find *Saxicola œnanthe* (L.) and *Budytes flava* (L.) (in Petropaulski I found the latter breeding, being more like the typical form than any other I have seen) and an *Otocoris*, to which the frequent sand-dunes offer favorite breeding places, one or two Siberian true *Emberiza* and *Schœniclus*, *Chelidon erythrogaster* (Bodd.)* (abundant in Petropaulski), and an *Archibuteo*. The orders *Herodii* and *Alectorides* are wanting altogether, and the remarkable poverty of the *Laridæ* I have already mentioned.

As a matter of course, my time was wholly occupied in collecting and preserving specimens of every branch of natural history, studying the rookeries, and taking meteorological observations. I had scarcely any opportunity for special ornithological studies.

Some observations, however, relating to the seasonal change of plumage of the ptarmigan occurring here (*Lagopus albus* Gm.) may perhaps be of some interest, as it forms a question involving the most contrary opinions among observers. Want of time will not allow any revision of the matter at present. For this reason I give the observations as they were written in my journal with the fresh birds before me.

With regard to No. 1342, a ♂ shot July 29, 1882, I find the following notes: The feathers on head, breast, and abdomen are old; that is to say, they are without any trace of the "outer follicle," and thus are also all the single white feathers, found mixed here and there between the brown ones on the upper surface. Almost all the dark feathers have their bases more or less concealed in the sheaths, and between these protrude still "unblown" sheaths with brown terminal pencils—in short, brown feathers in all stages of growth. The few dark feathers, also, on the hypochondries, some of which have white terminal spots, show the same phases. None of the white feathers are new. Between the white ones on the breast some sheaths are seen protruding, but still without end pencils, showing themselves, however, to be dark ones, when opened.

Another ♂ shot about fourteen days later (August 10, No. 1419) shows exactly the same conditions, only that the new dark feathers on the lower parts among the white ones are more developed, being blackish with white terminal spots.

The ♀ shot the same day (No. 1418), with the whole portion covering the sternum, the inner sides of the femora, and the fore part of the ab-

* I have no doubt that this species is identical with the North American bird, as both color and size agree very well with your description in Rev. North Amer. Birds, I, p. 295.

domen absolutely naked, has the feathers more uniformly developed, as most of the dark ones are fully grown out, only a few on the interscapulum being still partly in the sheaths. Besides, two or three new, yellowish-colored feathers protrude from the naked parts.

During my boat expedition around Bering Island in the latter part of August, I procured several males, two of which, being the most interesting ones, were prepared. Unfortunately, the bad weather almost spoiled them afterwards. (Nos. 1487 and 1489.) The following remarks are an extract from my journal of August 23: The summer plumage is now wholly developed in all specimens, as the dark or rather black feathers of breast and abdomen are out too. Some few dark ones, however, are still in their sheaths, this being especially the case in the aforesaid parts of No. 1487. But the white feathers are in progress on the same parts too, being, especially in No. 1489, developed to such a degree that the breast and abdomen are white already in the middle from the half "blown" new white feathers. In No. 1487 new black and white feathers occur on the same parts and in the same state of development. Consequently it follows that the moulting of the winter plumage does not extend beyond the breast and abdomen; these parts for a short time assuming black feathers, while at the same time the new white feathers of the coming winter plumage make their eruption on the same parts, and that the change of the summer plumage first begins where it had last been assumed. The same remarks are applicable to the wing coverts, with the modification that the greater part of these is white through the whole year, the new and the old white feathers staying side by side in my specimens. In the latter the inner wing feathers are new, while the three outermost primaries still remain from the foregoing year. The shafts of the new primaries are dark gray, this color being faded and almost invisible on the old ones.

The specimens show a very marked difference in color of the upper surface. No. 1489 has the upper parts darker, less rusty, and the feathers less distinctly banded, thus assuming a more irregular and more minutely watered aspect. It must be remarked, however, that in No. 1487 the few feathers still undeveloped, are of a darker color and of a pattern more like those of No. 1489 than the more rusty colored feathers of the remaining upper plumage. But these feathers are so few in number that I feel satisfied that this specimen at least would not have assumed any new plumage before the final change into the white winter plumage. The dark specimen has also some new and "unblown" feathers among the old ones on exactly the same parts as No. 1487. From this I feel very much inclined to believe that the difference is caused by age, and I doubt at present very much the idea of Professor Lilljeborg that the darker plumage signifies a special autumnal plumage. It seems to me that we may reasonably conclude that *Lagopus albus* in this region is subject to an uninterrupted change from the moment when the first dark feathers make their appearance in spring until the last one

has disappeared in fall, and that no marked seasonal plumage can be distinguished, except the white plumage of the winter and the dark one of the summer.

But it will be well to recollect here that the moulting of these birds depends so much upon the climate that one can hardly conclude from observations made in one country what the condition in another is. The many unpleasant quarrels about this theme have arisen from want of understanding the fact that it does not follow that an observation made in the north is erroneous because it differs from another made in the south, or *vice versa*.

I must confess, however, that the theory of a change of color from winter to summer plumage, without change of feathers, and the observations upon which it rests, is an insolvable problem to me.

The past four months form a season during which I had very little opportunity for observing or collecting cetaceans, and consequently I have but little to report about them. It is, however, to be expected that the fall and winter will prove richer, and that I may be able to satisfy you better in this repect next year. But as the natives have no means of capturing the living animals, I shall have to depend exclusively upon what may occasionally be cast on shore.

The female finback whale which we found during our boat expedition at Lissonkavaja Buchta, on the 23d of August, seems to me to belong to *Balænoptera velifera* Cope, agreeing tolerably well with it in dimensions and proportions, of which I give a table below. The baleen, of which I have secured some pieces (No. 1629) for comparison with specimens of the above-named species in the National Museum, has on the shorter layers a whitish color, with dark bluish-gray longitudinal and parallel stripes. These stripes increase in breadth, number, and darkness of color towards the longest baleen, which is dark bluish-gray with light stripes.

The base of the dorsal fin commences about at the terminal third of the body, and is placed almost directly above the anus. Its height—that is, the vertical from its tip to the back—is about $\frac{1}{30}$ of the total length of the body, which is about $6\frac{1}{2}$ times the length of the pectorals.

From this it will be seen that the exterior proportions are somewhat similar to those of *Sibbaldius laticeps* Gray, except that the pectorals are smaller in the latter species.

The dorsal fin is perfectly falcate with deeply incised posterior edge, showing that the animal does not belong to the var. *borealis*.

The color could not be ascertained, as the animal had been lying so long on the beach that it was perfectly yellowish white with the exception of some blackish patches on the shoulder region.

The impossibility of moving or lifting the colossal body prevented me from taking measurements in a straight line. For the same reason I could not obtain any measurement of the circumference.

The average breadth of the pectoral folds I found to be 80mm (3.15 inch.), and that of the eminences between them about 50mm (1.97 inch.)

In spite of a minute search for parasitic animals, none could be detected.

Dimensions.

	Meters.	English feet and decimals.
Total length from tip of upper jaw to notch of caudal fin along the back	15.77	51.69
Length from tip of lower jaw to notch of caudal fin along the abdomen	18.63	55.21
From end of upper jaw to spiracles	3.60	11.81
Length of spiracles	0.40	1.31
From end of upper jaw to anterior end of dorsal fin	10.60	34.78
Length of dorsal fin	0.75	2.45
Vertical from tip of dorsal fin to the back	0.42	1.37
From posterior end of dorsal fin to caudal notch	4.42	14.50
From end of upper jaw to corner of mouth	4.10	13.45
From end of lower jaw to corner of mouth	4.40	14.44
From end of upper jaw to anterior edge of upper lip	0.18	0.59
From end of upper jaw to anterior corner of eye	4.30	14.11
Longitudinal diameter of eye-opening	0.10	0.33
From end of lower jaw to anterior corner of vulva	13.00	42.65
Length of vulva	0.60	1.97
Length of perineum	0.10	0.33
Length of anus	0.15	0.49
From posterior corner of anus to caudal notch	4.78	15.68
Length of pectorals along anterior border	2.60	8.53
Breadth of pectorals at base	0.50	1.64
Length of lobes of caudal fin from tip to notch	2.10	6.89
Length of lobes along the exterior margin	2.65	8.69
Breadth of lobes at the notch	1.10	3.60
From vulva to nearest breast-fold	2.00	6.56
Length of longest baleen, exposed part	0.55	1.80
Breadth of longest baleen at the insertion in the gum	0.22	0.72
Length of fringe of longest baleen (average)	0.15	0.49
Length of shortest baleen, exposed part	0.34	1.08
Breadth of shortest baleen, at the insertion in the gum	0.16	0.52
Length of fringe of shortest baleen (average)	0.10	0.33

Besides this larger kind of whale, several denticetes occur in the waters around the islands, but, as the natives do not hunt them, they are captured only when they are cast ashore, which does not happen very often. Thus a sperm whale (*Physeter macrocephalus?*) was cast on shore some years ago, yielding a rich harvest of oil and blubber. Besides an *Orca*, which is said to visit the rookeries, but of which I have not been able to procure any specimen, or even to see one, there are at least two species of the family *Ziphiidæ*, both undescribed, as I suppose. I am very much indebted to Mr. Grebnitzky for a skull of each of the species, for one of which I should like to propose the name *Berardius bairdii*, as a slight token of my esteem and gratitude.

As I am now almost without any literary means, I find it impossible to decide with certainty in what genus this species will finally have to be placed. But I think that the supposition that this specimen (No. 1520) is a young *Berardius* may not be very far out of the way. At first I suspected that it is a *Dioplodon*, but the size of the skull, in connection with the distinctness of the sutures, the evident maxillary crests, and the terminal position of the teeth, very soon led me to the above conclusion.

The specimen in question has very low and scarcely incurved maxillary crests; the shortest distance of which is two and two-thirds times greater than their greatest height, and although it still is in its "adolescent" stage, I should greatly doubt whether the crests in this species ever become developed to such a degree as, for instance, in *Hyperoödon diodon* (Lacép.). The groove between the maxillary and the nuchal crest is very shallow. The maxillary notch is deep. The beak is long, making only a little less than half the length of the entire skull. Nares straight; right nasal larger than the left one, but not very much. The occipital condyles do not come in contact beneath the foramen magnum; the symphysis of the lower jaw is very short, amounting to only one-fifth of the whole length of the jaw.

Want of time and books prevents me from making more extended remarks, and until I can present an exhaustive and comparative description, I shall have to content myself by giving a provisional table of dimensions. The following dimensions are in millimeters and English inches, and are in every case measured in a straight line:

	Millimeters.	Inches.
Length of skull	1405	55.32
Greatest breadth	698	27.48
Greatest height	530	20.87
Length from the process of supramaxillaries before orbit to posterior edge of condyles	610	24.02
Length from the same process to tip of beak	890	35.04
Depth of maxillary notch	50	1.97
Length of premaxillaries	1222	48.11
Premaxillaries reach beyond supramaxillaries	134	5.28
Distance of upper edge of maxillary crests at their anterior end	228	8.98
Distance of same at their middle	358	14.10
Greatest height of maxillary crests	86	3.39
Length of visible part of vomer	325	12.80
Distance from anterior tip of vomer to tip of beak	275	10.83
Length of pterygoids	295	11.62
Height of foramen magnum	70	2.76
Width of foramen magnum	80	3.15
Distance of condyles at upper edge of foramen magnum	100	3.94
Closest approximation of condyles beneath the foramen magnum	2	0.08
Entire length of lower jaw	1292	50.88
Height of lower jaw at second tooth groove	100	3.94
Length of symphysis	257	10.12
Greatest diameter of foremost tooth groove (longitudinal)	100	3.94
Shortest diameter of foremost tooth groove (transverse)	45	1.77
Greatest diameter of posterior tooth grove (longitudinal)	40	1.58
Shortest diameter of posterior tooth groove (transverse)	35	1.38
Distance between the tooth grooves	65	2.56

This specimen was found stranded in Stare Gavan, on the eastern shore of Bering Island in the fall of last year, and only the skull was preserved. From analogy I should judge that the entire length of the animal must have been about 18 feet (5½ meters). This species is well known by the natives for the cathartic quality of the blubber, resembling in this respect the Atlantic "Dögling," or "Anarnak" (*Hyperoödon diodon*). The Russian name, by which the inhabitants here designate this whale, is *Pla-un* (sp. Plăoon), while the Aleut name is *Kigan agalusoch*, the meaning of which is said to be "having teeth on the nose,"

a very inappropriate designation, as the teeth are situated on the tip of the lower jaw, and not on the nose.

The second species, founded on my No. 1521, seems to belong to the Cuvierian genus *Ziphius*, having for its type *Z. cavirostris* Cuv., and more especially to the group (*Petrorhynchus* Gray) which is characterized by having the nasals, in connection with the premaxillaries, formed to a vaulted roof over the nares, and the ethmoidal cartilage ossified and extending above the premaxillaries in the anterior part of the beak.

I take great pleasure in dedicating this interesting species to its discoverer, the obliging governor of the Commander Islands, Mr. Nicolaj Grebnitzky, to whom science is indebted for these and many other contributions, and myself for so much courtesy. I propose to name it *Ziphius grebnitzkii*.

That the typical specimen is an old animal is evident from the fusion of the bones and the indistinctness of the sutures, thus making it somewhat difficult to distinguish the individual bones.

After my return from here I shall give a more complete description and figures; but in the mean time the following characters may serve for the identification of the species, as I consider most of them diagnostic:

The tip of the beak is obtuse, with a vertical furrow in the middle, the lower jaw with the two terminal teeth protruding considerably beyond the upper one. From about the middle of the beak towards the tip the mesethmoidal, ossified in its whole length, arises, like a rounded staff, between and above the premaxillaries, following these to the tip and being totally fused together with them. The nasal groove is very unsymmetrical, owing to a very prominent asymmetry of the premaxillaries and the nasals, so that the direction of the oblique nares forms an angle of not less than 20 degrees with the vertical plane through the longitudinal axis of the skull. The right os nasale and the premaxilla of the same side are by far the larger ones, and form the principal part of the roof above the nares, the nasal not reaching, however, so far forward as the premaxilla. The antenasal groove is large, and in the anterior half partly vaulted over by the edges of the premaxillaries, which are somewhat bent inwards.

The zygomatic process of the squamosals touches the orbital process of the frontals without coalescing, however. The jugale is not narrower in the fore part, which, consequently, is not dilated and does not reach the posterior maxillary notch. This is not particularly deep, and the anterior one is still more shallow. The visible part of the vomer is long and narrow, commencing 124^{mm} (4.88 inches) from the tip of the beak. The supraoccipital is rather inclined forwards, forming an angle of about 40° with a line parallel to the vertical axis of the skull.

The following table of dimensions contains the more important measurements in millimeters and English inches:

Table of dimensions.

	Millimeters.	Inches.
Length of skull in straight line	983	38.70
Greatest breadth	600	23.62
Greatest height	525	20.67
Length of beak from anterior maxillary notch to tip	485	19.10
Length of premaxillaries	835	32.88
Breadth of right premaxilla in front of nares	147	5.79
Breadth of left premaxilla in front of nares	93	3.66
Greatest length of right nasal	135	5.32
Greatest breadth of right nasal	84	3.31
Greatest length of left nasal	128	5.04
Greatest breadth of left nasal	40	1.58
Distance from tip of beak to anterior point of nasal roof	690	27.17
Greatest distance of premaxillary crests at fore border of nares	232	9.13
Length of visible part of vomer	258	10.16
Length from anterior end of vomer to tip of beak	124	4.88
Greatest height of foramen magnum	62	2.44
Greatest breadth of foramen magnum	56	2.21
Distance of condyles at upper edge of foramen magnum	95	3.74
Closest approximation of condyles beneath foramen magnum	10	0.39
Length of lower jaw	845	33.27
Lower jaw beyond the tip of the upper one	64	2.52
Length of symphysis	180	7.09
Height at posterior margin of symphysis	66	2.60
Longitudinal diameter of tooth at base	26	1.02
Transverse diameter of tooth at base	20	0.79
Height of tooth	36	1.42

It will be seen that the symphysis of the lower jaw is comparatively short, making only about one-fifth of the entire length of the jaw.

The species occurs here on the island, and my specimen was obtained in the same way as the one previously mentioned.

The natives employ the same names for both, considering them to belong to the same kind. The same defect which makes the *Berardius bairdii* unfit for food for men and dogs is also ascribed to Grebnitzky's Small-headed Whale. That these two whales should be confounded is not so strange, however, when we come to consider that the total length of the two animals, in spite of the much smaller skull of the latter, is nearly the same; for in the same manner as I judged the former to have a length of about 18 feet, I estimate the present old specimen to have been about 20 feet (6¼ meters) long, a length which the adult of Baird's beaked whale will probably also reach.

The most interesting objects in the natural history of these islands are unquestionably the remains of the extinct northern sea-cow (*Rytina** *gigas* (Zimm.) 1780† = *Rhytina stelleri* (Fischer) 1814, and at present the success of the collecting naturalist here depends more or less upon the harvest of bones of this animal which he may be able to send home.

As to my own results in this respect, I shall give you a separate, detailed report, from which you may learn the peculiar difficulties connected with this part of my operations, and the account of the "circum-

* The original spelling of *Illiger*, 1811.

† *Manati gigas* Zimmerman, Geogr. Gesch. II (p. 426). Besides, there are two other specific names older than Fischer's *stelleri*, viz, 1785, *Manati balænurus* Boddaert, Elench. Anim. (p. 173), and, 1800, *Trichechus borealis* Shaw, Gen. Zool. I (p. 240).

navigation" of Bering Island will show you likewise some of the ways in which these skeletons are deposited, preserved, and found.

At this place I shall present only a few remarks, occasioned by the inspection of the 11 skulls which I have obtained, and the two belonging to Dr. B. Dybowski, now in Petropaulski.

It is obvious at first sight, when comparing this series, that a remarkable individual variation is shown by each one of these skulls. Setting aside the differences caused by the more or less perfect state of preservation, these variations especially embrace the more or less marked developments of the lines, crests, protuberances, and processes for muscular insertion, and the more or less robust formation of special parts. Although the skulls are of about the same size, these differences, I think, are due to age, as it is very probable that these large animals must have reached an almost patriarchal age, and that the development of the bones in consequence hereof has been proportionally slow, continuing even after the skull had obtained the full and final size.

But, besides these individual variations, there is another striking difference, which divides the series into two well-defined groups. Dr. Dybowski and I stood side by side, looking at several skulls before us, and I had no sooner perceived and showed to him this fact than he was impressed in the same manner. We now eagerly sought for confirmation in the other skulls, and as we, by a careful examination, found a no less marked difference in the shape of the lower jaw, we brought together a tolerably good collection of these bones, commencing an exhaustive series of measurements to serve as a foundation for and proof of our discovery.* I have given below two tables containing the more interesting of these measurements.

The idea of two different species or varieties of the sea-cow was very soon rejected, and without much hesitation we agreed that the difference is a sexual one. This seems to be the only reasonable solution, and, judging from analogy we think that the broader and more robust skull belongs to the male, while the narrower and more slender one is that of the female, a supposition corroborating the opinion of the natives, who also have been aware of the difference. Of this, however, we were not informed until much later, when we made inquiries about the matter; but we could not learn whether this assumption is founded on traditions from the time when these animals still occurred in the surrounding waters or not.

---

*I call it thus because I doubt whether a similar observation has been published by any one before. This is, maybe, somewhat daring, considering our want of literature, but I prefer to take this risk rather than to wait until next year, and perhaps come too late with "the discovery."

Table of dimensions of skulls of RYTINA GIGAS (Zimmerm.) *not including those of the lower jaw.*

Measurements.	Collectors' No.								Average measurement.	Average measurement.
	Dyboski No 1. *	Stejneger No. 1110.	Stejneger No. 1207.	Stejneger No. 1062.	Stejneger No. 1550.	Stejneger No. 1056.	Stejneger No. 1193.	Stejneger No. 1181.		
Supposed sex	♂	♂	♂	♂	♂	♀	♀	♀	5♂	3 ♀
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
1. Total length from superior margin of foramen magnum to tip of intermaxilla	676	654	636	672*	625*	655*	645	662	653	654
2. Greatest breadth at zygomatic arch	353	353	342	360	338	330	324	331	349	328
3. Distance of tips of occipital mamillar processes	270	266	266	257	264	240	261	258	245	253
4. From mamillar process to posterior angle of zygomatic process of supramaxilla	305	280	280	288	280	295	284	285	287	288
5. Greatest breadth of occipital at base of mamillar process	261	277	254	246	258	269	250	260	259	260
6. Breadth of basilar part of occiput at posterior end of *eminentia ovalis* BRDT	47	61	45	50	46	51	48	45	50	48
7. Breadth of condyloid rami of occiput	51	54	42	47	45	52	47	45	48	48
8. Closest approximation of condyles beneath foramen magnum	66	63	75	51	68	78	67	80	65	75
9. Greatest distance of exterior margins of condyles	222	233	215	218	210	215	205	220	220	213
10. Distance of exterior, posterior angles of parietals	152	177	153	163	148	140	129	145	159	138
11. Distance of exterior, anterior angles of parietals	99	112	101	111	100	96	100	99	105	98
12. Distance of the alveolar margins at exterior tip of intermaxillar process of supramaxilla	84	91	81	78	73?	69	.....	73	81	71
13. Distance of tips of nasal processes of intermaxillaries	74	73	69?	74	77	58	59	55	73	57
14. Length of articular surface of nasal process of intermaxillaries	141	142	.....	140	138	127	136	118?	140	127
15. Breadth of intermaxilla at anterior angle of nasal aperture	74	74	72	69	65	59	57	57	71	58
16. Distance of posterior apices of zygomatic processes of supramaxilla from each other	289	280	263	270	270	265	232	252	274	250

* These specimens have the beak a little defective. Being broken in the same manner, the missing part in each has been estimated to make 10mm.

This table proves the fact that while the longitudinal dimensions are almost identical in the supposed two sexes, most of the transverse dimensions anterior to the occipital bone are much smaller in the female than in the male, the difference averaging from 7 to 25 per cent. of the smaller dimension.

The average measurements give a very clear representation of these relations, and they are therefore very serviceable in trying to express the difference in a diagnosis, because they eliminate the individual variation.*

* I recall here Humboldt's words: "Dass bei allem Beweglichen und Veränderlichen im Raume *mittlere Zahlenwerthe* der letzte Zweck, ja der *Ausdruck physischer Gesetze* sind, welche uns das Stetige in dem Wechsel wis in der Erscheinungen zeigen."

Vol. VI, No. 6. Washington, D. C. June 23, 1883.

It will thus be seen that in the supposed male, the length of the skull is less than twice the breadth at the zygomatic arch [653 < 698 (2 × 349)], while in the female the length is almost exactly two times the breadth (654 about = 656) (2 × 328), and this holds good, not only in the average measurements, but in every single instance:

♂ 676 < 706 (2 × 353)	♀ 655 about = 660 (2 × 330)
♂ 654 < 706 (2 × 353)	♀ 645 about = 648 (2 × 324)
♂ 636 < 684 (2 × 342)	♀ 662 = 662 (2 × 331)
♂ 672 < 720 (2 × 360)	
♂ 625 < 676 (2 × 338)	

We can also express the difference by comparing the length with another dimension, thus: In the male the total length is *less* than 10 times the breadth of the intermaxilla at the anterior angle of the nasal aperture [653 < 710 (10 × 71)], while in the female the length is *more* than even 11 times the same breadth [654 > 638 (11 × 58)], the result being the same in each individual.

♂ 676 < 740 (10 × 74)	♀ 655 > 649 (11 × 59)
♂ 654 < 740 (10 × 74)	♀ 645 > 627 (11 × 57)
♂ 636 < 720 (10 × 72)	♀ 662 > 627 (11 × 57)
♂ 672 < 690 (10 × 69)	
♂ 625 < 650 (10 × 65)	

I think that this will be sufficient at present to show that there exists a well-marked difference, which can be formulated as above. Besides, there are numerous points in which the two groups of skulls can be distinguished, but which cannot be expressed in figures. Unfortunately I cannot give minute comparative descriptions, as the skulls are already packed and shipped.

The same is the case with the lower jaws, of which I herewith give a table of dimensions.

Table of dimensions of mandibles of RYTINA GIGAS (Zimm.).

Dimensions.	Collectors' No.										Average measurement.	Average measurement.
	Steineger No. 1110.	Steineger No. 1181*a*.*	Steineger No. 1132.	Steineger No. 1150.	Steineger No. 1193*a*.*	Steineger No. 1056.*	Steineger No. 1128.	Steineger No. 1129.	Steineger No. 1207.*a*.*	Dybowski No. 1.*		
Supposed sex	♂	♂	♂	♂	♂	♀	♀	♀	♀	♀	5 ♂ ♂	5 ♀
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
1. Greatest length of the horizontal ramus	433	406	426	461	431	423	433	428	436	451	431	434
2. Distance from surface of condyles to inferior, posterior angle	271	261	267	261	240	297	290	280	280	297	260	289

Tables of dimensions, &c.—Continued.

Dimensions.	Collectors' No.										Average measurement.	Average measurement.
	Stejneger No. 1110.	Stejneger No. 1181a.*	Stejneger No. 1132.	Stejneger No. 1150.	Stejneger No. 1193a.	Stejneger No. 1056.*	Stejneger No. 1128.	Stejneger No. 1129.	Stejneger No. 1207.a*	Dyboroski No. 1.*		
Supposed sex	♂	♂	♂	♂	♂	♀	♀	♀	♀	♀	5 ♂ ♂	5 ♀
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
3. Distance from coronoid process to inferior, posterior angle	280	280	292	290	256	320	308	307	316	321	280	314
4. Distance from tuberositas of posterior margin of vert. ram. to inferior, posterior angle	161	183	189	181	154	191	201	190	184	209	174	195
5. Height of symphysis at posterior margin	85	86	86	81	88	90	93	94	108	90	85	95
6. Smallest breadth of vertical ramus	111	109	116	119	98	120	119	115	124	119	111	119
7. Distance of condyles	244	225	254	250	230	231	225	212	232	219	241	230
8. Distance between the inferior, posterior angles	139	145	187	164	152	96	91	124	129	107	157	109

* These jaws evidently do not belong to the skulls having the corresponding numbers on the foregoing table, although they were brought to me together by the natives. As the skulls and mandibles are seldom found together, the natives choose the best-preserved mandible or the one corresponding best as to color, the more as these bones are by no means scarce. This I had decided long before we had conjectured the difference of the sexes, and it will be seen that the remark is also applied to a specimen (No. 1056) in which the supposed sex in both parts agrees.

As I have already remarked, it is very unusual to get a skull with its authentic mandible, for which reason they in all cases ought to be looked upon with critical eyes. The only instance in which I am sure that the two parts belong together is my No. 1110, and as this specimen (in a very good state of preservation) has been regarded by us as the type of the male form, the lower jaws showing a different style are consequently considered to belong to the females.

The differences between the two groups are perhaps more striking in the mandibles than in the other parts of the skull, although the individual variations are very conspicuous too. In general the supposed female mandible is higher, with broader rami, higher symphysis, and more protracted posterior angles, which are bent inwardly towards each other, while in the male they are straight or somewhat turned outward. Thus the proportion between the distance of the two angles and the height of the vertical ramus is very different in the two sexes and may be formulated as follows:

In the male the distance from the articular surface of the condyles to the posterior angle is less than twice the distance between the tips of the posterior angles, while the proportion is the reverse in the female. The words "articular surface of the condyles" can also be replaced by "coronoid process," only that the formula then must be altered so as to read, that the distance from the coronoid process to the posterior angle

in the male is equal to or less than the distance between the angles, while it is greater in the female.

How closely the posterior angles approximate to each other in the female as compared with the male, is clearly expressed by the average figures of this distance and of that between the condyles. While the difference between the figures of the latter only amounts to 11[mm] it is in the former distance, which is not more than about one-half of the other, not less than 48[mm] or in other words: The difference between the average distances of the condyles amounts to about 5 per cent. of the smaller dimension, while the difference between the average distances of the angles is 44 per cent.

The average measurements furnish us with still more distinguishing marks. Thus, in the male the distance between the posterior angles is more than one-third of the total length of the horizontal ramus, while it amounts to almost exactly one-fourth in the female. Besides, the former distance in the male is greater than the smallest breadth of the vertical ramus, while the reverse is true in the other sex.

It may be well to give here the measurements of two other mandibles, which were not included in the above table, the one (No. 1202) a very young male, the dimensions of which would have diminished the average measurements so as to obscure the results, while the other (No. 1636), an adult female, was only found after the table had been compiled, when the other jaws were packed and shipped.

The numbers of the dimensions correspond with those of the table above:

Collector's No.	Sex.	1.	2.	3.	4.	5.	6.	7.	8.
		mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
Stejneger No. 1202	♂	380	245	247	155	84	104	224	122
Stejneger No. 1636	♀	437	288	303	197	99	121	232	112

It is interesting to see how closely the dimensions of the female jaw approximate the average dimensions of the table, and consequently how well they agree with the diagnosis. In the young male the proportions are a little obscured, as the bone has not yet assumed its final shape. The characters of the male jaw, however, are pretty well marked. The outward direction of the posterior angle is especially characteristic.

Concerning the year of the final extinction of the sea-cow I have little doubt that von Baer and Brandt, in supposing it to be 1768, are very nearly correct. That a single individual or two, perhaps, may have survived the others a few years is not impossible, but it is almost certain that such a huge animal, bound to the very coast for its subsistence, hardly could have found a place in which to hide itself from the keen eyes of its pursuers, who were sufficiently numerous and greedy to search for and slay even the last one. Besides, the animal does not seem to have avoided its enemies, a want of intelligence which in a

short time must have been fatal to all. As to the story reported by Professor Nordenskjöld (Vega Exped., Am. ed., p. 606) about an animal seen by two natives still living here, all the residents competent to form an opinion think that he has been deceived. After the investigations made by myself I have little doubt that the natives are right. I find it proper, however, not to publish any details until I shall have returned to Washington.

As to the geographical range of the sea-cow, I have only a few remarks to make. It can scarcely be doubted that it at least occasionally must have occurred on Copper Island. Besides, this is positively affirmed by Mr. Osche, who saw bones there (cfr. "Vega Exped."), an observation, corroborating my own experience. When Professor Nordenskjöld (*op. cit.*, Amer. ed., p. 605) remarks that the sea-cow does not appear to have ever occurred on the Aleutian Islands his statement is contradictory to the information which my friend Lucien M. Turner has received from the natives on Attu.* It would be especially interesting to know whether the statement of the natives, "that a number of bones much heavier than other bones, or more like ivory in weight, are to be found on Semitkhi and Agattu," is true or not.† It is very difficult to see why they should not have occurred on the other Aleutian Islands, as the natural conditions there are the same as here on Bering Island, and the sea-weed, on which the sea-cow fed, is as plentiful there as it is here, or even more so (cfr. the statement of Wosnessenski in Ruprecht, "Tauge des Ochotsk Meeres," Midd. Sibir. Reise. I, 2 p. 202). On the other hand, the probability of their occurence, even occasionally, in the more northern parts of Bering Sea (Nordenskjöld, *op. cit.*, p. 591) seems to be very slight, owing to the scanty marine flora in these waters (Ruprecht, *op. cit.*, p. 203). I have been informed that a certain Mr. Neumann has published in the Journal of the Geographical Society of Irkutzk an account that he had found bones of the sea-cow on the Chukch peninsula, which bones are said to have been deposited in the museum at Irkutzk. Further inquiries proved, however, that the bones were bought by him here on Bering Island. Fortunately, they were destroyed by the great fire in the museum.

---

* An account of which, I suppose, is now printed in his report.

† Information which I have received from a man born on Attu, but now living here, confirms this statement to a certain degree. Of course, he knows the bones of the sea-cow very well, and he has told me that similar bones, also skulls, occurred on Agattu. But he expressly added, that they were smaller than the bones found here. Neither he, nor another man from Attu, who, besides, did not know anything about the occurrence of such bones on Agattu, nor any of the other Aleuts here, chiefly from Atkha, have ever heard the Aleutian name *Kŭkh-sŭkh-tŭkh*, given by Mr. Turner. May, it, perhaps, have been a smaller kind? Any one familiar with these bones will hardly confound them with bones of either seals or whales. The stories of the natives about living animals in the time of their fathers is probably not more to be depended upon than the similar story which was told Professor Nordenskjöld here on Bering Island.

Finally, a word about the Kamtschadalian name "*Kapustnik*" and the conclusions which Professor Nordenskjöld (*loc. cit.*) derives from it. Steller translated it with "Krautfresser," and Nordenskjöld thinks that this word is specially distinctive of a graminivorous animal. The Russian word "*Kapústa*" signifies cabbage, but here and in Kamtschatka, where cabbage has never been cultivated, it is the local term for just that kind of kelp on which the sea-cow fed. The contents of the stomachs of the stranded animals give a natural reason for the name, and no support for the supposition that the sea-cow ever visited the coasts of Kamtschatka alive can fairly be derived from it.

I cannot close the chapter on the sea-cow without adding a few words about the exterior form of the caudal fin, a question highly exciting the scientific world in Washington when I left in the spring. It will be remembered that Mr. Henry W. Elliott made a restoration of the animal, showing the shape of the tail like that of the southern manatee, in spite of the only authentic information on the subject handed down to us by G. W. Steller, the eminent and conscientious naturalist. Besides, there is an old drawing, reproduced by Middendorff and by Nordenskjöld, agreeing with and consequently corroborating the statement of Steller, likewise representing the whale-like shape of the fin. The statements which I have had the opportunity to see (besides Brandt's Latin translation of Steller's words) are found in Neueste nord. Beitr. II, p. 292, "Typogr. Beschr. der Bering Insel," where he says: "Bis an den Nabel vergleicht sich dieses thier den Robbenarten, von da bis an den Schwanz einem Fisch"; and in Krashenninicoff's "History of Kamtschatka," the English edition, 1764, I find the following words: "The tail is thick, and bent a little towards the end; it somewhat resembles the beard of the whale, and somewhat the fins of a fish.

The sources of Krashenninicoff's notes about the sea-cow are, however, only Steller's manuscripts, which were placed at his diposal (cfr. the preface, *op. cit.*, p. vi). There is said to be a drawing in Pallas's "Icones ad Topogr. Ross.-Asiat." (fasc. II), and reproduced in Nordenskjöld's "Vega Exped.," Am. ed., p. 607, pretending to be a sketch made by Steller himself, and showing a very bifurcated and lobated fin.

I remember that the authenticity of this drawing was objected to on the ground that Nordenskjöld's statement of its having been given to Pallas by Steller evidently was false; but Nordenskjöld, *loc. cit.*, only says: "Sketch by Steller, given to Pallas," which is not the same as "Sketch given to Pallas by Steller." That Steller had a sketch of the animal is evident from the words in his "Beschreibung von Kamtschatka," 1774, where (p. 97) he says that he has "sehr weitläüftige Beschreibungen verfertigt, und sie zugleich zeichnen lassen," and it is therefore very probable that Pallas, who had so many of Steller's manuscripts, also had the said drawing. While now all the direct information agrees on this point, it is a very memorable fact that we, if we had only had

the caudal vertebræ of the skeleton left, and no descriptions of the exterior shape of the fin at all, nevertheless would have been forced to restore it as a whale's tail. The large transverse processes of these vertebræ must have had a special function, namely, to support a tail having a fin like that of a whale or a dugong, which have the same kind of processes, and not like that of the manatee, which is destitute of them. By seeing these vertebræ, I feel now more convinced than ever that there is no reason for supposing the old view, which even led to the specific name *Manati balænurus* (1785), to have been incorrect. It has been said that "nature" is not so contradictory as to provide such a sluggish animal like the sea-cow with the tail of the swift whale, a thought as ridiculous as to imagine "a rhinoceros with the legs of a race-horse." But it is to be remarked: 1, that the swiftness does not depend upon the shape, but merely upon the relative size, and upon the strength of the moving muscles; 2, that a careful study of Steller's words shows that it was not at all impossible for the sea-cow to move even very rapidly; and, 3, that "nature" would have been able to effect even extreme swiftness by a fin like that of the manatee, if it had been necessary, as it is a well-known fact that animals with legs as clumsy as those of a rhinoceros or an elephant are able to run as fast as a good horse.

I think I hardly need apologize for passing the fur-seal (*Callorhinus ursinus*) and its allies in silence, until I have had further experience. There is nothing gained by making a few more or less insignificant remarks on a matter about which an elaborate work has been published under your superintendence in this very year, especially as none of them are of such importance as to make a speedy publication desirable. On the whole, I am in a position to affirm most of Mr. Elliott's statements. But as a matter of course there must be some differences, caused partly by the local circumstances and partly by the fact that two observers do not always view the same thing in the same light. It is therefore evident that many of my final notes will take the form of more or less critical remarks on Mr. Elliott's monograph, an additional reason why I should wish to retain them until they have been subjected to a new and thorough test.

But an erroneous statement of Professor Nordenskjöld (Voy. Vega, Amer. ed., p. 609), that the list given in the note (*loc. cit.*) only embraces the fur-seals killed on Bering Island, must be corrected at once, as from the wide distribution of his book it is likely to be repeated by others not going back to the original source.* The following is an authentic

*Evidently he has understood Elliott's list as concerning only Bering Island. In his monograph, p. 113, Mr. Elliott gives the same figures with regard to "the Commander Islands," but without correcting Nordensjöld's mistake. The list actually embraces the skins from Robben Island, too. (This island, or rather rock, is situated close to Saghalin Island and does not belong to the Kurile chain as stated by Elliott, p. 8.) Besides, there is a slight typographical error in Elliott's figures, the total being given as 387,462 instead of 389,462.

List of skins of fur-seals slain on Bering Island for shipment:

Years.	Number.	Years.	Number.
1871	4,500	1878	8,674
1872	12,912	1879	13,028
1873	13,040	1880	15,160
1874	13,034	1881	16,078
1875	11,790	1882 to date	18,512
1876	9,822		
1877	6,006	Total, 1871–'82	142,556

I can account for the disagreement in Elliott's list concerning the year 1871 only by supposing that he gives the shipment, while the one above shows how many seals were actually killed every year. The skins taken in the fall are not shipped before the following year.

ENHYDRA LUTRIS (Linn.).

Of this animal I have only to report the sad fact that it has been totally exterminated, or nearly so, on Bering Island. It sometimes happens that a single animal is killed on shore opposite Copper Island, where they still occur in numbers, and I myself was so lucky as to observe a sea-otter swmming along the coast on the same side. It was far off, and my ball missed it; I had, however, a tolerably good opportunity of observing its peculiar manner of swimming by means of a spy glass. The present scarcity of this animal on our island, where it has been so abundant, will be perceived from the fact that since 1871 only ten sea-otters have been captured.

I do not wish to lengthen this already too protracted letter by giving details relating to the blue fox (*Vulpes lagopus* Auct.), and I should perhaps let it pass without mentioning, were it not that Professor Nordenskjöld has published a very erroneous statement, both as to its number and its color. He says (Voy. Vega, Amer. ed., p. 601): "Now they are so scarce that during our stay here we did not see one. Those that still survive, besides, as the European settled on the island informed me, do not wear the precious dark-blue dress formerly common, but the white, which is of little value. On the neighboring Copper Island, however, there are still dark-blue foxes in pretty large numbers," and to this he in a foot-note makes the remark that "it thus appears as if the eager hunting had an influence not only on the number of the animals, but also on their color, the variety in greatest demand becoming also *relatively* less common than before."

That the blue fox, however, is by no means uncommon on Bering Island will be perceived from the fact that a considerable number are killed and sent to San Francisco every year. Thus not less than 1,450 skins were shipped this year (1882), besides 900 from Copper Island. The statement about the color is certainly founded upon a mistake too, for among all the 1,470 skins bought on Bering Island by the Alaska Company in the course of this year only 20 are "white" foxes, so that

it is this latter form which is very rare, both absolutely and *relatively*. Formerly they were more common, but about twenty or twenty-five years ago the old Russian Company resolved to pay more for the white ones than for the blue, and to have them killed all the year round without respect to the season, in order to destroy them and possibly have them exterminated. At present they are very scarce, and now the natives themselves pursue them eagerly, because they spoil the brood by mixing with the blue ones.*

From the following list it will be seen that the number of foxes decreases greatly when they are hunted for several successive years. It has therefore been agreed upon that the hunt be suspended for one or two years, with intervals according to circumstances, in order to give the animals time to fill the diminished ranks. This may perhaps be the cause of Nordenskjöld's mistake. The fact is, that the fox hunting is a very important source of income to the natives on Bering Island.

Number of foxes killed on Bering Island.

Season.	Blue foxes.	White foxes.
1871–'72	836	4
1872–'73	580	28
1873–'74	514	24
1874–'75*	0	0
1875–'76	1,087	50
1876–'77	573	19
1877–'78*	0	0
1878–'79	789	0
1879–'80*	0	0
1880–'81*	0	0
1881–'82	1,447	20
Total	5,826	145

*No foxes hunted during the season in question.

I ought not to omit mentioning two other terrestrial mammals which offer a contribution to the history of the immigration of the fauna. The one is *Mus musculus* L., the other *Arvicola rutilus* Pall.

According to the assertion of the inhabitants, it is beyond any doubt that none of these animals occurred on Bering Island before 1870. Before that time they had not even seen a mouse, and many of them had never heard the name mentioned. In 1880 the "black mouse" (*musculus*) was brought from San Francisco by the schooner "Justus," with a cargo of flour. The "red mouse" (*rutilus*) made its appearance later, but as the natives were then already acquainted with that kind of animal, they did not pay sufficient attention to ascertain in what year the introduction actually took place. That it was introduced later than the common mouse is proved by the belief of the natives, who think that the red, short-tailed mouse is the offspring of the long-tailed, dark-colored animal. It finally turned wild by changing its more domesticated manner of life into the freer habits in the fields and moun-

*On Copper Island white foxes do not appear at all. Besides, the blue ones are said to be larger, which is probably caused by a larger supply of food.

tains. They overlooked the fact, however, that both forms infest their houses and huts in equal numbers.

It is very remarkable how enormously the number of this *Arvicola* has increased since its introduction. For in not more than ten years it has spread all over the island from the utmost point in the north to its southernmost end. Now it is abundant in every locality, in the swamps and among the sand-dunes, on the flats, and in the mountains, in the interior, and everywhere along the beach. All the huts on the island inhabited by the fox-hunters during winter are occupied by them, and they become a veritable annoyance by eating and gnawing everything they can get at. I myself have been greatly troubled by them. My various collections seemed a special attraction to them, and many a nice specimen fell a victim to their destruction. It is almost incredible how they find their way to places thought to be absolutely "mouse-proof."

None of these animals have yet reached Copper Island, but their introduction seems to be only a question of time.

Whether the red field-mouse was introduced by ships or by birds of prey, or in any other way from Kamtschatka, cannot be decided. At all events, the introduction of these two animals took place much against the will of men.

I finally wish to mention the introduction of another terrestrial mammal, which was imported with the intention of having it acclimatized for the use of the natives in the near future. It is the experiment of transferring tame reindeers (*Rangifer tarandus* L.) from Kamtschatka to Bering Island, where the rich pastures seem to justify the hope of success.

Dr. Dybowski and the Alaska Commercial Company share the honor of this enterprise, he by taking the trouble of procuring the animals from the interior of Kamtschatka and taking care of their transportation to Petropaulski; the company, by bearing, with never-failing liberality, the heavy expenses of an undertaking which never can be of any direct benefit to them, but only to the natives of the island.

Four males and eleven females were successfully transferred on board the company's steamer Alexander, where they fed on the fresh leaves of birch and willow procured in Petropaulski, much against the predictions of experts. After the leaves were consumed, they even put up with hay, and were safely landed at Bering Island on the 15th of July, 1882. On shore they eagerly began to graze the fresh herbs, but within half an hour the whole herd was *en route* southward for the mountains. All fifteen have been seen very lately. The natives complain that they have eaten all the cloud berries (*Rubus chamæmorus*) and crake berries (*Empetrum nigrum*) in the neighborhood of the Southern Rookery, a trifle, however, compared with the self-evident utility of the animal.

LEONARD STEJNEGER.

BERING ISLAND, *September* 30, 1882.

DESCRIPTIONS OF SOME BIRDS SUPPOSED TO BE UNDESCRIBED, FROM THE COMMANDER ISLANDS AND PETROPAULOVSKI, COLLECTED BY DR. LEONHARD STEJNEGER, U. S. SIGNAL SERVICE.

By ROBERT RIDGWAY.

The following apparently new species form part of a fine collection of birds from the Commander Islands and the vicinity of Petropaulovski, Kamtschatka, lately received at the National Museum from Dr. Leonhard Stejneger, U. S. Signal Observer at Bering Island. The writer was requested to descibe them in case they appeared, after due investigation, to be new.

1. HALIÆTUS HYPOLEUCUS Stejneger, MS.

SP. CH.—*Young* ♀ (No. 89127, collector's No. 1055, Bering Island, May 15, 1882). Ground color of pileum, nape, upper back, rump, with lesser and middle wing-coverts dirty white, spotted with grayish brown, the spots of the latter color being chiefly subterminal, but often occupying the tips of the feathers; upper part of rump with white largely predominating; greater wings-coverts and longer scapulars uniform dusky, bordered terminally with mottled dirty grayish white; tertials uniform slate-dusky; upper tail-coverts mottled dusky terminaly, mottled white basally; remiges uniform brownish black; rectrices blackish dusky, the inner webs much mottled with pale grayish and buffy white. Side of head with a broad and distinct stripe of nearly uniform brown, occupying the entire orbital, and auricular regions. Entire lower parts white, all the feathers with distinct dusky shafts; those of throat streaked with pale brown, those of jugulum and upper breast with a large terminal spot of dusky, many of the feathers of sides and abdomen with small and usually indistinct brown terminal spots; thighs and crissum dirty white, the feathers with dusky terminal spots, these largest on crissum, and on upper and inner portions of thighs coalesced so as to form the predominating color. Underside of wing white, spotted with dusky. Bill dusky, inclining to yellowish at tip and base, the rictus yellow; "iris faint yellowish white"; feet deep yellow, claws black. Wing 24.50 (ends of primaries much abraded), tail 13.50, culmen 2.25, depth of closed bill 1.50, tarsus 3.60 (naked portion in front only 1.75, after raising the feathers), middle toe 3., hind claw 1.80.

This eagle is perhaps the eastern representative of *H. albicilla*, although the latter, according to Sharpe (Cat. B. Brit. Mus., i, p. 304), occurs "in Kamtschatka, the Aleutian Islands, and Japan," and also in China, "as far as Amoy." It is barely possible, however, that all references to *H. albicilla* in the above-named countries may in reality apply to the present bird or (especially so far as the Aleutians are concerned) to *H. leucocephalus*, the latter occurring abundantly, not only throughout the Aleutian chain, but also in Bering Island, where, according to Dr. Stejneger, it breeds.

I have never seen a specimen of true *H. albicilla* at all resembling in coloration the bird described above, while its reference to *H. leucocephalus* seems to me out of the question, the proportions differing decidedly from those of the latter species; the bill and feet being much larger than in a specimen of the bald eagle of equal size so far as other measurements are concerned. I am therefore strongly inclined to agree with Dr. Stejneger as to its distinctness from either of the above-named species, although, as suggested above, it may be the eastern representative race of *H. albicilla*.

Dr. Stejneger's remarks concerning this specimen are to the following effect:

After alluding to the fact that *H. leucocephalus* not only occurs but also breeds on Bering Island, and that the *Thalassoœtus pelagicus* can only be considered an irregular if not wholly casual visitant—"a lonely straggler from Kamtschatka"—he says: "It seems that a third species of sea eagle must be added, not only to the fauna of Bering Island, but even to the list of known birds, for I have never seen a young *Haliœtus* with the whole lower surface white and the upper parts with dark tips and edgings on a whitish ground, such as my No. 1,055. This, a young female, still with black tail, was shot the 15th of May, and measures 890^{mm} (35 inches) in length, with a stretch of wings of 2.220^{m} (87.40 inches). Iris faint yellowish white,* bill horn-brown, cere yellow, with horn-brown shadings on top; feet bright golden yellow.

"Compared with the young of *H. leucocephalus* of the same age, it has, apart from the white color of the body, the tail-feathers, under tail-coverts and axillars, still darker colored. The size is in some respects inferior to that of the bald eagle, the specimen sent representing the maximum of its kind, being not larger than an old male of said species.† The bill holds fully the size of that of a young *H. leucocephalus*, and the feet likewise, but the body, the wing, and tail are smaller.

"I have little doubt that this bird growing old would have assumed an almost uniform white plumage below, with white tail‡ a supposition corroborated by the statement of Mr. Grebnitzky that he had himself seen an eagle on the island having the lower parts and the tail white.

---

*In the young of *H. leucocephalus*, even when two or more years old, the iris is usually if not always deep brown, and the bill and cere blackish, while in *H. albicilla* the iris is always (?) brown in the young, and sometimes in the adult also!

†Upon this point I am inclined to disagree with Dr. Stejneger, and as for size and proportions, would rather compare the specimen with the adult male of *H. albicilla*.

‡In Dr. Stejneger's specimen, the middle rectrices have been moulted, and those of the new dress are just making their appearance. *They are even darker in color than the old ones*, although similarly marked, which would indicate either that the individual in question would not have attained its perfect plumage the next year or else that the adult does not have a white tail. That the specimen is not in its first year is clearly indicated by the character of the plumage, as well as by the date of its capture (May 15th); while that it is probably more than two years old is strongly suggested by the light color of the bill and cere which in *H. albicilla* and *H. leucocephalus* do not become yellowish until the bird begins to assume a portion of its adult livery.

"That we have not to deal with an albino is evident not only from the color of the eyes, but also the character of the whole plumage, the white color having a normal appearance, while the dark colors are deep and distinct.

"After due consideration, I come to the conclusion that the present species is sufficiently distinct from *H. leucocephalus*, and consequently also from *H. albicilla*. There are two other species, however, of which I know only the names, viz, *H. leucoryphus* (Pall.) and *H. leucogaster* (Gm.); but Dr. Dybowski, who is well acquainted with the former, asserts that it is quite a different bird, while Dr. Henry Guillemard, who has collected in Central Africa, and is autoptically familiar with the latter, repeated the same assurance when seeing my bird during a day's visit here. Both received the impression that the species is still an unknown one."

It is, perhaps, needless to remark that Dr. Stejneger's bird is very distinct from both *H. leucoryphus* and *H. leucogaster*.

2. ACROCEPHALUS DYBOWSKII Stejneger, MS.

SP. CH.—*Adult* ♂ (No. 89151, Petropaulovski, Kamtschatka, July 5, 1882). Above, rather light olive-brown, more decidely olive, or somewhat tinged with russet, on rump and tail, and slightly more grayish across nape; a distinct superciliary stripe of pale buffy-grayish, paler anteriorly; a rather indistinct gray loral streak, and a narrow brown postocular streak along upper edge of auriculars; auriculars, sides of neck and breast, and entire sides, light grayish-olive, the first very narrowly and indistinctly streaked, especially anteriorly, with white; remaining lower parts dull white, very faintly shaded across jugulum with pale brownish-gray; crissum, buffy-white, and flanks tinged with deeper buff. Tail much graduated (the lateral feathers .65 of an inch shorter than the intermediæ), all the rectrices showing indistinct, faintly darker bars, the inner webs (except of middle feathers) decidedly darker than the outer, and the four outer pairs distinctly tipped with pale grayish, becoming nearly pure white on tips of inner webs, these pale tips growing gradually narrower toward middle feathers. Maxilla dark brown; its edge, with the mandible, pale-brownish (in dried skin), the base still paler; "iris hazel"; legs and feet pale flax-brown (in dried skin), the toes slightly darker. Wing 2.85, the secondaries 2.15; third quill longest, second and fourth equal; tail 2.40, culmen (from frontal feathers) .48, bill from nostril .31, tarsus .90, middle toe .60.

Dr. Stejneger sends the following interesting account of the habits of of this species:

"The loud song, consisting of the syllables *wit'she-wit'she-wit'she-witsh*, and somewhat resembling the sound made by whetting a scythe, was heard, especially towards night, from all sides, among the high grass and willows which cover the swampy slopes of the mountains with a thicket almost impenetrable to both foot and eye. It was but seldom I

could get a glimpse of a watchful songster, as he, clinging to the middle of an upright stalk of some high grass or orchid, did his best in a singing match with another of his own kind or a *Calliope kamtschatkensis* or *Carpodacus erythrinus*. But no sooner did I move my gun to secure the longed-for specimen than he silently disappeared, as traceless and suddenly as if he was the possessor of Dr. Fortunatus's cap. The only way to obtain one was to watch patiently near his favorite perch, with gun in hand. For hours have I sat thus in the wet swamp, almost desperate from the stings of the numberless bloodthirsty mosquitoes, which I did not dare to wipe off for fear of driving away the silent bird, who, after watching my immovable figure until satisfied of his safety, came cautiously nearer, slipping between the stems and branches near the ground; uttering finally a very low, thrush-like *tak*;–*tak*,–*tak*;–*tak*; with his tail held upright, very much in the manner of a long-tailed wren. If I kept absolutely quiet he would sometimes come close to my feet, looking curiously up at me with his dark pretty eyes. But before the challenge of a rival had attracted his attention and provoked a reply, which he usually began with a short trill, it would not be advisable to move a muscle. Then it would be time to lift the gun, very slowly, hesitating as often as he suspiciously stops his song, until the report puts an end to it forever, and I held in my hand a badly mutilated specimen, unfit for preservation; the alternative being to return without anything, since by killing him at longer range it would impossible to find the small plain-looking bird in the dense and luxuriant mass of vegetation.

"Should the species prove to be a new one, I propose that the name of its first discoverer be affixed to it, that the *Acrocephalus dybowskii* might rest as a memento of his meritorious and unwearying work in Kamtschatka."

3. ANORTHURA PALLESCENS Stejneger, MS.

SP. CH.—*Adult* ♂ (No. 88994, U. S. Nat. Mus., collection's No. 1644, Bering Island, Sept. 20, 1882). Above dull smoky-brown (far less rusty than in *A. alascensis*), uniform on pileum, nape, and upper back, but lower back and rump barred with dusky, the wing-coverts and upper tail-coverts still more distinctly barred with the same; middle wing-coverts tipped with a small deltoid spot of pure white; outer webs of five outer primaries spotted with brownish-white, the remaining quills with outer webs plain dull brown. Tail brown, crossed by 6 or 7 rather wide bands of blackish, the last three or four rendered more distinct by a decided lightening of the brown against their posterior edge; on the middle rectrices, however, the bars much less distinct and more irregular. Lores, an indistinct superciliary stripe, malar region, chin, throat, jugulum, and sides of breast dull light-brownish buff (much paler and duller than in *A. alascensis*), the middle of breast and upper part of belly much paler, or inclining to brownish white; sides, flanks, and

crissum brownish white, broadly and distinctly barred with dusky, the sides more tinged with brown. Auriculars dusky brown, streaked with the color of the throat. Bill brownish-black, more brown on lower basal portion of mandible; "iris dark brown"; legs and feet dark brown. Wing 2.15, tail 1.60, culmen (from frontal feathers) .50, bill from nostril .38, tarsus .75, middle toe .55.

A young bird from Copper Island is colored more like *A. alascensis*, and may be the same species or an intermediate race. The upper parts are entirely uniform rusty brown, becoming brighter rusty on rump and upper tail-coverts.

This new race is totally unlike the Japanese *A. fumigata* (Temm.), which is a small form of very dark coloration, and somewhat like *A. hyemalis pacifica* of the Pacific coast of North America, but, as a matter of course, very distinct. In large size and general proportions it agrees quite closely with *A. alascensis* (Baird), but the coloration is entirely different, as the following comparative diagnosis may show, the comparison being made between two adult males in autumnal plumage (the one of *A. pallescens* obtained September 20, that of *A. alascensis* October 21):

A. PALLESCENS.—Above dull smoky-brown, the lower back, rump, and upper tail coverts distinctly barred with dusky; indistinct superciliary stripe, lores, malar region, chin, throat, and sides of breast dull pale brownish-buff; lower breast and upper belly dull brownish-white; sides, flanks, and crissum brownish-white, broadly and distinctly barred with dusky. Wing 2.15, tail 1.60, culmen (from frontal feathers) .50, bill from nostril .38, tarsus, .75, middle toe .55. *Hab.* Bering Island.

A. ALASCENSIS.—Above, bright rusty brown, becoming more rufous posteriorly, the lower back, rump, and upper tail-coverts without trace of bars; superciliary stripe, lores, malar region, chin, throat, jugulum, breast, and sides, deep fulvous-buff, the belly similar, but slightly paler; flanks and anal region rusty brown, narrowly and indistinctly barred with dusky; crissum bright rusty-brown, each feather tipped with a pure white spot, this preceded by a dusky one. Wing 2.10, tail, 1.50, culmen .60, bill from nostril 40, tarsus .80, middle toe .60. *Hab.* (of specimen described) Unalashka.

There are several species or races of this genus belonging to the elevated regions of Central and Eastern Asia, which appear to be more or less nearly related to this new form, but I have not been able to make a direct comparison with any of them. The one which seems to come nearest, judging from descriptions, is *A. neglecta* (Brooks) from Gilgit and Cashmere (alt. 5,000–10,000 ft.), but there appear to be decided differences of coloration, while the habitat is of itself an almost certain indication of their distinctness. (*Cf.* SHARPE, Cat. Birds Brit. Mus., vi, p. 278.)

4. HIRUNDO SATURATA Stejneger, MS.

SP. CH.—Similar to *H. erythrogastra*, but much more richly colored beneath, the lower parts in the male being about the same color as the throat of the male in *H. erythrogastra*, and of the female a shade darker than the same parts in the male of that species. *Adult male* (No. 89165 Petropaulovski, June 28, 1882): Upper parts rich violaceous steel-blue (exactly as in *H. erythrogastra*), the wings and tail less glossy and more greenish; forehead, malar region, chin, and throat, rich chestnut (a shade darker, especially on throat, than in *erythrogastra*), the steel-blue of the neck encroaching on the sides of the jugulum, and extending interruptedly across the latter in the form of a narrow, broken collar; remaining lower parts rich chestnut rufous. Rectrices marked with white, exactly as in *erythrogastra*. Wing 4.70, lateral tail feathers 4.15, middle pair 1.75, culmen .30, width of bill at base .25, tarsus .40, middle toe .40. *Adult female* (No. 89166, same locality and date): Similar to the male, but chestnut of forehead less extensive, that of throat, etc., paler, the lower parts paler rufous, but still a shade or so darker than in the male of *H. erythrogastra*. Wing 4.60, lateral rectrices 3.60, middle pair 1.85.

This elegant swallow needs no comparison with the Japanese *H. gutturalis*, which is pure white beneath, and otherwise very different.

(?) ANTHUS JAPONICUS Temm. & Schleg. (*A. stejnegeri*, sp. nov., if distinct.)

SP. CH.—*Adult, summer plumage:* Above light raw-umber brown, very distinctly streaked with black, these markings broadest on the back, the exterior feathers of which have the inner webs chiefly dull whitish, producing, when the feathers lie in natural position, a distinct stripe on each side of the interscapular region; scapulars much less distinctly streaked with dusky, and without light edgings; middle wing coverts dusky, broadly and very distinctly streaked with brownish white; greater coverts more narrowly tipped with brownish white or very pale buff, and edged with light brown; remiges dusky, edged with light brown; middle rectrices similar, but others dusky, the outer pair mostly dull brownish white, or pale dull buff, with a dull brownish dusky space along edge of basal half of inner web; next feather with the outer web pale dull brownish buff, and the inner web with the terminal portion and stripe along shaft, nearly to the base, of the same color. Lower parts buffy white, the whole jugulum yellowish buff, of varying intensity, and distinctly, though not always sharply, streaked with dull black; superciliary stripe and side of head generally pale buff, the auriculars more brownish, especially along upper margin, where sometimes streaked with dusky; a small dusky spot immediately in front of eye, and throat sometimes bordered along each side by an interrupted series of narrow blackish streaks (these usually, however, nearly or quite obsolete); sides and flanks streaked with blackish, and longer lower tail-coverts also sometimes streaked. Maxilla brownish black, the tomia light brown-

ish; mandible pale brownish, darker terminally, paler at base; "iris dark brown"; legs and feet deep brown, the tarsi rather paler. Wing 3.10–3.45, tail 2.25–2.50, culmen .48, bill from nostril .35, tarsus .95–1, middle toe .65–.70, hind claw .40–.50. First, second, and third quills longest, and nearly equal (first, however, usually longest), fourth decidedly (.15 of an inch or more) shorter.

The six specimens collected by Dr. Stejneger differ more or less from one another in details of coloration and proportions. The minimum dimensions, as given above, are represented by a female (No. 89135, collector's No. 1231) from Copper Island. All the remaining specimens being males, there is much uniformity of size among them. The coloration varies much in intensity, notwithstanding the birds were all killed on nearly the same date. The deepest colored individual is No. 89134, from Copper Island. In this the lower parts are bright, though (except on breast) rather pale, yellowish buff, with a sulphury tinge, approaching white only on the abdomen and chin; the lower tail-coverts are a deep creamy buff, the longer with a distinct dusky streak near end. Along each side of throat extends quite a distinct though broken line of fine sagittate markings, extending almost if not quite to the chin. The palest example is No. 88992, from Bering Island. In this, the lower parts are buffy white, the breast and jugulum more distinctly buffy; the crissum is creamy white, or buffy white, and entirely immaculate; there is no trace of the line of dusky streaks along side of throat. Other specimens are variously intermediate, and there can be little doubt that the variation is, in part at least, purely individual.

There being no copy of the *Fauna Japonica* (*Aves*) accessible to me, I am unable to verify the conjectured identity of this species with the *Anthus japonicus* of Temminck & Schlegel. Even if not this species it is probably already described, but I have not been able to find any description at all applicable; and in view of the possibility of its proving new to science, I propose that it should bear the name of its talented discoverer.

SMITHSONIAN INSTITUTION, *February* 13, 1883.

DESCRIPTION OF A NEW GENUS AND SPECIES OF ALCYONOID POLYP, FROM JAPANESE WATERS, WITH REMARKS ON THE STRUCTURE AND HABITS OF RELATED FORMS, ETC.

By ROBERT E. C. STEARNS.

The interesting form herein described was obtained by Mr. W. J. Fisher, while acting as naturalist to the Tuscarora Telegraph Sounding Expedition, under Commander George E. Belknap, in 1873. The specimens were purchased of Japanese fishermen at Enosima, by Mr. Fisher, who kindly presented them to the author. They now form a part of the collections in the United States National Museum at Washington.

All of the specimens (four) were dry and more or less imperfect. The chief characters of the form, however, are so well marked as to readily admit of identification from the following description.

RADICIPES,* n. g.

Polyp-mass or cœnosarc linear, elongated, rooted; round, oval, or ovate in cross-section. Style or axis long, slender, attenuated, and tapering; calcareous and brittle; four sided or obtusely quadrangular to nearly round in cross-section; basal end furcate, ramified radiciform.

RADICIPES PLEUROCRISTATUS,† n. s.

Polyp-mass linear elongate attenuate, tapering; polypiferous portion about three-fourths to four-fifths of total length; the lowest fourth or fifth squarish round to round in cross-section and free from polyps: ovate to ovate elliptic in cross-section through center of polypiferous part; polyps arranged unilaterally in a single series, one above another along one edge or angle of the style; the sarcode of each polyp inclosing and sustained by numerous slender elongated spiculæ.

Axis or style long, slender, hard and bony, tapering simply to a fine tip: opposite or basal end forked, varicate and root-shaped.

The specimens before me vary from 20 inches to 3 feet or more in length, and from twelve-hundredths to sixteen-hundredths of an inch in diameter, measured at a point about half an inch above the root.

REMARKS.—The most perfect of the four styles is 20 inches long with about 2 inches of the tip wanting, and twelve-hundredths of an inch in diameter near the base. The diameters of the others are, respectively, fourteen-hundredths, fifteen-hundredths, and sixteen-hundredths of an inch just above the base. The last specimen must have been over 3 feet in length, judging from the diameter of the axis at the point of fracture.

While the arrangement of the polyps as seen in such portions of the styles as still hold their dried remains intact, indicates the unilateral and uniserial system above described, there is some little evidence of a twisting of the soft parts around the axis, which is not unusual in forms of this class.

The polyps occur with much regularity to the number of six or eight to the inch or from twelve-hundredths to sixteen-hundredths of an inch apart from center to center.

The angularity of the style (though obtuse) and the one-sided arrangement of the polyps point to a close relationship with *Pavonaria* (*P. quadrangularis*) in one direction, and the root-shaped base closely connects the Pennatula tribe (*Pennatulacea*) with the *Gorgonacea*.

When the characters of the axial styles in the various pennatulid groups are compared, the form described by Mr. Fisher as *Virgularia ornata* ‡ from specimens dredged by him in Hakodadi Bay, Japan (7

* Root-footed. † Side-crested.

‡ Proc. Cal. Acad. Sci., 1874, Vol. V, p. 418.

fathoms, muddy bottom), acquires additional interest. In this the basal end of the style is *broadly falciform and abruptly curved* at a nearly right angle to the line of the axis, a shape peculiarly well adapted for either permanent or prolonged anchorage in a muddy bottom, and in this respect certainly superior to, and advantageous over, the simpler based rods or styles in most of the species. *V. ornata*, it seems to me, fills the place of an intermediate and connecting link between what may be called the simple stalked pennatulids and the furcate-rooted species I have described in this paper. Such marked variation in the form of the styles seems to indicate a corresponding difference in habit.

It will hardly be questioned that the rooted form points to a sedentary habit, and a fixed and permanent local habitat; and the simple forms of axial rods, with such relevant data as we have at hand, imply, if not a positively and continuously active natatory capacity, certainly a less sedentary existence, more freedom, and greater activity of habit. As relating to the foregoing implication we may consider the following:

Bohadsch says that the Pennatulæ swim by means of their pinnæ, which they use in the same manner that fishes do their fins. Ellis says it "is an animal that swims freely about in the sea," "many of them having a muscular motion as they swim along;" and in another place he tells us that these motions are effected by means of the pinnules or feather-like fins; "these are evidently designed by nature to move the animal backward or forward in the sea, consequently do the office of fins." (Phil. Trans. abridg., xii, 42.) Pallas adopted, with some reservation (Misc. Zool., p. 177), the opinion of Bohadsch; * * * Cuvier tells us that they have the power of moving by the contractions of the fleshy part of the polypidom, and also by the combined action of its polyps; and to adopt the words of Dr. Grant, "a more singular and beautiful spectacle could scarcely be conceived than that of a deep purple *Pen. phosphorea*, with all its delicate transparent polypi expanded and emitting their usual brilliant phosphorescent light, sailing through the still and dark abyss by the regular and synchronous pulsations of the minute fringed arms of the whole polypi." And Bohadsch asserts that he has been a witness of this spectacle. But some authors, like Lamarck and Schweigger, reasoning from what is known regarding other compound animals, have denied the existence of this great locomotive power in a zoophyte placed so low in the scale as "contrary to every analogy, and not necessary to the existence or wants of the animal." To the foregoing, relating to the allied group Pennatulæ quoted from Johnston's British Zoophytes,* that author adds his opinion in these words: "And there is little doubt these naturalists are right, for when placed in a basin or plate of sea-water the *Pennatulæ* are never observed to change their position, but remain on the same spot, and lie with the same side up or down, just as they have been put in." To this I may say, by way of comment, that much depends on the length of time and under what condi-

* Volume 1, pp. 160, 161.

tions such experiments are made. What Johnston says might be applied with equal truth to some of the acephalous mollusca, like *Mya arenaria*, for instance, which though sedentary still possesses a certain degree of mobility, but nevertheless is so sluggish that one may wait and watch for some time without detecting any evidence of activity or voluntary motion. The protection or security of these low forms is through the secretive faculty; the more active hiding in the mud under stones or upon something which is the same color as themselves, or upon or amid objects of brighter colors by which their own is rendered obscure by contrast, or else seeking security by remaining motionless. It is not improbable that such animals may have periods or seasons of activity, and perhaps in their young or adolescent stages are much freer, else the geographical distribution of the species would be wholly mechanical exterior to and independent of the organism, and like many low aquatic forms be dependent upon currents and upon attachment to drifting objects, or to other and more mobile forms of animals. The activity of certain Pectens would hardly be presupposed by the closet student through the form and implied ordinary habits of these mollusks, nor from any analogies perceptible after a study of either the structure or habits of such species or groups as most closely approximate to the fanshells; yet these footless mollusks sometimes exhibit remarkable powers of locomotion, equaling in performance the more active cockle-shells (*Cardium*), which are provided with a powerful muscular foot, in its way a perfect leaping-pole.

The gigantic virgularian described by me in the proceedings of the Cal. Acad., in August, 1873 (*Verrillia Blakei**), "the fishermen say swims free and is so caught in their nets."† Mr. Chambers, who sent a specimen of this form to the British Museum, says:‡ "They move about rapidly in the water, and when brought to the surface move for a few seconds like a snake, then make a dart swift as lightning, and disappear." Dr. J. E. Gray, from whose paper the above is quoted, also says: "Mr. Clifton describes the Australian species as swimming rapidly in shallow water," and adds: "There seems to be no doubt that the Sea-Pens and Sea-Rushes do live in groups together, erect, and sunk in the mud, and that they are sometimes found swimming free in the sea; but the question is, are the free specimens those that have been disturbed by the waves and currents, and do they afterwards affix themselves in the mud, or are they vagrant specimens that live for a time and then die, or are eaten by fish, their struggling being mistaken for swimming?"

Various persons referring to *Verrillia* have reported it as swimming free among the dog-fish, &c.

A related form, probably one of those described by the late Dr. Gabb

---

* *Verrillia Blakei*, now *Halipteris Blakei*.

† Dr. E. L. Moss, in Proc. Zool. Soc., London, 1873, p. 732.

‡ Nature, Nov. 6, 1873, p. 13.

under the names *Virgularia elongata** and *V. gracilis*,† was observed by Dr. W. H. Dall in Catalina Harbor, Catalina Island, Cal., darting or swimming just below the surface of the water, and his observation I regard as especially valuable and confirmatory as to the mobility of these animals. If they can move when compelled to do so, through being disturbed in an unusual manner, it is difficult to perceive why they may not sometimes move of their own instinct or volition, using this last word in a restricted sense. The reasons from analogy are in my judgment full as weighty on the side of mobility as on the other, and the testimony of those who have actually seen these animals in their native element, including intelligent and ordinary observers, sustains the implication conveyed by the forms of the axial rods. The most active of the groups are quite likely sluggish animals, generally fixed and sedentary; probably not able to continue actively in motion (*motion en masse*) for any great length of time.

As to the mobility of one group as compared with another, it would seem as if those forms wherein the axis is simplest, the pinnæ the most prominent, or the individual polyps the most numerous, might have an advantage over the others. As to the character of the motion, when the mass as a unit is detached and moving (*swimming*) which involves reciprocal and rather complex muscular action and implies a more elaborate muscular system than these animals possess, hardly conveys the proper idea. Whether the motion requires primarily the simple saturation or absorption of water by and through the general mass, through pores in the basal section or through alleged or suspected terminal orifices of the interdermal longitudinal canals, or *via oris*—namely, through the mouth of each individual polyp—the propulsory movement is undoubtedly due to a sudden act of the cœnosarc, a spasmodic and contractile effort by which the water is ejected and forced out *via oris* by the simultaneous co-operation of all the polyps in the mass. The movement would be better defined by the word "darting," which is used by the fishermen who have seen it.

Before closing, I should refer to what appears to be another important assisting factor in holding on to the bottom, in forms like *Verrillia*, and which is conspicuously exhibited in the species described by Mr. Fisher. I allude to the bulbous expansion which the *cœnosarc* in that species presents at a point just above the falciform termination of the style, and also to the elongated bulb of the basal end in *Verrillia*. Dr. Moss refers to this in his article heretofore quoted, and I am prepared to find it pertains to all of the simpler stalked forms. As will be perceived at a glance, the dilatation of this part materially assists in anchorage, and the contraction also readily admits of withdrawal.

In relation to the geographical distribution of these interesting forms, I may add in this connection the discovery of another habitat for *Ver-*

---

*Proc. Cal. Acad., Vol. II, p. 167.

†*Id.*, Vol. III, p. 120.

rillia, by Dr. Dall, who reported it when he was last here as occurring on the cod-fishing banks of the Shamagin Islands, where it annoys the fishermen in deep fishing, by reason of their lines becoming entangled among the polyps. Dr. Dall presented the California Academy with several specimens of the styles obtained by him in this region. Before, it was reported from only one place—namely, Burrard's Inlet, Gulf of Georgia, British Columbia.

EXPLANATION OF PLATE VII.

Fig. 1, basal part of axial rod.

Fig. 2, section of polypiferous part, showing arrangement of the polyps.

NOTE.—It should be borne in mind that the drawings, rough, but characteristic, are made from dry specimens, and that the root prongs in all of the specimens are broken and much shorter than when perfect.

The figures are considerably enlarged.

REPORT ON A FRAGMENT OF CLOTH TAKEN FROM A MOUND IN OHIO.

By J. G. HUNT, M. D.

[Letters to Prof. S. F. Baird.]

PHILADELPHIA, *February* 21, 1881.

DEAR SIR: The fragment of cloth you sent me for examination, purporting to have been taken from a mound in Ohio, has proved not a little refractory. It was impossible to detect any structure until proper treatment rendered it translucent. I think it a mistake to call such cloth "charred"; it is not charred by the action of fire at all, or by slow chemical combustion otherwise accomplished. But it is rendered quite black and opaque, as all other perishable organic remains become when excluded, by burial or otherwise, from the changing conditions of atmospheric influence.

The contents of a mastodon's stomach I once examined were black and opaque, like this cloth, but were not "charred." Indeed, we lack a term to express this curious condition.

Those ancient weavers did not practice the art of coating textile fibers with heavy chemical combinations, as some modern commercial Christians are supposed to do.

You desire to know exactly what fiber this cloth is made of? Alas! My evidence is only negative. It is not cotton; nor hemp; nor flax. I think it is not any fiber now used for textile purposes. Though vegetable in its nature, it is not a fiber at all, but consists of the entire stem of the plant, or of large portions of it, no apparent attempt having been made to separate the fiber before manufacturing. I think the

plant used for such cloth did not come from the exogens, but the structural evidence is too scanty and indistinct to justify me in speaking more decidely.

The whole subject is of sufficient interest to warrant further study and comparison, and if any new facts of identification should appear I will write you. If you desire a slide of the material mounted for study. I can send one.

Very respectfully,

J. G. HUNT, M. D.,
1802 *Wallace Street.*

Prof. SPENCER F. BAIRD.

PHILADELPHIA, *March* 13, 1881.

DEAR SIR: I have now carefully examined all those specimens of grass sent by Doctor Vasey, and not one of them enters into the tissue of the mound cloth. I therefore arrive at the following conclusions regarding the cloth: It is made of vegetable matter. Only one plant enters into its composition. It is not cotton, flax, hemp, jute, manila, or any other fiber now used by civilized people in manufacture. It is not a fiber at all, but all or most of the stem has been used for the purpose. There has been no attempt made by those ancient weavers to separate any special fiber from the plant, and it is probable that they were ignorant of the process of rotting and hackling (so ancient), and now often used for that purpose. The fragments of this unknown plant present no distinct structural remains; not a cell can be seen. The only feature which may sometime lead to identification is an appearance of septa, crossing and apparently separating some fragments into indistinct divisions, as seen in this little figure [drawing]. If the material had been a grass we would have found some trace of epidermal structures, because in most of such plants silica imperishably preserves their structures. I think, therefore, that the bark of some other than a gramineaceous plant has been used for the purpose. Again, I have been taught how limited is our knowledge of things. We know the names of enough things to overstock seven worlds, but of things we don't know enough to identify this plant of the ancient mound-weavers.

Very respectfully,

J. G. HUNT, M. D.

Prof. SPENCER F. BAIRD.

LUCILIA MACELLARIA INFESTING MAN.

By FRED. HUMBERT, M. D., F. C. S.

ALTON, ILL., *October* 7, 1882.

I send you herewith a gag or screw fly?, as known here; they are in alcohol or alive in a green bottle; some of the maggots are also in alcohol. I wish you would hand this species to your entomologist for a minute examination and its proper name, as I cannot find a full description of this insect and its habits in any books in my possession. The following is part of an essay penned in 1876 but not published, which, with the history of this fly, will explain itself:

A farmer's wife, thirty-five years of age, was attacked on Monday, September 27, 1875, with a headache and a flushed face. She staid at work, expecting a malarial chill, an affection prevailing at that time in the neighborhood. From this time the pains in the region of the frontal cavity at the base of the nose and below the eye, extending to the right ear, increased. At times the pain was more severe than at others, but it never entirely left. This pain was described as preventing hearing and breathing, and so excruciating that at intervals, day and night, her cries could be heard at a great distance from the house. Tuesday evening blood mucus began to run from the right nostril, which was somewhat swollen, the swelling extending on Tuesday over the whole right side of the face. On this day, the fifth of the complaint, four large maggots dropped out of the right nostril. When I was first called to the patient, Monday, October 4, only the right lip and nostril were swollen, the acrid discharge having somewhat blistered the lips below. After each discharge the maggot dropped from the nostril, until the twelfth day, one hundred and forty or more maggots having escaped. The majority of the maggots were three-fourths of an inch in length, there being only a few which seemed a line or two shorter; they were of a yellow hue, conical shape, and having attached to one end two horn-like hooks. The patient recovered fully.

Monday, September 18, 1882, I saw a patient, in the same neighborhood as the first, suffering from the same malady. At that time two hundred and eighty maggots had been discharged, and at the close of the illness over three hundred. There was a swelling on each side of the nose, with a small opening to each. I lanced these openings and more maggots came out.

In the Indian Territory the so-called screw-fly laid its eggs in the nose of man. In 1847 I heard of several deaths of men and children in Texas, near Dallas. The gad-fly was common in the American Bottom forty years ago. It laid its eggs in the noses of cattle and in the ears of horses and deer, but never in the human nose. The fly that I send is about four times as large as the common fly. Head a dark, glisten-

ing green; a bronze face, very lively in appearance. Is it the same that they called in Texas or Indian Territory the screw-fly, or is it the gad-fly seeking a new field?

The patient of 1875 is now alive and well. The second case occurred two years ago near Collinsville, in this county, and proved fatal. The third patient, above named, is getting well. The fourth is reported from Georgia; the patient died.

The first case which I had under my charge was the first which ever occurred here. The eggs must have been deposited in the nose several days before the fifth, the day the maggots dropped out. On the eleventh day all were discharged. I secured live maggots at that time. September 18, 1882. I put soil in an open-mouthed vial and dropped the maggots on it; they crawled in the ground in about five minutes. I covered the opening with white damastis and hoped that the next year the fly would come out of the ground. But on October 6, or the twentieth day, the vial had fourteen living flies. So, reckoning from six days before the pain commenced for the laying of the eggs, to the twelfth day, when the maggot discharged, making eighteen days, and to this adding the twenty days during which the grubs were in the ground, we have thirty-eight days from the time the fly laid the egg until a new generation of flies is produced from them.

You may think I have dwelt too long on these cases, but if you had to stand at the bed and had seen the suffering and despair of the patients and found that the worms were eating them up, you would not think so.

Respectfully,

FRED. HUMBERT, M. D., F. C. S.

P. S.—All these cases occurred in the month of September.

REPORT BY C. V. RILEY.

SMITHSONIAN INSTITUTION,
Washington, D. C., November 9, 1882.

SIR: The insect referred to in the accompanying communication from Dr. Fred. Humbert, of Alton, Ill., is the *Lucilia macellaria* of Fabricius, the injuries of which to different animals are well known in the South and West, where the larva is called the "screw worm." I have repeatedly endeavored to obtain the true parent of this worm, and have published items in reference to it in the American Entomologist, 1880, pp. 21, 203, and 275. Dr. Humbert's communication is most interesting, but the specimens yet more so, as the flies he forwards are the first that have positively been bred from the larvæ known as "screw worms," and they confirm the above determination of the species. The larvæ agree with others which I have from Texas, taken from the root of the ear of a hog which had been bitten by a dog. In De Bow's Industrial Resources

of the Southern States, vol. i, is an account of its occurrence in remarkable numbers in the Southern States in 1834.

It is an interesting fact concerning this insect that it also occurs in the Eastern and Middle States, but that in these States we rarely hear of its injuries to man or to domestic animals.

Carbolic soap is considered an excellent preventive in the Southwest, and, according to Prof. J. Parish Stelle, who made the experiment for me in 1880, pyrethrum blown upon the sores will induce the worms to issue forth and leave them.

Respectfully,

C. V. RILEY,
Curator of Insects.

Prof. SPENCER F. BAIRD,
Secretary, Smithsonian Institution.

FISH MORTALITY IN THE GULF OF MEXICO.

By S. T. WALKER.

[Letter to Prof. S. F. Baird.]

Knowing your interest in everything connected with fish, &c., I take the liberty of giving you all the facts I have been able to collect in reference to the late mortality among the fishes in Tampa Bay and adjoining coasts. Had I known before I began my cruise of the extent of this mortality and splendid opportunities afforded of collecting specimens of strange and perhaps unknown species, I might have gone better prepared for collecting specimens, but I had only heard a few vague rumors, and I was little prepared for anything further than a collection of facts in regard to the matter.

On leaving Clear Water, November 20, I sailed south through Boca Ceiga Bay, and encountered the first dead fish floating on the water near Bird Key, a little southeast of Pass A'Trilla. These were mullet, and as we progressed to the south and east I began to encounter toadfish, eels, puff-fish and cow-fish, in immense numbers, and, on attempting to land on the extreme point of Point Pinellas for the night, I was driven to my boat by the stench of thousands of rotting fish upon the beach. The next morning I went ashore and found the dead fish drifted ashore in countless numbers. The eels appeared most numerous, followed by puff-fish, cow-fish, sailor's choice, and small fish of every shape and variety. After these followed groupers, mangrove snappers, jew-fish, gar-pike, spade-fish, sting-rays, and sharks. Other varieties, unknown to me, were mixed among these, together with vast numbers of catfish. I saw very few mullet here.

At Gadsden Point about the same species appeared, while at Tampa I saw but few dead fish, and they were principally gars and catfish. From Tampa I proceeded to the mouth of the Little Manatee to obtain

some information from Mrs. Hoy concerning her theory accounting for the death of the fishes. I subsequently visited the towns of Manatee, Palmetto, Bradentown, and proceeded thence to Hunter's Point, in Sarasota Pass, Longboat Inlet being the farthest point south visited. Returning, I spent several days on Anna Maria Key, where I collected the skulls of several kinds of fish; thence, passing northward by way of Passage Key, Egmont, Mullet Key, and so on back to Clear Water. From Longboat Inlet round to Mullet Key, the dead fish were principally mullet, catfish, eels, and groupers, the mullet preponderating at least ten to one. Puff-fish, toad-fish, cow-fish, and frog-fish were still extremely plentiful; indeed, I saw no diminution in their numbers, though the numbers of dead mullet had increased very greatly.

I saw many fish in every stage of sickness, from the first attack to the end. All were affected in nearly the same manner. The fish, apparently active and healthy, would be swimming along, when suddenly it would turn on its side and shoot up to the top of the water, gasping as though out of the water, apparently unable to control its motions, often lying on its side on the bottom for five or ten minutes motionless, then suddenly shooting hither and thither without aim or object, and finally ending the struggle on the surface and floating off dead. Whole schools of mullet would suddenly stand upright on their tails, spouting water and die in five minutes. Gars would run for a long time with their snouts above the water, and then lie motionless, as if dead, for ten or fifteen minutes. These generally lived an hour or more after being attacked. I obtained specimens of water from various localities, which I send herewith, marked to show whence obtained.

Before giving the statements of others in regard to the matter, I will give you the results of my own observation in a very brief manner:

1. The dead fish were most numerous on the outside beaches and on the inside beaches of the outer line of keys.

2. That dead fish were least numerous about the mouths of creeks and rivers, decreasing gradually as one approached such places.

3. That the poisoned water was not diffused generally, but ran in streams of various sizes, as proven by fish dying in vast numbers instantly upon reaching such localities.

4. That the fish were killed by a specific poison, as proven by the sickness and death of birds which ate of the dead fish.

5. The fish began dying on the outside beaches first, as Mr. Strand, assistant light-keeper at Egmont, reports them coming up first on the 17th of October, while Mrs. Hoy observed them first on the 1st or 2d of November, at Little Manatee River.

6. The examination of many hundred recently-dead fish revealed no signs of disease. The colors were bright, the flesh firm, and the gills rosy. The stomach and intestines appeared healthy.

In my haste I have neglected to state that I saw a good many dead birds during the trip. At Tampa, ducks were dying. I saw dead vul-

tures at Anna Maria Key, and at Passage Key, large flocks of cormorants were sick and dying. I also saw the carcasses of terns, gulls, and frigate birds. The cormorants sat on the beach with their heads under their wings, and could be approached and handled.

It might be also proper to state that on Monday morning, December 14, about one hour before day, I heard a roaring southwest of Passage Key, apparently far out at sea, resembling the "blowing off" of a steam boiler. The noise continued some ten minutes and ceased. After daylight I heard a similar roaring, which lasted about five minutes. There was no steamer in sight in the direction of the sound, and I observed no swell in the sea following it. After I got under sail I heard the noise a third time. Whether this was followed by the death of fish I am unable to say, as I did not stay to see. I mention this incidentally as a corroboration of Mrs. Hoy's statement, which is hereto appended. Whether or not either of these disturbances of the water had any connection with the mortality among the fishes, the theory of sub-aqueous eruptions of poisonous gases is extremely plausible and reasonable.

INDIAN ROCK, FLORIDA, *December* 21, 1880.

STATEMENT OF MR. ——— WILLIAMS, OF POINT PINELLAS.

The fish began dying about the last of October here. All kinds die except red-fish. Eels and sea-toads are most numerous, though all kinds die. I have seen only a few sheepsheads. I think it is caused by a black scum on the water resembling soot. When a school of mullet get into water covered by this black scum, they die at once. Oysters are affected by this also, and those who eat of them are made very sick.

STATEMENT OF MR. ——— SPENCER, OF THE TAMPA TRIBUNE.

I went out last Sunday (November 28), expressly to see for myself, and, if possible, to account for the dying of the fishes in Tampa Bay. I feel certain, from what I saw, that it is caused by fresh water from the creeks, rivers, and marshes. The water where the fish are dying looks black and slimy, very different from the usual color of the bay water. You see there has been an unusual amount of rain this fall, and this becoming impregnated with the poison of decaying vegetation, is poured into the bay in unusual quantities and poisons the fish. This is my opinion, and I give it for what it is worth. The oyster saloons here were obliged to close, as the oysters came near killing several people.

STATEMENT OF MRS. CHARLES HOY, OF LITTLE MANATEE.

The fish began dying here about the 1st of November. About 8 o'clock on the evening of October 28, or thereabout, I was sitting on my front gallery, the air being perfectly still and the bay calm, when I heard a heavy splashing of the water in the direction of Gadsden Point. This continued for a few minutes and was immediately followed

by a roaring sound, such as might be made by the wheels of a side-wheel steamer near at hand, though the noise seemed to be several miles away. This continued for about a quarter of an hour, as near as I could guess, when it suddenly ceased. Some 25 or 30 minutes afterwards heavy swells began to come up the river, such as come in during a heavy blow from the northwest. These continued for a long time, gradually becoming lighter until I went to bed. In three days the fish began to come up the river dead and dying. I caught several mullet that were standing upright in the water, sick, and each had three black spots on the back, which gradually faded away. I opened the fish and could see nothing the matter with them. The flesh was natural and firm, and the gills were normal.

In regard to oysters I have had a rather rough experience, and can with certainty say that they are poisonous. A few days after the fish began dying I had a quart of fine oysters for dinner. I had a lady visitor on that day, but she did not like oysters and ate none. My daughter and I ate heartily of them, and after dinner I took my gun and went out to a pond to shoot some ducks. I took a colored woman (my cook) along, and before I had gotten half way I began to feel weak, and a mist came before my eyes. I kept on, however, to the pond, and when I reached it was so blind I could not see the ducks, although the water was covered with them. With the assistance of the colored woman I got home, when I found my daughter similarly affected and unable to walk. Neither Mrs. Simms—the visitor—nor my cook were affected, which makes me know it was the oysters. The sickness and loss of vision gradually left us after drinking a cup of strong coffee. I am confident the death of the fish is caused by the discharge of poisonous gases from the bottom of the sea.

STATEMENT OF MESSRS. FORGARTY AND WHITTAKER, SMACKMEN OF BRADENTOWN.

We own a smack and fish off the coast from Egmont south to Charlotte Harbor. Our business is about ruined by the death of the fish. They are dying off the coast as bad as inshore. Our fish die after we put them in the well, frequently in five minutes. We cannot say what causes it, as we have no means of ascertaining. The poisoned water runs in streaks, for often when three or four smacks are in company one or two will lose all their fish in a few minutes, while the others, a short distance off, lose none. In one instance, three being in company, two lost all their fish, while one lost none, the vessels being only a few hundred yards apart.

STATEMENT OF R. B. STRAND, ASSISTANT KEEPER OF EGMONT LIGHT.

The fish first came up dead on the 17th of October in the following order: eels, cow-fish, toad fish, small fish, such as sailor's choice, min-

nows, &c.; terrapins, ducks, and other sea-birds followed. The water has the appearance of being very slimy.

INCIDENT RELATED BY MR. HENDRICKS, POSTMASTER AT PALMETTO.

Mr. Dolly threw a cast-net into a school of mullet which appeared active and healthy. Before he landed them they were all dead in his net; and looking back, the whole school was floating dead on the surface.

THE GENERIC NAMES AMITRA AND THYRIS REPLACED.

By G. BROWN GOODE.

I am told by my friend Professor Jordan that the names *Amitra* and *Thyris*, recently proposed by me for two new genera of fishes, are preoccupied in zoology. I wish to substitute for the former the name *Monomitra;* for the latter the name *Delothyris*. *Monomitra liparina* will consequently be the name for the *Liparis*-like fish noted in the Proceedings (vol. iii, 1880, p. 478), and *Delothyris pellucidus* for the transparent flounder, noticed in the same volume, p. 344. I wish also to express my thanks to Professor Jordan for his act of courtesy.

UNITED STATES NATIONAL MUSEUM, *January* 10, 1883.

SHELL BEDS IN WESTCHESTER, N. Y.

By MERRITT WILLIS.

Along Pelham Bay bordering on Long Island Sound, in the county of Westchester, State of New York, there are numerous shell beds. On the northwest side of the bay they are from 25 to 30 feet apart—true Kitchen Middens. They line the east side of the bay for some distance. There is one covering two or three acres, from which I have collected arrow-points, spear-points, arrow-scrapers, pestles, stone axes, knives, sharpening-stones, pipes, stone ornaments, &c. I also have taken from the shell beds several bones cut off at the joint for some purpose. I think they are the leg bones of deer.

I have collected in the town of Westchester alone some 900 arrow and spear heads, besides axes, balls, pestles, and numerous other implements.

Yours, respectfully,

MERRITT WILLIS.

NOTES ON THE NOMENCLATURE OF CERTAIN NORTH AMERICAN FISHES.

By DAVID S. JORDAN and CHARLES H. GILBERT.

1. Lepidosteus spatula Lacépède.

We have been enabled to compare the "Alligator Gar" of the Southern United States, with a Cuban "Manjuari" (*L. tristœchus* Bloch & Schneider) in the museum of Cornell University. It is probable that our species is distinct from the latter. The most prominent difference is in the development of the fulcra, the number of these on each of the fins being about twice as many in our specimens of *spatula* as in the single example of *tristœchus* examined. The number of scales in a vertical series is rather greater in the former. The number of fulcra increases somewhat with age, and it may be that this character will prove worthless. At present, however, it is best to retain the name *spatula* for the species found in the United States.

2. Ictiobus.

We find ourselves unable to recognize *Ictiobus*, *Bubalichthys*, and *Carpiodes* as distinct genera; they may be united under the earliest name, *Ictiobus*. An examination of Rafinesque's manuscript note-books, now preserved in the National Museum, shows, beyond a doubt, that the original *Catostomus bubalus* of Rafinesque was identical with the *Catostomus bubalus* of Kirtland, or the *Bubalichthys bubalus* of Agassiz. It is likely that the number of species in the group called *Carpiodes* has been much exaggerated. It is thought by Professor Forbes and Mr. Garman, who have worked over the very extensive material in the Illinois Laboratory of Natural History, that not more than two valid species exist. The same conclusion has been independently reached by Messrs. Swain and Kalb in the study of our own collections. We may, therefore, provisionally recognize the following as the known species of *Ictiobus:*

1. *Ictiobus* (*Sclerognathus*) *cyprinella* (C. & V.) Ag. (*Ichthyobus bubalus* Ag. non Raf.).
2. *Ictiobus* (*Ictiobus*) *urus* (Ag.) J. & G.
3. *Ictiobus* (*Ictiobus*) *bubalus* (Raf.) J. & G.
4. *Ictiobus* (*Carpiodes*) *carpio* (Raf.) Nelson.
5. *Ictiobus* (*Carpiodes*) *cyprinus* (Le S.) J. & G.

3. Esox vermiculatus Le Sueur.

It is evident from Rafinesque's manuscripts and drawings above noticed, that his *Esox rittatus* and *Esox salmoneus* are mythical, being known only from fraudulent drawings. The common small pickerel of the West, for which the name *Esox salmoneus* has been used by us, should stand as *Esox vermiculatus* Le Sueur, this name being prior to *Esox umbrosus* Kirtland.

5. **Scytaliscus** nom. gen. nov.

The name *Scytalina* given by us in 1880 to a genus of Congrogadoid fishes, is perhaps too near *Scytalinus* Erichson 1840, a genus of Coleoptera. We may therefore substitute for it the name *Scytaliscus*. The type is *Scytalina cerdale* J. & G.

NOTES ON THE NATURAL HISTORY OF LABRADOR.

By W. A. STEARNS.

There has been much contention between the two great powers, France and England, as to who first discovered this great peninsula of Labrador. It was certainly visited by Sebastian Cabot in 1496; and more or less explored by the Portuguese Cortereal, who, it is supposed, named it.

The popular tradition of the coast seems to be "that one Labrador, a Basque whaler, from the kingdom of Nevarre, in Spain, did penetrate through the Straits of Belle Isle as far as Labrador Bay, some time about the middle of the fifteenth century, and eventually the whole coast took its name from that coast and harbor."

There is very little doubt but that the coast here was visited by Norsemen as early as the tenth century.

There exists strong proof, also, that the discovery of this coast was made known by Basque fishermen.

As early as 1509, a chart of the coast had been published and was in the possession of the French.

In 1532, Jacques Cartier visited the coast *with Basque fishermen for pilots.*

The first established colony in Labrador appears to be that at "Brest," now Bradore, which was founded 1508, and soon contained 200 houses and 1,000 inhabitants, which number was trebled in the summer time or fishing season; but this colony did not survive over a century or a century and a half.

At present, from Red Bay to Natashquan, a distance of over 400 miles, there is scarcely a township containing more than thirty resident families.

The principal seal-fishing establishments are at La Tabatier, Dog Islands, Bradore, Long Point, and L'anse Loup. At these the average catch of eight stations, where hand nets are used, that are about 40 to 75 fathoms long and 30 feet deep is 800 large and 50 to 100 small harp and hood seal. The catch of Newfoundland and other steamers and vessels is 13,000 to 16,000 young "white coats" on the ice in the spring. These figures are increased or diminished according to the season.

I have visited nearly every station of importance from Mingan to Triangle Harbor, some miles north of Belle Isle, and everywhere found the people hard at work at their fishery in the summer time.

Blanc Sablon forms the dividing line between the Province of Quebec on the left hand and southwest and Labrador on the northeast.

All along the coast there are little harbors and bays some of small and some large size. All these places that can harbor a vessel contain from one to three and eight—the usual number—of houses. They are various distances apart, say from half a mile to 8 miles, though generally 3 to 5 miles. It is thus, save in one or two rough places, easy to go along the coast in small boats, stopping here or there in rough weather or at night.

In 1875 I made a summer excursion to Labrador, and remained there about two months chiefly within a radius of 60 miles southwest, and 10 northeast of Bonne Espérance.

In 1880 I visited the coast in September, and remained there the fall, winter, and spring of 1880–'81, returning home after an absence of just one year on the coast. During that time I visited nearly all the important points from Mingan to Red Bay.

In 1882 I spent the summer on the coast again, starting from Boston, as I had done in 1875 (my 1880–'81 trip had been from Quebec), with a party of about twelve young college men, when much good work was done in collecting, but owing to insufficient apparatus only enough to show what might be done with a properly fitted-out craft going for this express purpose and no other.

The following list of mammals, birds, and plants will show what has been accomplished in that line, and it is hoped that they will add, if ever so little, to our knowledge of the Labrador fauna and flora. Much more remains to be done, however, in each of these departments.

My examinations have been chiefly along the sea-coast. The interior has been rarely, if ever, to any great extent invaded by man.

W. A. STEARNS.

MAMMALS.

During the three trips that I have made to Labrador I have found the following mammals more or less abundant (according to their designation) all along the coast:

LYNX CANADENSIS (Desm.), Raf. *Canada Lynx.*

Common, especially in winter, when it is hunted for its fur all along the coast.

CANIS LUPUS, Linné, var. GRISEO-ALBUS. *Gray Wolf.*

Reported as seen occasionally, but very rare.

VULPES FULVUS (Desm.), var. FULVUS. *Red Fox.*

Abundant, especially in furring season.

VULPES FULVUS (Desm.), var. ARGENTATUS. *Silver Fox; Black Fox.*

The former variation is not uncommon; the latter is rare along the coast. I saw three beautiful skins of the black variation, with scarcely a light hair in them, caught on the coast.

Vol. VI, No. 8. Washington, D. C. August 1, 1883.

VULPES LAGOPUS, (Linné) Gray. *Arctic Fox.*

Rather common, but getting more and more scarce in Northern Labrador.

MUSTELA PENNANTI, Erxleben. *Fisher.*

Found occasionally in the southern portion of Labrador.

MUSTELA AMERICANA, Turton. *American Sable; Marten.*

Abundant inland, in the furrring season, throughout the peninsula.

PUTORIUS ERMINEA, (Linné) Griff. *Ermine; Stoat.*

Common all along the coast and probably equally so inland.

PUTORIUS VULGARIS, (Erxl.) Griff. *Common small Weasel.*

As far as I can discover equally abundant with *P. erminea.*

PUTORIUS VISON, (Schreb.) Gapp. *Mink.*

Abundant everywhere along the coast and about inland ponds.

GULO LUSCUS, (Linné) Sabine. *Wolverine.*

Rather common, but not nearly so often taken as one would imagine by the trappers. Seems to be pretty generally distributed along the coast.

MEPHITIS MEPHITICA, (Shaw) Baird. *Skunk.*

Seen occasionally in the lower portions of Labrador, but is rare.

LUTRA CANADENSIS, Sabine. *Otter.*

Common in the furring season all along the coast.

URSUS AMERICANUS, Pallas. *Black Bear.*

Common inland and along the high bluffs by the sea shore, all along the coast.

THALARCTOS MARITIMUS, (Linné) Gray. *White or Polar Bear.*

Rare, occasionally seen on blocks of floating ice off shore in the extreme northern portions. Twice recorded as far down through the straits of Belle Isle as Blanc Sablon.

PROCYON LOTOR, (Linné) Storr. *Raccoon.*

"Occurs at Square Island."—*Packard.*

PHOCA VITULINA, Linné. *Harbor Seal.*

Common. Rears its young on sand-bars about 15 to 20 miles up the rivers in the interior in the spring. Abundant outside in the fall.

PHOCA FŒTIDA, Fabricius. *Ringed Seal. Jar.*

Not uncommon in harbors in spring and fall. Distinguished from last species only on close examination.

PHOCA GRŒNLANDICA, Fabricius. *Harp? Seal.*

Common *in migrations* all along the shores south of Belle Isle.

ERIGNATHUS BARBATUS, (Fabricius) Gill. *Square-Flipper Seal.*

Rather common on cakes of floating ice in the spring, all along the coast.

CYSTOPHORA CRISTATA, (Erxl.) Nilsson. *Hooded Seal.*

With *P. grœnlandica*, but less common.

ODOBÆNUS OBESUS, (Illiger) Allen. *Walrus.*

Rare along the coast of Northern Labrador. Two were shot in 1880 and 1881, at Fox Harbor, St. Lewis Sound, off the shore a little way. A gentleman of our party obtained the tusks of one of them, which were about 7 inches long and nearly an inch in diameter.

Regarding the deer of Labrador some confusion exists. Two species, about equally common, are found throughout the peninsula in small, or less frequently in large (300 or 400), herds. They are probably the following:

TARANDUS RANGIFER, Brookes, var. CARIBOU. *Woodland Caribou;* and

TARANDUS RANGIFER, Brookes, var. GRŒLANDICUS. *Barren Ground Caribou.*

ALCES MALCHIS, (Linné) Gray, the *Moose*, and CERVUS CANADENSIS, Erxleben, the *American Elk*, have both been reported as found on the southwestern portion of Labrador, about north from Anticosti, but they are doubtless very rare and occasional.

OVIBOS MOSCHATUS, Blainville. *Musk Ox.*

On the authority of Prof. A. S. Packard a single relic of this animal may be accredited to this region. Probably it was its most southern limit in former times.

DELPHINAPTERUS CATODON, (Linné) Gill. *White Whale.*

Common in the Saint Lawrence River, at least as far as Anticosti.

MONODON MONOCEROS, Linné. *Narwhal.*

Given on the authority of Professor Packard, but it is probably exceedingly rare.

ORCA GLADIATOR, (Bonnaterre) Gray. *Killer.*

Occasional all along the coast apparently.

GLOBICEPHALUS INTERMEDIUS, (Harlan) Gray. *Black-fish.*

Common in the Gulf, at least to the mouth of the Straits of Belle Isle.

GRAMPUS GRISEUS, (Cuvier) Gray. *Grampus.*

Not uncommon all along the shores to Belle Isle, and perhaps farther.

PHYSETER MACROCEPHALUS, Linné. *Sperm Whale.*

Occasionally taken along the coast, as I am informed by the traders and people.

SIBBALDIUS BOREALIS, (Fischer) Geoffroy. *Sulphur-bottom Whale.*

Not regarded as rare. Frequently taken by the people along the shore. One towed ashore at Old Fort Island in 1878 or 1879.

One of the whalebone whales is occasionally taken along this coast, but which species it is I cannot tell. I am sure that several species both of whales and porpoises will be eventually added to this list.

SCIUROPTERUS VOLUCELLA, (Pallas) Geoffroy, var. HUDSONIUS. *Flying Squirrel.*

Occasional along the coast. Specimens found at Saint Augustine.

SCIURUS HUDSONIUS, Pallas. *Red Squirrel.*

Common in the woods along the shore, and probably inland also, all along the coast.

Gray Squirrels are said to occur here also, but I did not see any.

ARCTOMYS MONAX, (Linné) Schreber. *Woodchuck. Whistler.*

Common at Mingan, growing scarce towards Bonne Esperance.

CASTOR FIBER, Linné. *Beaver.*

Common in inland ponds all along the coast in furring season, but growing rapidly scarce.

ZAPUS HUDSONIUS, (Zimmermann) Coues. *Deer Mouse. Jumping Mouse.*

Not rare on the dry tops of many of the islands along the coast.

HESPEROMYS LEUCOPUS, (Raf.) Le Conte. *White-footed Mouse.*

Occurs probably about equally abundant with *Z. hudsonius.*

A species of ARVICOLA, or *Meadow Mouse* is very abundant in summer.

FIBER ZIBETHICUS, (Linné) Cuvier. *Muskrat.*

Very common in the ponds inland all along the coast, at least to Belle Isle.

ERETHIZON DORSATUM, (Linné) F. Cuvier. *White-haired Canadian Porcupine.*

Very common along the coast certain years; periodical. Killed by the Indians for food.

LEPUS AMERICANUS, Erxleben, var. AMERICANUS. *Northern Varying Hare.*

Common, some years even abundant.

[LEPUS AMERICANUS, Erxleben, var. VIRGINIANUS. *Southern Varying Hare.*

Occurs in Newfoundland, but has not yet been recorded from Labrador.]

VESPERTILIO SUBULATUS, Say. *Little Brown Bat.*

A specimen flew on board our vessel one night, when about opposite Natashquan, and was secured. Other species doubtless occur.

BIRDS.

The following list of birds comprises those collected during a stay of twelve months on the coast in 1880–'81, and also some additions made the summer of 1882. A few are added on the authority of Dr. Coues in 1860. I think that the number of land birds will probably be largely increased by further investigation.

1. MERULA MIGRATORIA. *Robin.*

Saw a small flock at Old Fort Bay, October 10, 1881; shot a specimen April 26, 1882; found them breeding in the interior in June, same year.

2. HYLOCICHLA MUSTELINA.* *Wood Thrush.*

Certainly heard this bird repeatedly—other persons present verified the same—10 miles up Esquimaux River, one day late in July.

3. SAXICOLA ÆNANTHE. *Stonechat.*

Dr. Coues procured a single specimen at Henley Harbor, August 25, 1860.

4. REGULUS CALENDULA. *Ruby-crowned Kinglet.*

Shot a single specimen at Old Fort Island, October 11, 1881. Dr. Coues shot one August 6, 1860, at Rigoulette.

5. PARUS HUDSONICUS. *Hudsonian Chickadee.*

Abundant everywhere along the coast all the year.

6. EREMOPHILA ALPESTRIS. *Shore Lark.*

Common everywhere, except in winter.

7. ANTHUS LUDOVICIANUS. *Titlark.*

Common everywhere, except in the winter.

8. DENDRŒCA CORONATA. *Yellow-rumped Warbler.*

Common in interior. Breeds.

9. DENDRŒCA STRIATA. *Black-poll Warbler.*

Common in interior. Breeds.

10. GEOTHLYPIS TRICHAS. *Maryland Yellowthroat.*

Common at Natashquan.

11. SIURUS AURICAPILLUS. *Golden-crowned Thrush.*

Not uncommon in the interior. Breeds.

---

* More like *H. aliciæ* (Gray-checked Thrush), since the Wood Thrush is not known to occur even so far north as the southern shores of the Gulf of Saint Lawrence.—R. R.

12. SIURUS NÆVIUS. *Water Thrush.*

Not uncommon in the interior. Breeds.

13. MYIODIOCTES PUSILLUS. *Green Black-capped Flycatcher.*

A specimen was shot by D. H. Talbot, Sioux City, Iowa; 10 miles up Esquimaux River another specimen was seen and others heard. The bird cannot be rare.

14. PINICOLA ENUCLEATOR. *Pine Grosbeak.*

Common in fall and winter.

15. ÆGIOTHUS LINARIA. *Red-poll Linnet.*

Rather common in the interior. Breeds.

16. PLECTROPHANES NIVALIS. *Snow Bunting.*

Common in large flocks in winter.

17. CENTROPHANES LAPPONICUS. *Lapland Longspur.*

Rather common.

18. PASSERCULUS SANDWICHENSIS SAVANNA. *Savanna Sparrow.*

Abundant everywhere. Breeds. None seen in winter.

19. JUNCO HYEMALIS. *Snow Bird.*

Not rare in spring and fall. Obtained several near Old Fort.

20. SPIZELLA MONTICOLA. *Tree Sparrow.*

Not rare in spring and fall. With the last.

21. ZONOTRICHIA ALBICOLLIS. *White-throated Sparrow.*

Common everywhere. Breeds.

22. ZONOTRICHIA LEUCOPHRYS. *White-crowned Sparrow.*

Common everywhere. Breeds.

22. PASSERELLA ILIACA. *Fox-colored Sparrow.*

Common at least as far as Red Bay in spring and fall, if not in summer.

24. SCOLECOPHAGUS FERRUGINEUS. *Rusty Blackbird.*

Common and breeds at least as far as L'Anse Amour.

25. CORVUS CORAX. *Raven.*

Abundant all the year around.

26. CORVUS AMERICANUS. *Common Crow.*

A few are occasionally seen as far north as Esquimaux River.

27. PERISOREUS CANADENSIS. *Canada Jay.*

Abundant inland all the year.

28. CHORDEILES POPETUE. *Night Hawk.*

Common at Natashquan.

29. CERYLE ALCYON. *Kingfisher.*

Common at least as far as Esquimaux River. Breeds.

30. PICUS VILLOSUS. *Hairy Woodpecker.*

Common inland in winter at least about Esquimaux River.

31. PICUS PUBESCENS. *Downy Woodpecker.*

I found this common with the last.

32. PICOIDES ARCTICUS. *Black-backed three-toed Woodpecker.*

On authority quoted by Coues.

33. COLAPTES AURATUS. *Golden-winged Woodpecker.*

Not rare, at least as far as L'Anse Claire.

34. BUBO VIRGINIANUS. *Great Horned Owl.*

Not rare in neighborhood of Esquimaux River.

35. ASIO ACCIPITRINUS. *Short-eared Owl.*

A specimen was brought to me by one of the young fellows at Old Fort.

36. NYCTEA SCANDIACA. *Snowy Owl.*

Not rare in winter. All along the coast to Red Bay, at least, if not further.

37. CIRCUS HUDSONIUS. *Marsh Hawk.*

One specimen found at Dead Island Harbor.

38. ACCIPITER COOPERI. *Cooper's Hawk.*

Seen several times.

39. ASTUR ATRICAPILLUS. *Goshawk.*

Dr. Coues obtained one specimen.

40. HIEROFALCO GYRFALCO OBSOLETUS? *Labrador Gryfalcon?*

Saw the bird, and have no doubt but that he had a nest on an inaccessible crag near the house, but was unable to obtain it.

41. ÆSALON COLUMBARIUS. *Pigeon Hawk.*

Seen several times on our way down the coast.

42. CANACE CANADENSIS. *Spruce Partridge.*

Common all the year around.

43. LAGOPUS ALBUS. *Willow Ptarmigan.*

Not rare. In winter generally common.

44. LAGOPUS RUPESTRIS. *Rock Ptarmigan.*

Not rare. Generally common in winter.

45. SQUATAROLA HELVETICA. *Black-bellied Plover.*

Common in spring and fall.

46. CHARADRIUS DOMINICUS. *Golden Plover.*

A specimen of this bird was obtained at Fox Island, Saint Lewis Sound.

47. ÆGIALITES SEMIPALMATUS. *Semipalmated Plover.*

Common. Breeds everywhere.

48. STREPSILAS INTERPRES. *Turnstone.*

Common at Dead Island and along the coast in small flocks.

49. PHALAROPUS FULICARIUS. *Red Phalarope.*

Given by Dr. Coues, who procured them from off Belle Isle.

50. GALLINAGO WILSONI. *American Snipe.*

Given by Dr. Coues. A single specimen secured.

51. MACRORHAMPHUS GRISEUS. *Red-breasted Snipe.*

Given by Dr. Coues. A single specimen secured.

52. EREUNETES PUSILLUS. *Semipalmated Sandpiper.*

Common in spring and fall.

53. ACTODROMAS MINUTILLA. *Least Sandpiper.*

Common in spring and fall. Breeds in summer.

54. ACTODROMAS MACULATA. *Pectoral Sandpiper.*

Occasional in fall.

55. ACTODROMAS BONAPARTEI. *Bonaparte's Sandpiper.*

Abundant in large flocks in spring and fall. A few breed.

56. TRINGA CANUTUS. *Knot.*

Not very common in fall.

57. CALIDRIS ARENARIA. *Sanderling.*

Common in flocks of 20 and 30 at Old Fort Island.

58. LIMOSA HÆMASTICA. *Hudsonian Godwit.*

I obtained a single specimen at Old Fort Island. It is said to be very rare.

59. TOTANUS MELANOLEUCUS. *Greater Yellowlegs.*

Not rare in fall and spring. I think breeds. Have found it late into breeding season.

60. RHYACOPHILUS SOLITARIUS. *Solitary Sandiper.*

Not rare in spring and fall. Breeds.

61. TRINGOIDES MACULARIUS. *Spotted Sandpiper.*

Not rare. Breeds.

62. NUMENIUS HUDSONICUS. *Hudsonian* or *Jack Curlew.*

Not rare in fall.

63. NUMENIUS BOREALIS. *Esquimaux Curlew.*

Formerly abundant; now common in the interior in fall.

64. BOTAURUS LENTIGIMOSUS. *American Bittern.*

Authority of Dr. Coues. One specimen.

65. BERNICLA CANADENSIS. *Canada Goose.*

Not rare in spring and fall.

66. BERNICLA BRENTA. *Brant Goose.*

Rather common at least as far north as Cape Whittle.

67. ANAS OBSCURA. *Black Duck.*

Common; said to breed.

68. DAFILA ACUTA. *Pintail Duck.*

Rare. I obtained one specimen of a pair seen at Old Fort Island. One taken a short time before near same place.

69. MARECA AMERICANA. *Widgeon.*

Occurs as far as Natashquan; said to occur inland at Esquimaux River.

70. NETTION CRECCA. *English Teal.*

Authority of Dr. Coues, who obtained one specimen.

71. NETTION CAROLINENSIS. *Green Winged Teal.*

Dr. Coues obtained one single specimen at Rigoulette.

72. AIX SPONSA. *Wood Duck.*

Not rare in interior. Breeds in hollow trees.

73. ÆTHYIA AMERICANA. *Redhead.*

I saw a single specimen in the water at Baie des Roches, September 23. Am told that it is common.

74. CLANGULA ISLANDICA. *Barrow's Golden Eye.*

Common in rivers as far as Natashquan. Said to occur in Esquimaux River in mild winters.

75. CLANGULA ALBEOLA. *Buffle-head Duck.*

Common in fall.

76. HARELDA GLACIALIS. *Long-tailed Duck.*

Common in mouths of rivers in spring and fall.

77. HISTRIONICUS MINUTUS. *Harlequin Duck.*

Rather rare. Mouths of rivers, spring and fall Probably breeds.

78. SOMATERIA MOLLISSIMA DRESSERI. *American Eider Duck.*

Abundant everywhere. Breeds.

79. SOMATERIA SPECTABILIS. *King Eider.*

Abundant in spring in large flocks. I shot a great many of them. It is said to breed in this region occasionally. In the Canadian Sportsman and Naturalist, vol. 1, No. 7, July 15, 1881, p. 51, in an article headed "Bird-nesting in Labrador," Mr. Napoleon A. Comeau, the writer, whom I know personally and who spoke with me personally to the same purport, says that on a small island opposite Mingan: "Indeed, one small island, visited by us, was almost covered with the nests of this species (*S. mollissima*), *and here we first found the nest of its congener, the King Eider* (*S. spectabilis*)." This is, I believe, the first record of this rare nest found on the Atlantic.

SOMATERIA V-NIGRA. *Pacific Eider.*

Abundant in large flocks in spring. I myself obtained specimens that had the decided "V-shaped black mark" on the chin, and was told by the natives that there were "three different species of spring ducks so near alike that you could hardly tell the difference." This species has been doubted by several authorities. I still believe that I can secure specimens and prove its occurrence unquestionably.

80. ŒDEMIA AMERICANA. *Black Scoter.*

Abundant. Breeds by inland ponds.

81. MELANETTA VELVETINA. *White-winged Coot.*

Common in fall, rare in spring. Not known to breed.

82. PELIONETTA PERSPICILLATA. *Sea Coot.*

Common in spring, rare in late fall. Not known to breed.

83. MERGUS MERGANSER AMERICANUS. *Fish Duck.*

I have seen one specimen taken near Fort Island.

84. MERGUS SERRATOR. *Red-breasted Merganser.*

Common in spring and fall. Breeds occasionally.

85. LOPHODYTES CUCULLATUS. *Hooded Merganser.*

Rather rare but occasional.

86. SULA BASSANA. *Gannet.*

Common in Gulf of Saint Lawrence. Occasionally seen near the Labrador coast.

87. PHALACROCORAX CARBO. *Common Cormorant.*

Abundant off Mecattina Islands. Breeds.

88. PHALACROCORAX DILOPHUS. *Double-crested Cormorant.*

Common with the former.

89. STERCORARIUS POMATORHINUS. *Pomarine Jaëger.*

I have seen a specimen of this species I think taken near the mouth of Esquimaux River. Dr. Coues also obtained it.

90. STERCORARIUS PARASITICUS. *Richardson's Jaëger.*

Shot a specimen in St. Lawrence River, about opposite Point des Monts.

91. STERCORARIUS BUFFONII. *Buffon's Jaëger.*

Seen by Dr. Coues.

92. LARUS GLAUCUS. *Burgomaster.*

Not rare. I obtained several specimens. Breeds.

93. LARUS MARINUS. *Great Black-backed Gull.*

Abundant and breeds all along the Labrador coast.

94. LARUS ARGENTATUS SMITHSONIANUS. *Herring Gull.*

Common. Breeds everywhere.

95. RISSA TRIDACTYLA. *Kittiwake Gull.*

Common in spring and fall. Breeds occasionally.

96. LARUS PHILADELPHIÆ. *Bonaparte's Gull.*

Common in large flocks in fall, perhaps spring, but not known to breed on the Labrador coast.

97. STERNA MACRURA. *Arctic Tern.*

An abundant spring and fall migrant in the Gulf.

98. STERNA FLUVIATILIS. *Common Tern.*

Seen at Regoulette by Dr. Coues.

99. FULMARUS GLACIALIS. *Fulmar.*

Recorded by Dr. Coues off Belle Isle.

100. CYMOCHOREA LEUCORRHOA. *Leache's Petrel.*

Common off coast as far at least as to Belle Isle.

101. PUFFINUS MAJOR. *Greater Shearwater.*

Not rare off shore along the whole coast.

102. PUFFINUS FULIGINOSUS. *Sooty Shearwater.*

A few were seen by Dr. Coues in company with *P. major.*

103. COLYMBUS TORQUATUS. *Loon.*

Abundant. Breeds inland.

104. COLYMBUS SEPTENTRIONALIS. *Red-throated Diver.*

Dr. Coues obtained "two eggs supposed to be of this species at Sloop Harbor, on the 4th of July."

105. COLYMBUS ARCTICUS. *Black-throated Diver.*

Two specimens were obtained of this rare bird off the Labrador coast by one of the French priests at Bersimis, one in 1880.

106. PODICEPS HOLBÖLLII. *American Red-necked Grebe.*

Not rare in spring and fall. Occasionally breeds.

107. UTAMANIA TORDA. *Razor-billed Auk.*

Abundant, more so north of Esquimaux River. Breeds.

108. FRATERCULA ARCTICA. *Puffin.*

Abundant on one or two islands near Bradore; not rare in other localities along the coast.

109. ALLE NIGRICANS. *Sea Dove.*

Abundant certain seasons. Occasional all along the coast.

110. URIA GRYLLE. *Black Guillemot.*

Common everywhere in spring and fall. Breeds in certain localities abundantly, though not so much so as either *U. torda*, or *F. arctica*, or *L. troile*.

111. LOMVIA TROILE. *Foolish Guillemot.*

Abundant; more so south of Esquimaux River. Breeds like *U. torda* in vast colonies on the islands along the coast.

REPTILES AND BATRACHIANS.

There are few members of this class to be found on the Labrador coast, yet, strange to say, on but one part of the coast, in the marshes about the mouth of Pinway (Black River on the charts) river, about 12 miles from Point Amour Light-House, the air was full of the pipings of some species of frog which I was unable to secure specimens of, as we did not stop at this point. The inhabitant, at one or two places along the coast invariably said: "There are frogs at Pinway, but we know of none anywhere else on the coast."

Professor Packard found *Rana septentrionalis* at Okkak, also *Plethodon glutinosa* at Belles Amour. The Reptilian fauna will probably be enlarged, but not to any great extent.

FISHES.

A very few of the species in this most important department have been secured this year, 1882; and though they are only the most common and abundant species, they will perhaps serve to show a part of the characteristic fish fauna of this region.

CTENOLABRUS ADSPERSUS. *Common Blue perch.*

Was very common all about Cape Britain.

GASTEROSTEUS ACULEATUS. *Common Stickleback.*

Abundant in large swarms everywhere about the shoal waters of Cape Britain. I saw two specimens of Gasterosteus biaculeatus, taken off coast in the midst of a large sea, sporting in immense areas close by the vessel.

GASTEROSTEUS PUNGITIUS.

Was found occasionally off Cape Breton coast.

OSMERUS MORDAX. *Smelt.*

Common in August, all along the shoal water off the wharfs of Cape Britain.

SCOMBER SCOMBRUS. *Mackerel.*

Seldom taken at all on the Labrador coast, except as isolated individuals or by twos and threes. One person at Triangle Harbor took eight while we were there, but said that he had not taken as many before in as many years.

SALMO SALAR. *Salmon.*

Common everywhere in the mouths of rivers all along the Labrador coast. The most abundant species of the family.

SALVELINUS FONTINALIS. *Speckled Brook-trout.*

Abundant in all the streams along the coast, seldom growing large. Is said not to be found in the ponds or far from the mouths of the streams, not mingling much if any with the large sea trout.

MALLOTUS VILLOSUS. *Caperlin.*

Abundant in large colonies in shoal water all along the coast. Used for cod bait, and pursued and fed on by the codfish in the water. When traveling in these large bodies the movements of the whole body seem to be almost simultaneous, and though the front of the phalanx is generally composed of a single fish, the two sides fall off triangularly, so that, strange to say, the change of direction appears, if it is not in reality, to be simply the assuming the chief position by any fish, in any position along the line, while all the others immediately fall into their proper place, and the whole body moves off as an acute triangular shaped mass of living Caperlin. When few in number, they delight to swim singly, or by twos or threes in a long line, repeatedly sinking and swimming under the vessel from side to side, shortly returning again.

CLUPEA HARENGUS. *English Herring.*

Abundant north of Blanc Sablon, growing more and more so all along the Labrador coast, the further down which are the greatest catches. The *young* fish remain about in the waters *all the year*, if the reports of several different individuals can be credited. The people tell me that they refrain from catching the fish until September, so that the young may have a chance to grow to the fine, large fish for which this region is so celebrated, but that the nets might be drawn full of small fish *in any month of the year when the ice did not interfere.*

GADUS MORRHUA. *Common Cod.*

Abundant everywhere; but usually the fish are small, and seldom the size of those taken off the Grand Banks. Most of them go to France,

where they seem to be preferred to the larger fish. The larger fish are taken chiefly in the fall, in deep water—70 to 100 fathoms—the spring and summer fish average 3 to 8 and 10 pounds, and are taken in about 8 to 15 fathoms of water. The Squid is *not* common nor even "not rare" along the Labrador coast. Although it is an *abundant* bait off Newfoundland, it is *very* rare along the Labrador coast.

GADUS OGAC. *Greenland Codfish.*

Occasionally, but rarely, taken in deep water off the Labrador coast. Frequently taken within a mile from shore along the northern part of the coast, especially north of Belle Isle. Often regarded as much more delicate eating than the common cod. Seldom grows large. Swims in bodies with small "tom cods," as they are called, which are probably the young of the common cod.

COTTUS SCORPIOIDES. *Sculpin.*

Common in shoal water, about the fish stages, all along the coast.

COTTUS GRŒNLANDICUS. *Northern Sculpin.*

Common, with *scorpioides*, all along the coast.

GYMNACANTHUS PISTILLIGER. *Sculpin.*

Rather common in the northern portions along the coast like the others.

HIPPOGLOSSOIDES PLATESSOIDES. *Arctic Dab.*

Common about the stage heads all along the coast.

PLEURONECTES AMERICANUS. *Common Flounder.*

Rather common, usually in deeper water than the *H. platessoides*, along the whole coast.

SOMNIOSUS MICROCEPHALUS.

This species of shark is found not rare all along the coast, some years doing more damage than others. It breaks the fish-nets, stops the fish from attaching themselves to the *trolls* of the fishermen, and is finally captured itself by some of the innumerable hooks of this same troll. After tangling and otherwise ruining the lines to the best of its power, it itself becomes the prey of the fishermen, who curse it heartily. The liver of this fish is said to yield the most delicate and pure oil of any fish known upon the coast. Several portions of the vitals are preserved by the people with the greatest of care, under the supposition that the wearing or carrying of them or the simple having them in the house will prove sure protection against not only the rheumatism, but several diseases peculiar to the male sex.

There are several other species common along the coast but of which we were not fortunate enough to obtain specimens, notably the Launce, or Lance, the fall bait for the codfish. Several other species of trout are also common.

PLANTS.

In reviewing and adding to the excellent list of "Labrador Plants," by the Rev. S. R. Butler (Canadian Naturalist, vol. v, 1870, September, p. 350), it seems necessary to say a few words explanatory of the nature of the regions bordering the sea-coast, as well also of those in the interior of Labrador.

There are two well-defined areas to which I would call attention; a simple designation of them as *sea-coast* and *interior* will present to you the general idea which I wish to convey. I will draw the line, as near as my own observation coincides with that of others, at somewhere between 2 and 4 miles inland. Of the interior of this whole region very little is known. In summer, woods of mostly low, stunted spruce, with various evergreens, are everywhere abundant, and it is with the utmost difficulty that one can make any progress whatever. Few have attempted to penetrate this area, and we know but little of it. Its accessible edges abound in many plants very similar to ours, especially those crowning the summits of the White Mountains. That part styled the coast differs from the province just mentioned in that it is composed mostly of numerous low, hilly, island crests, everywhere interspersed with narrow straits of water, besides a narrow ribbon of land up and down the coast line itself. The general flora of all the islands is much the same, but there are localized species of both wild and introduced plants. Mr. Butler makes the following remarks prefatory to his enumeration of species in the above-named paper: "The two places I have most thoroughly examined are Caribou Island and Forteau Bay. When a plant is marked 'Caribou,' it is meant that I found it only at that place; when 'Forteau' is mentioned, the plant may occur all around Forteau Bay, while 'Amour' means that I have found it only at 'L'ance Amour,' and that it is not likely to occur elsewhere in the Bay; and where no locality is specified, the species may be expected to occur at many places, if not all along the coast." The collection of Miss MacFarlane, referred to in the same paper, has also afforded much valuable material. The specimens collected by myself were procured at *Harrington Harbor*, the southernmost limit visited, *Baie des Roches*, *Bonne Espérance* (in and about Salmon Bay); also the "winter quarters" of the inhabitants, a distance of 7 miles inland, up Esquimaux River, and which belongs to the mainland.

The list here presented is impartial and imperfect at best, but it will suffice until a more accurate and thorough examination of the country shall perfect it. The letter B, after a plant, signifies that the remarks are by Mr. Butler.

1. ANEMONE PARVIFLORA, Michx.

Common upon the high lands of Forteau. B.

2. THALICTRUM DIOICUM, Linn.

Common on the highlands, along the margin of streams, and in the interior visited by me, August 5.

3. THALICTRUM CORNUTI, Linn.

"(Miss Macfarlane, No. 1)."

4. RANUNCULUS ACRIS, Linn.

Rather common on the level grassy plats of Forteau, B., probably more or less distributed all along the coast in suitable localities.

5. COPTIS TRIFOLIA, Salisb.

Rather common in marshy grounds.

6. NUPHAR ADVENA, Aiton.

"In ponds, Caribou." B.

7. SARRACENIA PURPUREA, Linn.

Very abundant in one or two confined areas on the large Mecattina Island, at Harrington Harbor, July 26, and found also in the wet places among the rocks inland, October, 1880.

8. ARABIS ALPINA, Linn.

"Brooksides, Forteau." B.

9. DRABA INCANA, Linn.

"Caribou." B.

10. COCHLEARIA TRIDACTYLITIS, Linn.

"Seashore, Caribou." B.

11. COCHLEARIA, ———.

"Hilltops, Forteau." B.

12. CAPSELLA BURSA-PASTORIS, Mœnch.

Probably introduced, abundant at Bonne Espérance about the yard and pathways, August 11.

13. VIOLA BLANDA, Willd.

In greater or less abundance all along the coast in damp localities.

14. VIOLA CANINA, *L.*, var. SYLVESTIS, Regel.

Distributed much as in the preceding, but in dry localities.

15. DROSERA ROTUNDIFOLIA, Linn.

Not common. It is found in several localities along the coast. I found it in moist places about Bonne Espérance, August 12.

16. SILENE ACAULIS, Linn.

"Hilltops of Amour, also Old Fort Island." B.

17. ARENARIA GRŒNLANDICA, Spreng.

This was found on the summits of many hilly crests at Baie des Roches,

and though I did not find it elsewhere I suspect it occurs in like situations all along the coast.

18. ARENARIA PEPLOIDES, Linn.

Quite common, springing up in the sand along the shore. Mr. Butler found it at Caribou and at Forteau. I think it occurs generally.

19. ARENARIA VERNA, Linn.

"Hillsides, Amour." B.

20. ARENARIA LATERIFLORA, Linn.

I suspect pretty generally common, as Mr. Butler remarks, in "level, grassy places."

21. STELLARIA LONGIPES, Goldie.

Common all along the sea-coast. Very common at Bonne Espérance, August 11.

22. STELLARIA LONGIPES, Goldie, var., EDWARDSII, Torr. & Gray.

"(Miss Macfarlane, No. 9. Torrey & Gray very properly reduce this to a variety of the last species)."

23. STELLARIA BOREALIS, Bigelow.

Common on hilly slopes along the coast, especially at Caribou, B., and Bonne Espérance islands, August 11.

24. STELLARIA CRASSIFOLIA, Ehrh.

Distributed much the same as *longipes* and *borealis*, occurring in damp localities, August 11.

25. CERASTIUM ALPINUM, Linn.

"Very common at Forteau." B.

26. CERASTIUM ARVENSE, Linn.

"Abundant about Forteau." B.

27. ASTRAGALUS ALPINUS, Linn.

"Hillsides, Amour." B.

28. HEDYSARUM BOREALE, Nuttall.

"Hillsides, Amour." B.

29. OXYTROPIS CAMPESTRIS, D. C.

"Hillsides near Forteau light-house." B.

30. LATHYRUS MARITIMUS, Bigelow.

More or less common all along the coast in dry and moist places and on low land. Early August.

31. LATHYRUS PALUSTRIS, Linn.

"At Caribou," B., and *probably* other places along the coast.

32. POTERIUM CANADENSE, Benth & Hook.

Very common on the dry, sloping flats along the coast. August 6.

Vol. VI, No. 9. Washington, D. C. Sept. 20, 1883.

33. ALCHEMILLA VULGARIS, Linn.

"Abundant on hillsides, Amour." B. I also found it in several localities along the coast.

34. DRYAS OCTOPETALA, Linn.

"Hilltops, Amour." B.

35. GEUM RIVALE, Linn.

In similar situations as those in which it is found in New England, all along the coast. Early August.

36. POTENTILLA NORVEGICA, Linn.

All along the coast, and in the interior, more or less abundant. August 5.

37. POTENTILLA ANSERNIA. Linn.

On sandy or marshy flats all along the coast, often very abundant, especially so at Harrington Harbor. July 24.

38. POTENTILLA PALUSTRIS, Scopoli.

"Marshy places, Caribou," B.; also at Bonne Espérance. August 6.

39. POTENTILLA TRIDENTATA, Solander.

Equally abundant near the coast and in the interior. August 5.

40. POTENTILLA MACULATA, Pourret.

"Hills, Amour." B.

41. FRAGARIA VIRGINIANA, Duchesne.

Found occasionally, but apparently rather rare.

42. RUBUS CHAMÆMORUS, Linn.

One of the most abundant and characteristic plants both in flower and fruit of Labrador; grows everywhere, on plain and hilltop, be it dry or damp. The berry, when ripe, forms the celebrated "Baked Apple" of this region, and is a most delicious article of food. August and September.

43. RUBUS ARCTICUS, Linn.

This is not common, and yet is hardly rare; is found in greater or less abundance all along the coast. August 12.

44. RUBUS TRIFLORUS, Richard.

Rather common on the hilly slopes along the coast.

45. RUBUS STRIGOSUS, Michx.

"In inland gulches." B. Quite common, I judge.

46. RUBUS CASTOREUS, Fries.

"Forteau." B.

47. PIRUS AMERICANA, D. C.

Common on the highlands all along the coast.

48. P. AMERICANUS var. MICROCARPA.

Not rare.

48*a*. AMELANCHIER CANADENSIS, Torr. & Gray, var. OLIGOCARPA, Torr. & Gray.

Common in swamps and on low ground everywhere. July 24.

49. RIBES LACUSTRE, Poiret.

"Common in the interior." B.

50. RIBES PROSTRATUM, L'Her.

"Common in the interior." B.

51. SAXIFRAGA AIZOIDES, Linn.

Common in rocky places at Forteau, and other places.

52. SAXIFRAGA OPPOSITIFOLIA, Linn.

"On rocks, Armour." B.

53. SAXIFRAGA CÆSPITOSA, Linn.

"In level sandy places, Forteau." B. I found other specimens, but the locality was lost or mislaid. I think they were from Bonne Espérance, however; late, in July.

54. MITELLA NUDA, Linn.

"Hillsides, Forteau." B.

55. PARNASSIA PARVIFLORA, D. C.

"Hillsides Amour." B.

56. SEDUM RHODIOLA, D. C.

Very common in localities all along the coast, in damp places; quite abundant at Harrington Harbor and on the neighboring islands, July 26.

57. HIPPURIS VULGARIS, Linn.

Rather rare. My specimens were gathered by a small pond in the interior, if I remember correctly, August 5.

58. EPILOBIUM SPICATUM, Lam.

"On hillsides Caribou." B. It is also not rare in the interior. August 5.

59. EPILOBIUM MOLLE, Torr.

At Bonne Espérance and in the interior. Very common. August 5 and 12.

60. EPILOBIUM ALPINUM, Linn.

"Wet places, Forteau." B.

61. EPILOBIUM PALUSTRE, Linn.

Quite common in damp places all along the coast.

62. EPILOBIUM LATIFOLIUM, Linn.

"Sea-shore, Amour." B.

63. HERACLEUM LANATUM, Michx.

"Hillsides and ravines." B.

64. ARCHANGELICA ATROPURPUREA, Hoffm.

"Hillsides and ravines." B.

65. LIGUSTICUM SCOTICUM, Linn.

"Caribou." B. In the interior, rather rare. August 5.

66. CORNUS CANADENSIS, Linn.

Abundant everywhere both on the coast and in the interior. A most characteristic species. July and August.

67. LINNÆA BOREALIS, Gronov.

On the highlands at Harrington and other places along the coast. July 24.

68. LONICERA CÆRULEA, Linn.

"On hillsides." B.

69. VIBURNUM PAUCIFLORUM, Pylaie.

"In ravines." B.

70. GALIUM TRIFIDUM, L., var. PUSILLUM, Gray.

I found this species, though I cannot tell the locality, from a mislaying of the label; I think it was Bonne Espérance, or in the interior.

71. ASTER RADULA, Aiton.

All along the sea-shore, August 5 to 15.

72. SENECIO AUREUS, L., var. BALSAMITÆ, Gray.

"In swamps." B.

73. SENECIO PSEUDO-ARNICA, Lessing.

"On hillsides." B.

73*a*. TARAXACUM DENS-LEONIS, Desf.

Not uncommon along the coast; flowers very large usually.

73*b*. CAMPANULA ROTUNDIFOLIA, Linn.

"It grows at Middle Bay, Belles Amour, and L'Anse Amour. I have never heard of its being found on any of the islands." B. I found it all along the shore at Forteau; it appears quite common there.

74. VACCINEUM CÆSPITOSUM, Michx.

"On hillsides." B.

75. VACCINEUM ULIGINOSUM, Linn.

Rather common in swampy regions all along the coast.

76. VACCINEUM VITIS-IDÆA, Linn.

Very common on all highlands, August 1 to 15.

77. VACCINEUM OXYCOCCUS, Linn.

Very common in swampy regions, August 1 to 15.

78. VACCINEUM PENNSYLVANICUM, *Cary*, var. ANGUSTIFOLIUM, *Gray*.

Common on the highlands August 11. All these five species, particularly the four last, are more or less abundant all along the sea-coast.

79. CHIOGENES HISPIDULA, Torrey & Gray.

"(Miss MacF. No. 35.)"

80. CASSANDRA CALYCULATA, Don.

"In marshy places." B.

81. ANDROMEDA POLIFOLIA, Linn.

Rather common in ravines and swampy grounds, July 26.

82. KALMIA LATIFOLIA, Linn.

Of this plant Mr. Butler writes me: "I have found it in ravines and near ponds in the interior, up Salmon River, and on Esquimaux Island."

83. KALMIA GLAUCA, Aiton.

With *A polifolia*, rather common at Harrington Harbor as well as more or less so apparently all along the coast.

83*a*. KALMIA ANGUSTIFOLIA, Linn.

"In ravines near ponds in the interior, up Salmon River, and on Esquimaux Island." B.

84. RHODODENDRON RHODORA, Don.

Of this Mr. Butler writes: "I found it very abundant at one place at the westward of Bonne Espérance, but on that island it only grows sparingly in one little spot. Similarly at Caribou Island, and I saw it nowhere else, though it is probably to be found sparingly all along, but by no means so plentifully as *Kalmia glauca*, which is everywhere." I found it rather common in several places, and also at Harrington Harbor August 2.

85. RHODODENDRON LAPPONICUM, Wahl.

"On a hilltop near Amour." B.

86. LEDUM LATIFOLIUM, Aiton.

Everywhere common on the whole coast. July 26 and August 12.

87. LOISELEURIA PROCUMBENS, Desv.

"On hillsides, Caribou." B.

88. PYROLA ROTUNDIFOLIA, Linn.

"In swamps, Amour." B.

89. MONESES UNIFLORA, Gray.

"In damp, shady places." B.

90. PLANTAGO MARITIMA, Linn.

Not uncommon at Bonne Espérance, August 12.

91. PLANTAGO PAUCIFLORA, Pursh.

"(Miss Macfarlane, No. 42.)" (*P. maritima* or *P. dicipiens*, Barneoud.)

92. ARMERIA VULGARIS, Willd.

"On hilltops, Amour." B.

93. PRIMULA FARINOSA, Linn.

Rather rare at Harrington Harbor and on the neighboring islands, July 24.

94. PRIMULA MISTASSINICA, Michx.

"It grows both at Bonne Espérance and neighboring islands (Fox Island near Caribou)," and Forteau.

95. TRIENTALIS AMERICANA, Pursh.

Quite common on the high, dry grounds in early August.

96. PINGUICULA VULGARIS, Linn.

"In moist places at Bonne Espérance and Forteau (Amour)," B. I found specimens on several of the small islands in damp places in and around Harrington, July 26.

(96*a*.) In a letter Mr. Butler says: "There is a *Pinguicula* which you have omitted, and I believe *stricta* was the specific name, a low, white-flowered species; it grew both at B. Espérance and neighboring islands and Forteau." I did not find it, and it was omitted from his list.

97. EUPHRASIA OFFICINALIS, Linn.

Very abundant on portions of Bonne Espérance August 12. "On hillsides Caribou." B.

98. RHINANTHUS CHISTA-GALLI, Linn.

Very common in places on Bonne Espérance, found all along the coast with *E. officinalis*, in low, moist, but not marshy places, August 12

99. MERTENSIA MARITIMA, Don.

"In sand on the sea-shore." B.

100. DIAPENSIA LAPPONICA, Linn.

"Common on hill tops at Caribou." B.

101. HALENIA DEFLEXA, Griseb.

On the hillsides at Amour and the lowlands at Bonne Espérance, August 12.

102. GENTIANA ACUTA, Hook. f.

"On flats, Caribou." B.

103. GENTIANA PROPINQUA, Richards.

Distributed much as *H. deflexa*.

104. MENYANTHES TRIFOLIATA, Linn.

In a letter Mr. Butler mentions this plant as "found in small pools at Caribou Island and Bonne Espérance. I also found it quite abundant on the shores of a pond at Forteau. Probably somewhat sparingly distributed along the coast in such places."

105. PLEUROGYNE ROTATA, Griseb.

The plants of this species were furnished by Mr. Butler from Bonne Espérance. I found two poor specimens in the interior near the Mission house, August 5, hardly then in bloom. Mr. Butler also found it "on the flats at Caribou and shores of Esquimaux River."

106. POLYGONIUM VIVIPARUM, Linn.

Quite common at Bonne Espérance, August 11, probably so all along the coast.

107. EMPETRUM NIGRUM, Linn.

Common everywhere.

Respecting the dwarf Berches there appears some confusion. I think, however, that the species will stand as I have given them below.

108. BETULA POPULIFOLIA, Ait.

Very abundant everywhere in the woods and on sidehills. An abortive tree seldom over 20 feet high here. (*B. papyracea Ait.* is rare and young here, having been killed by repeated robbings of its bark by the Indians for canoe barks.)

109. BETULA PUMILA, Linn.

"Ascending stems, not glandula" (Miss Macfarlane, No. 57).

110. BETULA GLANDULOSA, Michx.

"Ascending stems glandular." "On hillsides everywhere." B.

111. BETULA NANA, Linn.

"(Of Europe.)" "A low trailing shrub." "On hillsides everywhere." B. Reported to me from Old Fort Island.

112. ALNUS SERRULATA, Ait.

Rather common in moist ravines and on hillsides at Old Fort and probably all along the coast.

113. ALNUS VIRIDIS, D. C.

Same as last.

114. LARIX AMERICANA, Michx.

In ravines and swampy regions, occasionally on hillsides, common everywhere.

115. JUNIPERUS COMMUNIS, Linn.

On high grounds inland; also hilltops.

116. SPARGANIUM SIMPLEX, Hudson.

"(The vars. *genuinum* and *angustifolium* of *Gray*) in ponds, Caribou." B.

117. TRIGLOCHIN PALUSTRE, Linn.

In the interior rare or not common; in marshes, August 5.

118. HABENARIA OBTUSATA, Richu.

On dry, elevated grounds, or on hill slopes, "at Caribou," B, and Bonne Espérance, August 12.

119. HABENARIA DILATATA, Gray.

120. HABENARIA HYPERBOREA, R. Bv.

"In swamps and on hillsides." B.

121. LISTERA CORDATA, R. Bv.

"In ravines, Caribou," B.

122. MICROSTYLIS MONOPHYLLOS, Lindl.

I found this rare orchid in only one locality, a small triangular patch of damp ground, almost wholly concealed by short grass, at Bonne Espérance, August 12. "The plant is much smaller than those collected in Massachusetts and Vermont."

123. IRIS VERSICOLOR, Linn.

Common all along the coast.

124. STREPTOPUS ROSEUS, Michx.

Rare in damp ravines and gulches, August 10.

125. STREPTOPUS AMPLEXIFOLIUS, D. C.

"(Miss Macfarlane, No. 62,)" B.

126. CLINTONIA BOREALIS, Rafin.

Rather generally distributed all along the coast. Common, or not rare, August 1 to 15.

127. MAIANTHEMUM CANADENSE, Desf.

Common all along the coast in wet places, August 12.

128. SMILACINA TRIFOLIA, Desf.

Not as common as the last, apparently.

129. SMILACINA STELLATA, Desf.

"On the sea shore." B.

Mr. Butler mentions but few of the rushes, sedges, or grasses in his list, merely saying that he collected "neither pines, willows, nor glumaceous plants." I give a list of what specimens I collected, but am not able to say anything about their apparent rarity or abundance, as they were collected hastily and indiscriminately; the majority of those I did notice appeared to me to be more or less common; they were named through the kindness of a friend to whom all disputed cases were referred. Unless otherwise mentioned, the locality is the inland "winter quarters" of the inhabitants. Most of them are thought to be characteristic specimens of the region.

130. LAZULA PARVIFLORA, Desv.
"On hills." B.

131. JUNCUS FILIFORMIS, Linn.

132. SCIRPUS CAESPITOSUS, Linn.

133. ERIOPHORUM CAPITATUM, Host.
"On hilltops." B.

134. ERIOPHORUM VAGINATUM, Linn.

135. ERIOPHORUM VAGINATUM, var. RUSSEOLUM, Fries.
"In swamps and on high hills." B. Rather rare.

136. CAREX CANESCENS, Linn.

137. CAREX MARITIMA, Vahl.

138. CAREX LIMOSA, Linn.

139. AGROSTIS CANINA, Linn.

140. CALAMAGROSTIS LANGSDORFFII, Prin.

141. POA ANNUA, Linn.

142. POA ALPINA, Linn.

143. POA PRATENSIS, Linn.
"On the sea-shore." B. Rather common.

144. FESTUCA OVINA, Linn.

145. ELYMUS MOLLIS, Trin.
"On the sea-shore." B. Rather common.

146. AIRA FLEXUOSA, Linn.

147. HIEROCHLOA BOREALIS, Roem. et Schultez.
"On the seashore." B.

The ferns have received a little more attention, though there are fewer of them.

148. PHEGOPTERIS DRYOPTERIS, Fée.
"On rocks." B.

149. PHEGOPTERIS POLYPODIOIDES, Fée.

"In ravines." B. Both species are more or less abundant all along the coast, the latter more than the former.

150. PELLÆA (ALOSORA) GRACILIS, Hook.

Not very common, but distributed in localities apparently along the coast? Mr. Butler found it "but upon one small rock which had fallen from the cliffs at Forteau; and on my last visit to F. I could not find even that." I am sure I have seen it more than once in my expeditions, but, unfamiliar with its small size and delicate texture, I have not collected and identified it.

151. CYSTOPTERIS FRAGILIS, Bernh.

"Amour." B.

152. CYSTOPTERIS MONTANA, Bernh.

"Amour." B.

153. ASPIDIUM SPINULOSUM, Swartz.

Abundant everywhere along the coast and in the interior.

154. ASPLENIUM FELIX-FŒMINA, Bernh.

"On hillsides." B.

155. OSMUNDA CINNAMOMEA, Linn.

Rare. I found several small specimens growing about the edges of a small pond at Bonne Espérance, August 11, and I believe found it in one or two other places near by.

156. BOTRYCHIUM LUNARIA, Swartz.

Very abundant in a few small spots at Bonne Espérance; found in dry places distributed sparingly along a limited line of coast. "Amour." B.

157. LYCOPODIUM ANNOTINUM, Linn.

"Ravines and hillsides." B.

Several other species were collected this season, but I have been unable to secure names for them as yet.

ON THE BLACK NODULES OR SO-CALLED INCLUSIONS IN THE MAINE GRANITES.

BY GEORGE P. MERRILL.

Accompanying the samples of granite collected by agents in the employ of the building-stone department of the tenth census, there were received at the museum from various States, but principally from Maine, numerous specimens of the dark nodules or socalled *inclusions* so abundant in many of the ganites of that region. I have prepared thin sec-

tions of these, together with a considerable number collected by myself, and submitted them to microscopic examination, in order to ascertain their composition in comparison with the rock in which they are contained. The results of the examination are given below. It may be well to state that all the granites spoken of bear biotite as their characterizing accessory and without exception contain together with orthoclase a varying amount of an undetermined triclinic feldspar. These nodules are of all sizes from that of a filbert to a foot in diameter, of a color varying from light bluish-gray to almost perfectly black, and of a texture usually too fine to allow a certain determination of their mineral composition by the unaided eye. They are commonly oval in shape, though angular forms are not rare. In definiteness of outline they vary considerably. In a few cases the fine black material blends gradually into the coarser material of the surrounding rock without sharp lines of demarkation. In others again the line of separation is so complete as to leave a distinct groove, easily traceable with the point of a knife. In the most cases, however, although the separation is as sharp as the granular structure of the rock will permit, there is no abrupt line of demarkation such as would lead one to suppose them to be foreign bodies taken up by the granite while in a plastic state. They show no tendency to separate from the matrix, but possess the same amount of tenacity at their line of contact as elsewhere. These spots are so abundant in many of the Maine rocks as to be a serious drawback to their extensive use for architectural purposes. As they are fine grained and take a good polish, they might not at all times be considered as particularly objectionable in polished work, but for the fact that owing to the large proportion of mica they contain they weather more rapidly than the inclosing granite, and thus after a short time greatly mar the beauty of the stone. On bush-hammered and other rough-finished surfaces they appear as irregular dark blotches that are very unsightly.

JONESBORO.—The granite quarried at Jonesboro is a coarse red rock, quite poor in mica, of even texture, compact, and hard. Under the microscope a part of the biotite is seen to have altered into a greenish chloritic product, while a few small apatite and zircon crystals, together with scattering grains of magnetite and sphene, are brought to view. The feldspars, as is usual in red granites, are found to be quite opaque. Dark patches in the rock are not particularly abundant, and I have examined but few. These are oval in shape, from one to three inches in diameter, of a bluish-gray color, very fine grained, and quite hard. Their outlines are usually quite well defined.

Under the microscope these are seen to be largely feldspathic in composition, the crystals in polarized light often showing a somewhat radial arrangement. They are quite impure. The fine, even texture of the nodule is sometimes broken by the presence of larger crystals of a plagioclastic feldspar, which are of particular interest, since their angles

and corners are often greatly rounded and the crystals reduced to mere oval grains. These rounded crystals are quite small, being only from 1^{mm} to 4^{mm} in length. The mica, as seen in the section, is in part biotite of the ordinary yellowish brown color; in part a colorless variety, occurring in small slender laminæ which are often arranged in fan-shaped forms, or again in part a green chlorite, with the characteristic fibrous radiated structure. A few grains of pyrite are present, together with some epidote and numerous grains of magnetite. The quartz granules are frequently pierced by small colorless microlites, which could not be accurately determined.

SULLIVAN.—The Sullivan granite is a coarse, gray rock, containing, so far as observed, but few accessory minerals, a few small crystals of magnetite, apatite, and zircon only being visible under the microscope. Dark nodules are very abundant in this rock, and I have examined a considerable number. As a whole, these are very fine and compact, with outlines well defined. By the microscope they are seen to be composed of essentially the same minerals as the surrounding granite, but in varying proportions and in a more finely divided state. But little quartz is present, while the feldspar is largely triclinic, sometimes showing a well-defined zonary structure. In all biotite is very abundant, frequently obscuring all other ingredients. Magnetite, in the form of small rounded grains, is usually very plentiful, together with very many colorless microlites such as were noticed in the Jonesboro rock. One of the inclusions in this rock is of so peculiar an appearance as to merit special attention. In size it is about 2 inches square and 6 inches long, with sharp angles and corners. On three sides and the ends, although the line of demarkation is perfectly sharp and runs in nearly straight lines, still there is no perceptible separation between the inclusion and the enclosing granite, the contact apparently being perfect. On the fourth side, however, there is a distinct groove traceable with a knife-point for several inches, as though the imperfect fluidity of the granitic mass had prevented its completely enveloping it. I can conceive, however, that this effect may have been produced by weathering, as this side was exposed at the time of my finding the specimen. The texture of this specimen is too fine to allow any determination of its composition by the naked eye. In color it is almost perfectly black. In thin sections the composition is found to be quite simple, consisting of mica scales and magnetite granules, so abundant as at times to almost entirely obscure all other ingredients. But little quartz is to be seen, and the feldspar is largely a triclinic variety.

MOUNT DESERT.—The rock quarried at Somesville, Mount Desert, is a coarse pinkish gray granite, in which much of the mica is of a greenish color, apparently of a chloritic or talcose nature. Magnetite, apatite, zircon, and sphene occur as accessories. The dark nodules in this rock closely resemble those in that of Jonesboro. The larger grains that lie imbedded in the even gray groundmass of the inclusion

are, however, in this case quartz, and not feldspar. The proportion of green mica in the inclusion is much greater than in the granite proper, and the colorless microlites are here again abundant. It presents no other new features.

East Blue Hill.—This is a coarse rock in which large snow-white crystals of orthoclase of an inch or more in length, twinned after the Carlsbad law, are frequently developed, giving the rock a beautiful porphyritic structure. Muscovite, magnetite, and zircons are the more common accessories. The biotite usually occurs in reddish-brown laminæ, which are frequently surrounded by a black border of magnetite grains. Often, however, it is found altered into a chloritic product, enclosing very many small perfect crystals of the magnetite. Black nodules in this rock are, so far as my experience goes, very irregular in outline, small in size, and quite black. Under the microscope they are found to contain the same deep reddish-brown and green mica, enclosing grains of magnetite, as does the surrounding granite. There is a very evident increase in the proportional amount of feldspar, and a corresponding diminution in the amount of quartz.

Mount Waldo.—This is a coarse, gray rock, much resembling the last mentioned. The feldspar is in part microcline, and the usual amount of apatite and magnetite is present. The nodules in this granite are said to be quite abundant, though I have been able to obtain but few, one only of which needs especial mention. This is oval in shape, about 1½ by 3 inches in size, of firm texture, and dark gray in color. Almost exactly in the center of the fine homogeneous mass of the nodule is a large crystal of microcline, some half an inch in diameter. Its angles are quite sharp. The finer surrounding material is composed of quartz, orthoclase, microcline, biotite, apatite, and magnetite in about the usual proportions of the granite, though in a more finely divided state. Colorless microlites also occur in these inclusions.

Hurricane Island.—In the Hurricane Island rock the feldspar is nearly all orthoclase, though under the microscope a few crysfals of a plagioclastic variety are seen. Some hornblende is present, though not enough to be macroscopically evident. The nodules in this rock are quite abundant, and I have examined a considerable number. These are usually quite black and of a fine, homogeneous texture. Their outlines are well defined, showing under the microscope an abrupt transition from the ordinary coarse texture of the granite to the finer-grained inclusion. There is, however, no tendency to separation along this line of contact; a thin section of the rock made to include portions of both granite and inclusion, after being ground to a thinness of one four hundredth of an inch, being transferred to the mounting slide without difficulty. Under the microscope the fine-grained portion is found to consist of hornblende and biotite in about equal proportion, and in great abundance, together with varying amounts of quartz and feldspar. The proportion of quartz varies in different inclusions. Sometimes it is quite

abundant, and again it is almost entirely absent. Of the feldspars the triclinic variety is usually in excess. The chief point of note in this case is that the hornblende and plagioclase occur in much larger proportion in the inclusions than in the granite proper. There are also found in this rock narrow vein-like inclusions which are light gray in color, of fine texture, and very hard and compact. These consist of quartz and feldspar, with only rarely a shred of mica and hornblende, or grain of magnetite.

VINAL HAVEN.—The Vinal Haven rock is of much finer texture than that of Hurricane Island, and contains a larger proportion of plagioclase. It contains a little hornblende, though in very sparing quantity. Accessories are not abundant. Small crystals of sphene are occasionally found, occurring in close contact with the mica laminæ, but they are not plentiful. I have seen but few inclusions from this locality, and they differ from the containing granite only in their finer texture and perhaps increased proportions of feldspar. The vein-like inclusions noticed in the Hurricane Island rock occur also here, and are of the same composition.

BIDDEFORD.—I have seen but two of the nodules in these granites. They differ from the inclosing rock only in their finer texture, increased proportion of biotite, and perhaps slight diminution in the proportional amount of quartz.

The results of the examination may be briefly summarized as follows: The nodules differ from the surrounding rock in their increased proportional amounts of biotite, or hornblende, and magnetite. In the majority of cases there is also an increase in the amount of feldspar, chiefly a triclinic variety, and a corresponding diminution in the amount of quartz. This, however, is not invariably the case. With the exception of the colorless needle-like crystals, they in no case contain minerals not found in the enclosing granite. These results agree closely with those of Mr. J. A. Phillips,* who has examined similar formations in granites of other localities, and who considers them as of concretionary origin; "as the result of an abnormal arrangement of the minerals constituting the granite itself."

FEBRUARY 1, 1883.

* On Concretionary Patches and Fragments of other Rocks contained in Granite. J. A. Phillips, esq. Quar. Jour. of Geol. Soc., vol. xxxvi, 1880, p. 19.

DESCRIPTION OF TWO NEW SPECIES OF FISHES (APRION ARIOMMUS AND OPHIDIUM BEANI) FROM PENSACOLA, FLORIDA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

1. Aprion ariommus sp. nov.

Head $3\frac{1}{4}$ in length to base of caudal; depth, $3\frac{2}{3}$. D. XI, 11; A. III, 8. Lateral line with about 60 tubes, the number of transverse series of scales being about 70; about 7 scales between first dorsal spine and lateral line.

Body elliptical, rather elongate, moderately compressed, highest near the front of the dorsal, the anterior profile regularly and not rapidly declined. Snout short, $4\frac{1}{4}$ in head, the premaxillaries in front being about on the level of the middle of the eye. Mouth oblique, the lower jaw slightly projecting; maxillary reaching about to front of pupil, $2\frac{1}{2}$ in head; maxillary naked, striate, without supplemental bone, slipping under the edge of the narrow, entire preorbital.

Jaws each with a moderate band of villiform teeth, those of the outer series enlarged, especially above, none of the teeth distinctly canine like. Vomer, palatines, and tongue with bands of villiform teeth, those on the vomer in a long, somewhat arrow-shaped patch, being prolonged far backward on the median line, as in many species of *Lutjanus;* teeth on the tongue in two patches, a small one before a large one. Lower jaw thin, without evident pores.

Eye very large, $2\frac{1}{3}$ in head. Interorbital space flattish, $1\frac{2}{5}$ in eye. Occipital crest rather low, thin, and sharp. Preopercle sharply toothed, the teeth near the angle sharp and straight, directed backward, the teeth on posterior limb directed upward. No notch above angle of preopercle. Opercle ending in two flat points, between which is an emargination. Suprascapula strongly serrate.

Gill-rakers long and strong. Pseudobranchiæ large.

Scales small, ctenoid, those above lateral line in very oblique series, not at all parallel with the lateral line, those below the lateral line forming curved series, which are convex downwards. Bases of soft dorsal and anal naked. Pectoral without axillary scale.

Dorsal moderately but not deeply notched; the spines rather strong, not very unequal, the longest (fourth) about $2\frac{1}{3}$ in head. Caudal long, rather deeply forked, its lobes about $1\frac{1}{3}$ in head. Anal spines short, the second longest $3\frac{1}{4}$ in head. Pectorals long, $1\frac{2}{5}$ in head. Ventrals, $1\frac{1}{2}$.

Color in spirits silvery white, perhaps rosy in life. Sides with faint, dark olive, narrow, undulating streaks which follow the direction of the rows of scales. Fins plain, probably red in life.

Two specimens of this species, each about six inches long, were obtained by Mr. Silas Stearns from the stomachs of red snappers (*Lutjanus blackfordi* Goode & Bean) on the "Snapper Banks" off Pensacola. Both

are in bad condition, parts of the body having been injured by the digestive process. There is apparently no doubt that the present species belongs to the genus *Aprion*, as understood by Bleecker (=*Apsilus*, *Chætopterus*, *Pristipomoides*, *Sparopsis*, and *Platyinius* of authors). It does not, however, seem to be very closely related to any of the other species known.

Several other interesting species are in the collection of which these specimens form a part. The following list includes those which were taken from the stomachs of the snappers:

Ophichthys schneideri Steindachner.

The remains referred by us (Proc. U. S. Nat. Mus. 1882, 260) to *Ophichthys mordax* belong to this species. It is doubtful whether *O. punctifer* (= *mordax*) has yet been taken on the United States coast.

Leptocephalus caudicula (Bean) J. & G.
Myrophis? microstigmius Poey (very bad condition).
Etrumeus teres (Dekay) Bleecker.
Synodus intermedius (Spix) Poey.
Exocœtus mesogaster Bloch. (= *E. hillianus* Gosse).
Trichiurus lepturus L.
Scomber colias Gmelin.
Trachurus saurus Raf.
Serranus philadelphicus (L.) J. & G.
Aprion ariommus Jor. & Gilb.
Platyglossus radiatus (L.) Jor. & Gilb. (= *P. florealis* J. & G.).
Platyglossus caudalis (L.) Günther.
Xyrichthys lineatus (Gmel.) J. & G. (nec C. & V.).
Ophidium marginatum Dek.

(=? *Ophidium josephi* Grd. ? O. *graëllsi*, Poey, nec Jor. & Gilb.).

Emblemaria Bean, MSS.
Opisthognathus lonchurus Jor. & Gilb.
Hemirhombus pœtulus Bean.

2. **Ophidium beani** sp. nov. (30868).

(= *Ophidium graëllsi* Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 31.)

In our previous paper on the fishes of Pensacola, we referred two specimens (30868) of an *Ophidium* from the stomach of a red snapper to *Ophidium graëllsi*, of Poey, in spite of several important discrepancies. We have lately received from Pensacola a specimen of an *Ophidium* which agrees fully with Poey's description, and which is evidently very different from the fish at first called *graëllsi* by us. This species we cannot distinguish from *O. marginatum* Dekay (already known from Charleston) nor from *O. josephi* Girard, known from the coast of Texas. We may therefore provisionally consider *O. marginatum*, *O. josephi*, and *O. graëllsi* as identical, while the fish called by us *O. graëllsi* may receive a

new name (*Ophidium beani*), in honor of our excellent friend the Curator of Ichthyology in the National Museum. *O. beani* agrees with *O. holbrooki* Putnam, in the long and tapering air-bladder, but differs in the much longer head (6 in length in *O. holbrooki*). In *O. marginatum*, the air-bladder is ovate, truncate behind. Its form is not mentioned in the descriptions of *O. graëllsi* and *O. josephi*.

INDIANA UNIVERSITY, *February* 7, 1883.

ON THE PROBABLE IDENTITY OF MOTACILLA OCULARIS SWINHOE AND M. AMURENSIS SEEBOHM, WITH REMARKS ON AN ALLIED SUPPOSED SPECIES, M. BLAKISTONI SEEBOHM.

By ROBERT RIDGWAY.

The Pied Wagtails of Eastern Asia have given much trouble, as the numerous papers in the Ibis and Proceedings of the London Zoölogical Society, by Mr. Swinhoe, Mr. Seebohm, and others, testify. In a recent article in the first-named journal (in the number for January, 1883, pp. 90–92) the latter author gives some "Observations on the Pied Wagtails of Japan," in which is described a supposed new species (*M. blakistoni*) breeding in the Kurile Islands, South Yesso, and Askold, and concluding with a synoptical "Key" to the allied Asiatic species, nine in number

The material in the National Museum is not what could be desired, and is by no means so extensive as that upon which Mr. Seebohm's observations are based. Nevertheless, the series includes specimens which throw much light upon the subject, to the extent, in fact, of conclusively proving that, either it is only the summer adult male of *M. amurensis* which has the back black, while the fully adult female is undistinguishable from *M. ocularis*, or, else, that these two birds are identical, the former representing the adult male, and the latter the adult female, or perhaps, in winter, both sexes. The specimens which render this fact perfectly obvious are a series of five skins collected by Dr. L. Stejneger, of the United States Signal Service, on Bering Island and at Petropaulovski, Kamtschatka (one only from the latter locality). This series includes two males and three females (the sex of one of the latter conjectural, however*), the former being typical *ocularis* and the latter equally typical "*amurensis*." There can be no doubt that they represent opposite sexes of the same species, having been obtained together, the duties being from May 11 to June 27.

Granting that the gray-backed specimens hereinafter to be described really represent the *M. ocularis* of Swinhoe (and they agree in the

* There can be no question as to the correctness of the collector's identification of the sex, his invariable practice being to mark the sex only when determined by dissection.

Vol. VI, No. 10. Washington, D. C. Oct. 5, 1883.

minutest particulars with the descriptions which I have been able to consult), the synonymy of the species would be as follows:

MOTACILLA OCULARIS Swinhoe.

SWINHOE'S WAGTAIL.

1811 (?). *Motacilla albeola* (supposed variety from Kamtschatka and Kuriles) PALLAS, Zoog. Rosso-As. i, 507.

1832. "*Motacilla lugens* PALL." KITTLITZ, Kupf. Nat. Vög. 16, pl. 21, fig. 1 (nec TEMM. et SCHLEG., 1847).

1850. "*Motacilla lugens* ILLIG." BONAP. Consp. i, 250.

1851. *Motacilla alba* LINN., var. *lugens* ILL., Midd. Sibir. Reise, ii, 166 (nec Ill., nec Temm.).

1860. "*Motacilla alba*, var. *lugens* ILLIG.," von SCHRENCK, Amur-Lande, i, 338.

1863. *Motacilla ocularis* SWINHOE, Ibis, Jan., 1860, 55 (Amoy, in winter); P. Z. S., 1863, 275 (Kamtschatka and E. Siberia to China and Formosa).—SEEBOHM, Ibis, 1878, 345; 1883, 92.—RIDGW. Proc. U. S. Nat. Mus., vol. 4, 1882, 414 (Lower Cal., accidental).

1871. *Motacilla baicalensis* var. *temporalis* SWINH., P. Z. S., 1871, 363.

1878. *Motacilla amurensis* SEEBOHM, Ibis, 1878, 345, pl. 9; 1883, 91, 92.

1882. "*Motacilla camtschatica* PALL." TACZAN., Bull. Soc. Zool. France, 1882, 388.

(??) 1883. *Motacilla blakistoni* SEEBOHM, Ibis, Jan., 1883, 91 (Kurile Islands, South Yesso and Askold; coast of China in winter).

Adult ♂ in summer (Nos. 88986, Bering I., May 11, and 89146, Petropaulovski, June 27, 1882, L. Stejneger): Posterior half of crown, with occiput, glossy blue-black; back, scapulars, and upper tail-coverts, duller black, the rump mixed black and plumbeous-gray; lesser wing-coverts, uniform ash-gray. Forehead, anterior half of crown, and broad superciliary stripe, pure white; beneath this, a distinct black line, confluent with the black of the occiput, and extending thence forward along upper edge of auriculars to the eye, and from the latter across lores to the bill, but loral stripe rather indistinct anteriorly; side of head below this black line, pure white; chin also white, but more or less mixed with blackish; throat and jugulum, uniform blue-black, with a strongly convex posterior outline; rest of lower parts, pure white, but tinged laterally with bluish gray. Lateral upper tail-coverts with outer webs very broadly edged with white; middle rectrices black, the outer webs distinctly edged with pure white (almost worn off in No. 89146); next three rectrices, on each side, uniform brownish black; two outer rectrices (on each side) pure white, the inner web of the first with or with-

out a very narrow edging of blackish along the middle portion,* that of the second with a broader and more extended blackish edging. Exposed portion of middle and greater wing-coverts and outer web of tertials (except first), pure white, appearing as a continuous, unbroken, elongated patch on the closed wing; inner webs of tertials, blackish; secondaries, grayish-brown, the outer webs edged with white, but inner webs with no trace of white edging toward ends; primaries and their coverts, with alulæ, also grayish brown (or brownish gray) edged with white. Bill, uniform deep black; feet, duller black; "iris, dark brown." Wing 3.70–3.80, tail, 3.80–4.20, culmen .50, tarsus .95, middle toe .58–.60.†

Adult ♀ *in summer* (Nos. 88987–'8, Bering Island, May 11 and June 10, 1882, L. Stejneger): Similar to the adult ♂, as described above, but nape, back, and scapulars, uniform plumbeous-gray, instead of black; chin black, with (No. 88987) or without (No. 88988) a slight admixture of white. Wing 3.50–3.60, tail 3.85–3.90, culmen .45–.49, tarsus .90–.95, middle toe .55.

[These two examples differ in slight details of coloration: No. 88988 has the "mantle" absolutely uniform plumbeous-gray, while the other has a slight clouding of blackish on the scapular region. Another specimen from the same locality (No. 88985, obtained May 9) presumed to be a ♀, though the sex is not marked, has still more black on the scapulars, while the hinder interscapulars are decidedly clouded with black. The measurements are, wing 3.75, tail 3.75, culmen .48, tarsus .90, middle toe .55. A specimen from Plover Bay, Siberia, obtained June 26, 1881, by Mr. E. W. Nelson, and marked "♂" (No. 89676), although in somewhat worn plumage, agrees minutely with No. 88988 in coloration. It measures, wing 3.65, tail 3.90, culmen .50, tarsus .90, middle toe .55.

Adult (?) *in winter* (No. 86259, La Paz, Lower California, January 9, 1882‡): Forehead, superciliary stripe, cheeks, chin, and throat white; also side of neck and lower parts, except sides; jugulum with a large crescentic patch of black, the posterior feathers narrowly tipped with white; crown, occiput, and upper part of nape mixed black and ash-gray, the latter predominating, or in fact almost uniform, centrally. In other respects almost like the summer ♀, as described above, but white of wings and gray wash on sides somewhat tinged with brownish. Bill dusky, the mandible lighter brownish and paler basally. Wing 3.60, tail 3.85, culmen .42, tarsus .90, middle toe .50.

* In No. 89146 there is no trace of dusky edging on the inner web of the outer pair, both rectrices being wholly pure white; even on the second pair the dusky edging is very poorly defined, while the third feather, in addition to the pure white shaft, has a broad, whitish streak on the middle portion of the inner web, while the corresponding feather of the opposite side has no white at all! In No. 88986, however, the pattern is more symmetrical, though on one side the dark edging to the outer feather is perceptible only on the closest inspection.

†The lesser measurements are represented by No. 89146.

‡*Cf.* Proc. U. S. Nat. Mus., vol. 4, p. 414.

A specimen from Plover Bay, Siberia, obtained in fall or winter (No. 57977, Capt. C. M. Scammon, collector), agrees pretty closely with the La Paz specimen described above, but is decidedly more brownish-gray above, while the black of the jugulum extends farther up on the throat. Wing 3.50, tail 4.

An example, from China, of what appears to be this species, differs from the two described above in the wing-markings, the middle coverts being dusky, tipped with white, the greater wing-coverts also dusky and narrowly edged with dull grayish, but without white, even at tips. The head-markings, however, are precisely identical, and it may be merely a a younger individual. Wing 3.70, tail 3.80.

Mr. Seebohm's *M. blakistoni* is said to differ from *M.* "*amurensis*" (♂) only in having black lesser wing-coverts and white secondaries, these parts being, respectively, ash-gray and brownish-gray in *M.* "*amurensis*." Is it not possible, therefore, that *M. blakistoni* merely represents the perfectly developed plumage of the adult ♂ of *M.* "*amurensis*" (=*ocularis*)?

THE FIRST OCCURRENCE OF PSEUDOTRIACIS MICRODON, CAPELLO, ON THE COAST OF THE UNITED STATES.

By TARLETON H. BEAN.

The United States National Museum has just received, in the fresh state, a fine example of a species of *Pseudotriacis*, which came ashore at the Amagansett Life-Saving station on Long Island, February 8, 1883.

This shark is the first result of a request by Prof. S. F. Baird to the Superintendent of life-saving stations, Mr. S. I. Kimball, for information from points along the entire coast concerning the movements of marine animals and for the sending of such specimens to the National Museum as it may be desirable to possess. The example here described was forwarded by Mr. J. B. Edwards, keeper of the Suffolk life-saving station, February 12, 1883.

No species of the genus *Pseudotriacis* has heretofore been recorded in the western Atlantic. The genus was first made known by Capello,* who had the single discovered species, *P. microdon*, from the coast of Portugal. A figure of the species is published in the journal referred to on Plate 5. An examination of the description and figure leaves no doubt in my mind that our example is identical with Capello's species. Owing to the extreme rarity of this shark a full description and table of measurements may prove interesting.

PSEUDOTRIACIS Capello.

Body elongate; mouth wide, with a very short labial fold around the angle; snout depressed, rounded, moderately long; nostrils inferior, near the mouth, but not confluent with it; eyes oblong, lateral, without

*CAPELLO: *Jorn. Sc. Math. Phys. e nat. Lisboa*, t. I, 1868, p. 321, pl. V.

nictitating membrane; spiracles well developed behind the eye; gill-openings moderate, in advance of the pectoral; jaws armed with numerous rows of small, tricuspid teeth; first dorsal fin, opposite the space between pectorals and ventrals, long and low, gradually increasing in height posteriorly; second dorsal behind ventrals, opposite and similar to anal; ventrals and pectorals well developed; no pit at the root of caudal fin, the basal lobe of which is very low and long; skin with minute asperities.

The genus *Pseudotriacis* was provisionally referred to the family *Scyllidæ*, in which it properly belongs.

PSEUDOTRIACIS MICRODON Capello.

The greatest height of the body is at the origin of the first dorsal; it is contained $8\frac{3}{4}$ times in the total length. The height at the origin of ventrals is contained $9\frac{1}{2}$ times in total length. The height of head at the first gill-opening is a little greater than that of body at the ventral origin, while the height of the head at the angle of the mouth is a little less than one-eleventh of the total length. The least height of the tail equals the height of the anal, and is contained 25 times in total length.

The head is somewhat depressed in front, with moderately sharp snout, which is nearly twice as long as the distance of its tip from the mouth. The distance from snout to last gill-opening is contained 5 times in total length. The distance from snout to first gill-opening, measured horizontally, equals twice the height of body at origin of second dorsal. The distance between the first and last gill-openings equals nearly twice the length of the eye. The height of the first gill-opening is about equal to the distance between the angle of the mouth and the spiracle. The height of the head at angle of mouth is contained 11 times and at the first gill-opening 9 times in total length. The length of the snout equals one-half the body height at origin of first dorsal. The distance of mouth from snout, measured on the axis of the fish, equals one-third width of mouth. The distance from snout to angle of mouth, obliquely taken, equals one-fourth the distance from snout to last gill-opening. The distance between eye and spiracle equals that from mouth to nostril. The distance from angle of mouth to spiracle is about equal to height of first gill-opening. The spiracle is moderately large, the length of its opening being contained twice in the height of fourth gill-opening. The oblong eye is placed near the dorsal profile; the length of the orbit is about one-half the greatest height of second dorsal; the length of the eye equals about one-fourth width of mouth. The length of upper jaw is slightly more than that of lower, and nearly equals the distance between the spiracles. The distance from the mouth to the nostril is about one-fourth least height of tail; the distance between nostrils equals 4 times the distance from eye to spiracle. The

interorbital space equals one-half the length of second dorsal base. The distance between the spiracles equals 4 times their greatest length.

The first dorsal is very long and low, highest behind its middle, the length of its base equal to 7 times its greatest height; its distance from the snout is a little more than twice the greatest length of pectoral. The second dorsal is distant from the end of the first a length equal to nearly twice its greatest height; the length of its base is somewhat more than the body height at origin of first dorsal.

The second dorsal begins at a distance from the end of the first, which is equal to the height of body at ventral origin; the length of its base equals twice the interorbital distance; its height equals nearly twice the length of the orbit.

The anal is entirely under the second dorsal, but its base is a little less than five-sevenths as long as that of the latter; the greatest height of the anal equals the least height of caudal peduncle.

The caudal originates at a distance from the end of the second dorsal about equal to the height of the anal; it is divided by a notch into a short upper portion, whose length is very little more than the greatest height of first dorsal, and a very low and long lower portion, the longest margin of which is nearly twice as long as the snout. The distance of the caudal from the end of anal base equals one-fourth the length of second dorsal base.

The distance of pectoral from snout is contained 5 times in total length; the length of pectoral equals nearly twice the width of its base, and is a little more than one-ninth of total length. The greatest width of pectoral equals twice the height of anal, and is contained twelve and one-third times in total length.

The origin of the ventral is slightly in advance of the end of first dorsal, and is behind the middle of total length a distance equal to the interorbital space. The length of ventral equals that of lower jaw. The width of ventral base equals that of pectoral base; the greatest width of ventral slightly exceeds its length.

Color.—When received the margins of the fins were apparently faded; the original color was probably grayish-brown with dark margins on all the fins except the first dorsal. Capello states that his example was chestnut-brown.

Remarks.—The gills and mouth were obstructed by sand. The only parasites discovered on the animal were a couple of isopods, one of which was found in the eye cavity.

Measurements.

	Millimeters.	Hundredths of length.
Total length	2,950	100.0
Body:		
Height at origin of first dorsal	350	12.0
Height at origin of ventral	310	10.5
Height at origin of second dorsal	210	7.0
Height at end of ventral base	210	7.0
Least height of caudal peduncle	118	4.0
Width at origin of first dorsal	250	8.5
Head:		
Distance from tip of snout to first gill-opening (horizontally)	425	14.4
Obliquely	450	15.3
Distance from tip of snout to last gill-opening	583	20.0
Distance from first gill-opening to fifth	133	4.5
Distance from first gill-opening to fourth	102	.....
Distance from first gill-opening to third	62	.....
Distance from first gill-opening to second	27	.....
Height of first gill-opening	75	.....
Height of second gill-opening	78	.....
Height of third gill-opening	72	.....
Height of fourth gill-opening	70	.....
Height of fifth gill-opening	68	.....
Height at angle of mouth	265	9.0
Height at first gill-opening	325	11.0
Height at base of pectoral	342	11.6
Distance from tip of snout to eye (horizontally)	176	6.0
Distance from tip of snout to mouth (horizontally)	90	3.0
Distance from tip of snout to mouth (obliquely)	147	5.0
Distance from tip of snout to angle of mouth (horizontally)	280	9.5
Distance from tip of snout to angle of mouth (obliquely)	305	10.3
Distance from tip of snout to spiracle (horizontally)	286	9.7
Greatest length of spiracle	56	2.0
Length of opening of spiracle	35	.....
Distance from eye to spiracle	31	.....
Distance from angle of mouth to spiracle	74	.....
Length of orbit	80	2.7
Length of eye	68	2.3
Width of mouth	270	9.0
Length of upper jaw to angle of mouth	219	7.4
Length of lower jaw to angle of mouth	215	7.3
Distance from mouth to nostril	30	.....
Distance between nostrils	125	4.2
Distance between eyes	182	6.2
Distance between eyes on cartilage	142	4.8
Distance between spiracles	226	7.7
First Dorsal:		
Distance from snout	1,000	34.0
Length of base	670	22.7
Greatest height	95	.....
Second Dorsal:		
Distance from end of first dorsal	310	10.5
Distance from snout	1,980	67.0
Length of base	368	12.5
Greatest height	158	5.4
Length of posterior margin	55	.....
Anal:		
Distance from snout	2,087	70.7
Length of base	250	8.5
Greatest height	119	4.0
Length of anterior margin	233	.....
Length of posterior margin	47	.....
Caudal:		
Distance from end of second dorsal	116	.....
Distance of tip from end of second dorsal	620	21.0
Greatest width	232	.....
Length of upper lobe	98	.....
Greatest width of upper lobe	117	.....
Distance of lower lobe from anal base	91	.....
Length of anterior margin of lower lobe	228	.....
Length of longest margin of lower lobe	345	.....
Pectoral:		
Distance from snout	590	20.0
Greatest length	330	11.2
Width of base	169	5.7
Greatest width	240	8.0
Ventral:		
Distance from snout	1,655	56.0
Greatest length	215	7.3
Length of posterior margin (last ray)	108	.....
Width of base	170	5.7
Greatest width	222	7.5

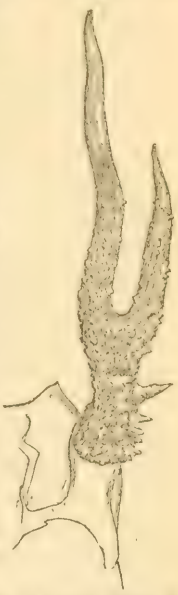
U. S. NATIONAL MUSEUM,
Washington, February 17, 1883.

ON A PAIR OF ABNORMAL ANTLERS OF THE VIRGINIA DEER.

By FREDERICK W. TRUE.

The Museum received from Mr. John M. Forbes, some four months ago, a pair of antlers of the Virginia deer (*Cervus virginianus*), which present an interesting malformation. The animal to which the antlers belonged formed one of the herd kept in park on Naushon Island (Elizabeth Isles), Massachusetts.

The left antler is perfectly normal. It has the usual tynes, four in number, in the normal positions, and not peculiar either in length or shape. The right antler, on the contrary, bears only the brow-tyne, which, although of the usual length, occupies a position on the anterior side of the beam, so that the outlines of tyne and beam are best seen when the skull is viewed in profile. From the base of the tyne the beam rises parallel to the latter for about one-third its length, and then bends backward, forming an obtuse angle. Its outline is undulatory, and throughout the superior third the surface is smooth; the tip is as acute as that of the brow-tyne.



The entire length of the antler is 13.6 inches; from the burr to the base of the brow-tyne, 4.5 inches; length of the brow-tyne 5.2 inches; greatest width of beam and tyne at the base of the latter, 2.9 inches.

There is nothing in the form or structure of this antler to suggest injury by accident or disease.

The investigations of Professor Baird and Mr. Caton upon the Cervidæ of North America show that similar cases are not rare. Of the Virginia deer, Professor Baird writes: "Sometimes a perfectly adult, fullgrown male will have but a single slender spike, thus resembling a buck of the second year."* Mr. Caton's allusion is to deer antlers in general. "Usually," he states, "the first antler grown on the young buck is not branched, but consists of beam only, and is called a *dag* or *spike* antler, and the latter term applies to the antlers of the adults when they are not branched, which is sometimes the case."†

Conditions exactly opposed to those which I have reported above, have been very recently noted by J. S. Cockburn as occurring in a specimen of the Porcine deer (*Hyelaphus porcinus*).‡

I am indebted to Mr. F. A. Lucas for the drawing accompanying this note.

---

* Baird: Mammals of North America, 1859, p. 647.

† Caton: The Antelope and Deer of America, 1877, p. 193.

‡ Journal Asiatic Society of Bengal, LI, 1882, p. 44.

DESCRIPTION OF NEW SPECIES OF REPTILES IN THE UNITED STATES NATIONAL MUSEUM.

By H. C. YARROW, M. D. (Univ. of Penn.),

Honorary Curator of Reptiles.

EUTÆNIA VAGRANS PLUTONIA, subspecies nov.

This subspecies resembles *E. vagrans angustirostris*, but may be distinguished by the characters given below.

Body very short when compared with length. Tail more than one-quarter total length. Head short and broad, snout blunt, not long and narrow as in *E. vagrans angustirostris*. Crown flat above. Eye small, directly over the fourth and fifth upper labials; upper labials eight, the sixth a third larger than the seventh; eighth small and triangular. Lower labials ten, sixth largest; one large anteorbital, three postorbitals. Mouth deeply cleft. Pretrontals triangular, postfrontals broader than long, verticals and occipitals about the same as in *E. vagrans angustirostris*. Dorsal rows of scales twenty-one, outer row smooth, a few showing traces of slight carination, but not so much as do the upper rows, the keeling increasing towards the dorsal ridge. An ivory-white dorsal band, eight scales wide, commences four scales posterior to hinder margin of verticals, becoming narrower as it extends towards the tail; no traces of it can be seen on the lower third of the body. On both sides are indistinct and broken lateral lines, which commence five scales posterior to the angle of the jaw on the third and fourth rows of scales, then drop to the second and third rows of scales. These lateral lines in some places appear to be double. Below the lateral lines many of the blue-black scales are margined with white. Color above blue-black, with an ashy tint, due to a sprinkling of whitish dots on many scales. The upper border of the ventral scales, below the first row of dorsal and lateral scales, is blue-black, the centers greenish-white; many of them are maculated with black anteriorly. Length of specimen 2 feet 1 inch. This specimen was seen some years since by Professor Cope, who suggested the name which has been given to it.

No.	Locality.	Date.	Collector.	Alc.
8171	Arizona	1871	F. Bischoff.	Type.

EUTÆNIA HENSHAWI, species nov.

Among the many very valuable specimens of reptiles sent to the National Museum by Capt. C. Bendire, U. S. A., is one new species for which the above name is suggested.

Head rather broad and short, mouth deeply cleft. Eye large, over fourth and fifth upper labials. Verticals longer than broad; eight upper labials, six and seven of same size; ten lower labials; twenty-one rows of scales, first not carinated except on lower third of body, and then

very faintly; second row faintly carinated. Carination strongly marked on three dorsal rows of scales, particularly near the tail. One anteorbital; three postorbitals. A dorsal line extends to the tip of the tail, and with a glass indications of lateral lines may be seen on the second and one-half of the third rows of lateral scales. These are so faintly marked as only to be noticed by careful scrutiny. Color blue-black above, no spots, belly greenish-olive, not black-spotted. Resembles the *E. couchi*, described by Kennicott in Pacific Railroad Survey Reports, Vol. X, p. 10, but differs in the appearance of the head. The general coloration is similar to dark specimens of *E. atrata*.

The subspecies is dedicated to my old and dear friend H. W. Henshaw, in remembrance of pleasant collecting days in the Rocky Mountains.

Length of specimen 1 foot 9½ inches.

No.	Locality.	Date.	Collector.	Alc.
10712	Fort Walla Walla, Wash	June, 1881	Capt. C. Bendire, U. S. A	Type.

BASCANIUM FLAGELLIFORME BICINCTUM, subspecies nov.

In a collection of reptiles from Old Fort Cobb, Tex., made by Dr. E. Palmer, is a serpent which resembles very nearly *B. flag. testaceum*, but differs in some particulars. The above name is provisionally adopted.

Scales of head normal, with exception of vertical, which is slightly contracted at middle third. Center of the eye a little behind junction of fourth and fifth upper labials. Seventh upper labial longest and broadest. The most marked difference from the species named is in the coloration and markings. General color above rusty brown, anterior margin of scales, if skin is stretched, marked with bluish-black. Traces of two yellowish lines on both sides of body at last row of lateral scales. Abdominal scutellæ on upper third of body black spotted, with double series on each scale. These markings become obsolete near the tail. The chin yellow, ante and post orbitals same color. Upon the head at the posterior margin of superciliaries and the vertical is a faint trace of a blackish transverse line. The base of the occipitals is similarly colored, and directly behind is a transverse black band four scales wide passing around the back of the neck, terminating just behind the posterior borders of the last upper labials. Five scales posterior to this band is another, two scales in width descending as low as the former. The interval between the two bands is lighter than the rest of the body color. At first sight the band reminds one of a characteristic of the ringed-neck *Diadophis*. I have examined many specimens of *Bascanium* and failed to find any traces of the nuchal ring found in the above-named species.

The specimen is half grown, and measures 1 foot 5.1 inches in length.

No.	Locality.	Date.	Collector.	Alc.
11814	Old Fort Cobb, Texas	1880	Dr. E. Palmer	Type.

TROPIDONOTUS COMPRESSICAUDUS WALKERI, subspecies nov.

In a collection of reptiles sent from Florida by Mr. S. T. Walker is a Tropidonotus which differs so markedly in coloration from anything in the reserve series of the National Museum that the above name is proposed for it.

Body short, form triangular, somewhat compressed towards the tail. Head deep, broad, and short. Postfrontals very large, vertical long and narrow, occipitals large. One anteorbital, three postorbitals, the lower angle of the central one being prolonged to touch the sixth upper labial. Eight upper labials on each side, sixth and seventh about the same size. Twenty-two rows of scales, the first and second faintly the rest strongly carinated. Ground color, yellowish-olive, two black bands on neck, behind which are zigzag transverse blackish bands which continue down the body to the end of the tail.

It will be seen from this description that the subspecies under consideration resembles in a very marked degree Kennicott's *Tropidonotus compressicaudus*, but differs in having a larger and narrower vertical, one more row of scales, and in shape of head. So far as pattern and coloration are considered, they are precisely as described by Kennicott in *T. compressicaudus*, with the exception that there are two stripes on the neck, not four, and that the zigzag bands in the present species taper at the sides, and continue to end of tail, not breaking up into spots.

The subspecies is named in honor of Mr. S. T. Walker, who has forwarded many valuable specimens to the National Museum.

No.	Locality.	Date.	Collector.	Alc.
10681	Clearwater, Fla	October, 1879	S. T. Walker	Type.

DESCRIPTIONS OF SOME NEW BIRDS FROM LOWER CALIFORNIA, COLLECTED BY MR. L. BELDING.

By ROBERT RIDGWAY.

1. Lophophanes inornatus cineraceus. ASHY TITMOUSE.

SUBSP. CH.—*Adult ♂* (No. 89800, Laguna, Lower California, February 2, 1883; L. Belding): Above ashy-gray, slightly tinged with olive, especially on the rump; sides of head and neck paler ashy, gradually fading into whitish-gray on lores, cheeks, chin, throat, and jugulum; other lower parts grayish-white, the sides and crissum slightly tinged with brownish. Bill and feet black (dark plumbeous in life?). Wing 2.80, tail 2.50, culmen 38, depth of bill at base .20, tarsus .75, middle toe .50.

This local race of *L. inornatus* is even more decidedly gray above than the Middle Province form (*L. inornatus griseus*), characterized in volume 5 of these Proceedings (page 344). It is likewise much paler colored

beneath, the lower parts appearing almost white (the belly quite so) on comparison. The bill is likewise much smaller and apparently quite different in color, being uniform deep-black in the type specimen, whereas in *griseus* (as well as in *inornatus* proper) it is horn-colored. Typical *inornatus* is equally light-colored beneath, but the upper parts are very different, being olive-brown instead of ashy-gray.

2. **Psaltriparus grindæ**, Belding, MS. GRINDA'S TITMOUSE.

SP. CH.—*Adult* (No. 89801, Laguna, Lower California, February 2, 1883): Entire pileum uniform light brown, or isabella-color (exactly as in some specimens of *P. minimus*); side of head similar, but paler, and gradually fading into white on chin and throat; remaining lower parts very pale smoky-gray, with a faint lilac tinge (exactly as in *P. minimus*). Upper parts light plumbeous-gray, in very marked and abrupt contrast with the brown of the nape. Bill, legs, and feet deep black. Wing 2, tail 2.30, the outer feather .50 of an inch shorter; culmen .20, depth of bill at base .12, tarsus .60, middle toe .30.

This pretty new species, while combining, to a certain degree, the characters of *P. minimus* and *P. plumbeus*, is yet apparently quite distinct from both. In the brown head and color of the under parts it agrees exactly with the former, but the resemblance ends there. From the latter it differs in much whiter throat and decidedly clearer, more bluish shade of the upper parts, in both of which respects there is a close resemblance to *P. melanotis*. The bill is very slender, like that of *P. plumbeus*.

"I take much pleasure in dedicating this species in honor of my good friend Sr. Don Francisco C. Grinda, of La Paz, as a slight token of my appreciation of his generous impulses and gentlemanly qualities of head and heart.—L. B."

3. **Junco bairdi**, Belding, MS. BAIRD'S SNOWBIRD.

SP. CH.—*Adult:* Head and neck ash-gray, gradually lightening into very pale ashy on the throat, the occiput and nape somewhat tinged with brown; lores blackish, in distinct contrast. Back, scapulars, upper (or inner) greater wing-coverts and tertials dull light rufous-brown, somewhat tinged with olive; rump and upper tail-coverts grayish-olive, or light grayish-brown, as are also the lesser, middle, and lower (outer) greater wing-coverts; primaries more gray, edged with paler, the outermost white on the margin; inner webs of tertials dusky. Tail dusky grayish olive-brown, the exterior feather chiefly white, the next with nearly the terminal half white next the shaft, the third with or without a small terminal white spot. Jugulum very pale buffy-grayish, in rather abrupt, though not pronounced, contrast with the white of the abdomen; entire sides and flanks deep cinnamon buff; crissum dull white. Maxilla dark brown (not black), mandible "bright yellow"; iris "color of ripe oranges" or "bright yellow"; legs and feet pale brown

in the dried skin. Wing 2.75–2.80, tail 2.70–2.80, culmen .40–.41, depth of bill through base .25, tarsus .80, middle toe .52–.55.

Types, Nos. 89811 ♂ ad., and 89810 (sex not determined), Laguna, Lower California, February 2, 1883; L. Belding.

This pretty and very distinct species is perhaps most nearly related to *J. insularis*, of Guadalupe Island, but differs in much brighter and more varied coloration, longer tail, and other differences of proportions. In general appearance there is a somewhat close resemblance, at first sight, to a very brightly-colored female *J. oregonus*, especially in the color of the back and sides, but it is the only one of the "pink-sided" group, having yellow eyes and mandible, the latter characters, as well as the pale color of the throat, allying it more closely to *J. cinereus*. It is so markedly distinct, however, from all its congeners as to really need no comparison with any of them.

The species is dedicated by Mr. Belding to Professor Baird.

MARCH 9, 1883.

NOTE.—Since the above was put in type, additional specimens of all these new birds have been received from Mr. Belding. Their characters as already given require no modification.

ANTHUS CERVINUS (PALLAS)* IN LOWER CALIFORNIA.

By ROBERT RIDGWAY.

In the collection of birds made by Mr. L. Belding in Lower California, during the winter of 1882–'83, is a single specimen of an *Anthus* collected at San José del Cabo on the 26th of January, which was thought to be, and in fact was described in MS., as a new species, until three specimens of the same bird were found among a small lot from the coast of China, recently received at the National Museum from Mr. P. L. Jouy. These additional specimens naturally led to a further examination of the type of the supposed new species, and the much-scattered literature pertaining to the Asiatic species of this genus, the result of

---

*ANTHUS CERVINUS (Pall.) Keys. & Blas. Tawny-throated Titlark.

Motacilla cervina PALL. Zoog. Rosso-As. i, 1811, 511.

Anthus cervinus KEYS & BLAS. Wirb. Eur. 1840, 48.—NAUM. Vög. Deutschl. xiii, 1860, 97.—MIDD. Sibir. Reise, ii, 165, pl. 14, figs. 1-3.—CAB. & HEINE, Mus. Hein. i, 1850, 14.—PÄSSLER, J. f. O. 1859, 464 (monographic).—GOULD, B. Gt. Brit. iii, pl. 12.—NEWTON, ed. Yarr. Brit. B. i, 579.—HARTING, Handb. Brit. B. 1872, 109.—DRESSER, B. Eur. iii, 299.

Anthus caecilii AUDOUIN, Hist. Nat. de l'Egypte, Ois. 1828, 360.

Anthus rufogularis BREHM, Vög. Deutschl. 1831, 963.

Anthus pratensis rufigularis SCHLEG., Rev. Crit. 36.

Anthus ruficollis VIEILL., Less. Tr. Orn. 1831, 424.

Anthus rosaceus HODGS., Gray's Miscel. 1831, 83.

Anthus pelopus HODGS., l. c.

Red-throated Pipit AUCT.

Tawny-throated Pipit AUCT.

which was the discovery that the specimens in question were *A. cervinus* (Pall.), in winter plumage.

As this species must now be added to the North American fauna, a description is in order, and is accordingly presented herewith.

Adult, winter plumage (No. 89799, San José del Cabo, January 26, 1883): Above light grayish olive-brown, everywhere very broadly and distinctly streaked with dusky, the streaks much broader, and nearly black, on the dorsal region; wings and tail brownish dusky, all the feathers edged with light brownish, the edge of the longer tertials pale buffy, and the terminal borders of the middle and greater wing-coverts nearly white; outer tail-feather with a considerable portion of the inner web white at end and along shaft, the middle portion of the outer web also whitish; next feather with a white spot at end of inner web. A pale superciliary stripe, becoming bright rufous-buff above eyes and auriculars; a pale malar stripe, whitish anteriorly and posteriorly, but rufous-buff for about .20 of an inch in the middle portion; auriculars raw-umber brownish, paler in the middle portion (longitudinally). Lower parts dull white, the jugulum marked with very broad streaks, or longitudinal spots, of brownish-black, the breast, sides, and flanks with more lanceolate streaks of the same; chin immaculate, but throat sparsely marked with minute streaks, and bounded on each side by a distinct submalar stripe of aggregated blackish streaks; abdomen, anal region, and crissum immaculate buffy-white. Bill black, the basal third of the mandible yellowish; legs and feet uniform deep brown. Wing 3.30, first primary decidedly longest, the second and third equal, the fourth nearly .10 of an inch shorter; fifth .35 of an inch shorter than the fourth; tertials about .20 of an inch shorter than longest primary; tail 2.50, the intermediæ about .10 of an inch shorter than lateral rectrices; culmen .45, tarsus .85, middle toe .65, hind toe .40, hind claw .40.

The *summer plumage* is similar, except the entire chin and throat, together with other light markings about the head, are deep cinnamon-buff, or fawn-color.

The Chinese specimens, above alluded to (Nos. 91810, '11, and '12, Mirs Bay, January 22, 1882), agree very closely with Mr. Belding's specimen. One of them, however (No. 91811), has scarcely a trace of the reddish on sides of head (present in both of the others), while the ground-color beneath has a slight sulphury-yellow tinge.

In its winter plumage this species resembles somewhat *A. pratensis* in summer dress, but differs, among other particulars, in having the rump much less olivaceous, and very distinctly and broadly streaked. The measurements are quite similar.

MARCH 9, 1883.

NOTE ON MERULA CONFINIS (BAIRD).

By ROBERT RIDGWAY.

The type of this species, obtained by Xantus, in 1860, at Todos Santos, Lower California, has remained unique up to the present year. Two additional specimens, however, have lately been received at the National Museum from Mr. L. Belding, who has so ably supplemented the work done by Xantus in the vicinity of Cape St. Lucas;* and since considerable doubt has been expressed by some authors as to the validity of the species, some remarks upon these additional specimens may not be unacceptable.

No. 89796, adult (sex not determined), Laguna, February 1, 1883: Very similar to the type, but lower parts even paler, the entire abdomen, flanks, anal region, and crissum being white (the lower tail-coverts, however, mixed with bluish-gray, and the sides washed with the same); the ground-color of the breast and jugulum is exactly the same as in the type (rich creamy-buff), but this is more distinctly obscured by a gray clouding. The white superciliary stripe is very distinct, beginning above the lores and extending quite uninterruptedly over the eyes and auriculars, nearly or quite to the end of the latter. The bill is dark brown, with the edge of the maxilla and basal half (or more) of the mandible yellow; the feet horn-brown. Wing .5.10, tail .4, culmen .85, tarsus 1.20, middle toe .85.

No. 89797, ♀ ad., Laguna, February 3: This specimen is in very perfect feather, and, so far as plumage is concerned, is almost a duplicate of the type. Owing to the more perfect condition of the feathers, however, the colors are softer and somewhat richer, but the color of the jugulum, breast, sides, and lining of the wing is of an exactly similar creamy-buff, or soft creamy-ochraceous, the breast clouded with pale

*Although but just commencing his second season's work, Mr. Belding has already made several additions to the number of species known to be peculiar to Lower California at the conclusion of Xantus's explorations; and when the objective point of his present trip, the pine-clad mountains of the interior, shall have been reached and thoroughly worked, the number will no doubt be materially increased. The new species and races already discovered by Mr. Belding are the following: (1) *Lophophanes inornatus cinereaceus*, (2) *Psaltriparus grindæ*, (3) *Geothlypis beldingi* (see p. 344, vol. 5, of these Proceedings), (4) *Junco bairdi*, and (5) *Rallus beldingi* (vol. 5, p. 345). Xantus discovered altogether nine forms peculiar to the vicinity of the cape, as follows: (1) *Merula confinis*, (2) *Methriopterus cinereus*, (3) *Campylorhynchus affinis*, (4) *Passerculus guttatus* (doubtful), (5) *Pipilo fusca albigula*, (6) *Basilinna xantusi*, (7) *Picus scalaris lucasanus*, (8) *Melanerpes formicivorus angustifrons*, and (9) *Halocyptena microsoma*, the latter, however, a pelagic bird, and therefore probably of wider distribution. In addition to those named above, Mr. Belding has sent single skins of several forms which will prove to be local races should additional examples agree with them in certain peculiarities noted, while two Asiatic species (*Motacilla ocularis* and *Anthus cervinus*), besides a number of North American species, have been added to the Cape fauna.

gray to about the same extent as in the type. The superciliary stripe is very conspicuous and quite continuous. Bill and feet as in the preceding. Wing 5.20, tail 4.15, culmen .80, tarsus 1.25, middle toe .90.

It thus appears that the characters of the species, as originally defined by Professor Baird (Review Am. Birds, p. 29), are not only quite constant but also very pronounced, so that there need be no further reason for denying it the specific rank to which it is clearly entitled.

MARCH 9, 1883.

PRELIMINARY NOTE ON THE CRYSTALLINE SCHISTS OF THE DISTRICT OF COLUMBIA.

By GEORGE P. MERRILL.

As is well known, the region about Washington, D. C., is very poor in crystalline rocks, they being confined entirely to that narrow portion of the District in the immediate vicinity of Rock Creek and the strip of country to the westward included between the creek and the Potomac River.

It is probably due largely to this poverty of material that these rocks have been so little studied, the only reference to the character of the formations that I am able to find dating back nearly fifty years. It is as follows:

"Rock Creek and its immediate vicinity is the line between the primitive formation and the Tertiary. From Rock Creek up the Potomac the borders of the stream are pregnant with primitive rocks *in situ* and in *boulders*, with the exception of a few small pieces of alluvial soil here and there in the valley of the river. This is the case for 20 miles or more, when the country changes to old red sandstone, which continues 20 or 25 miles farther up the river, with occasional ridges of breccia, or pudding-stone. * * * About a mile, however, east of the entrance of Rock Creek into the Potomac, on the southern point of the city, near the glass-house, the final termination of the primitive rocks that line the bed and banks of the Potomac above clearly takes place. In digging wells beyond this point rocks seldom obtrude; the alluvial soil everywhere prevails. Rock Creek separates the primitive from the alluvial soil. In the former gneiss abounds, which is succeeded by amphibolic rock, or grünstein. The gneiss contains small crystallized tubes of magnetic iron, veins of feldspar, and quartz of opaque white color. * * * The rock employed to form the foundation, or base, of the houses in Washington is a species of gneiss composed of feldspar, quartz, and mica, of a leafy texture owing to the abundance and disposition of the mica. It contains primitive sulphurous iron, and also particles of the same metal which are attracted by the needle."*

* From "A new and comprehensive Gazetteer of Virginia and the District of Columbia." By Josiah Martin. Charlottesville, 1835.

The general topography of the country as here given is, I believe, very nearly correct, and need not again be referred to, as it is with the lithological character of the formation only that this paper has to deal. The results here given are based upon microscopic examinations of thin sections prepared from material gathered by myself, and, though they may be subject to alteration on further study, seem at present to be conclusive.

So far as my present experience goes, the prevailing and almost* only indigenous rock of the District is an extremely variable hornblendic, chloritic, or micaceous schist, which sometimes becomes somewhat gneissoid in constitution through the presence of a small amount of a plagioclastic feldspar. The finer varieties of the rock are much used for building purposes, and make a fairly durable material. They are light-gray or slightly bluish in color, compact, and under the microscope are found to consist essentially of quartz and biotite, with but few accessories, among which a silvery-white mica, magnetite, and apatite are most abundant. The coarser varieties of the rock, however, presents a much more complex structure, containing frequently plagioclase (oligoclase?), hornblende, chlorite, apatite, epidote, pyrite, magnetite, garnets, and rutile. The plagioclase occurs only in small, pure crystals, showing to good advantage the characteristic banding in polarized light. The quartz is as usual in irregular grains, and contains but few cavities, the moving bubbles so frequently seen in the quartz of granites being almost entirely wanting. The mica of all these schists is principally biotite, which is frequently more or less altered into a green chlorite. It bears numerous inclosures of apatite and magnetite, and occasionally there is present quite an amount of infiltrated calcite. This ordinarily appears as irregular grains, sometimes showing the characteristic rhombohedral cleavage and laminated structure in polarized light, or merely as minute silvery-white granules imbedded in the mica.

Magnetite is quite abundant in some parts of the rock, as is also pyrite. The garnets, which are of frequent occurrence, are entirely devoid of crystalline outline, and are of light salmon color in thin sections. They are sometimes quite pure, or again contain numerous inclosures of quartz and magnetite.

Apatite is abundant in small colorless prisms, usually showing one or more lines of fracture parallel to the base. The hornblende, when present, is usually in very imperfect crystals of a faint bluish or greenish color; it contains very many cavities and inclosures. Occasionally it is met with in the form of small, flat rhombic prisms, which are often broken transversely. Rutile is a common accessory in the hornblendic varieties of these schists, occurring as small four or eight sided prisms of a bright reddish, brown color. They are usually too small to allow

*A very small outcrop of impure soapstone occurs just north of the Woodley Road and west of Rock Creek.

Vol. VI, No. 11. Washington, D. C. Oct. 5, 1883.

an accurate determination of their optical properties, but nevertheless are easily recognizable. The smaller crystals are often grouped together in clusters of half a dozen or more, but the larger are always single and scattering. The common form is that of a single prism not over 1^{mm} long and perhaps one-half as broad. Geniculate forms, so characteristic of this mineral, are met with but rarely.

On the bank of Rock Creek, near Oak Hill Cemetery, and in numerous other localities in the near vicinity, a tough, though not hard, dark-green rock is found interstratified with the prevailing schist, which has been supposed by some to be a trap-rock, or "greenstone," and presumably it is this rock that is referred to in the quotation as grünstein.*

But however much the rock may resemble a trap in its external appearance, it requires but a glance with the microscope to dispel the illusion. The rock consists of clear, glassy quartz, very rarely a small crystal of a triclinic feldspar, and an abundance of hornblende and mica, the former very extensively altered into chlorite; and it is in this respect only, so far as I have observed, that the rock differs from the prevailing schist in the neighborhood. So far as yet observed no true eruptive rock is to be found within the District limits.

UNITED STATES NATIONAL MUSEUM, *March* 16, 1883.

CATALOGUE OF A COLLECTION OF ETHNOLOGICAL SPECIMENS OBTAINED FROM THE UGASHAGMUT TRIBE, UGASHAK RIVER, BRISTOL BAY, ALASKA.

By WILLIAM J. FISHER,

*United States Signal Service Observer at Kadiak.**

UGASHAGMINT TRIBE, UGASHAK RIVER, BRISTOL BAY, ALASKA.

1. Na-dshiak. Head-dress worn by women at dances and festivals.
2. A-gach-wot. Ear-rings worn by women.

---

*I have found specimens of this rock in the Museum collection marked "Trap, or Greenstone," though upon whose authority I do not know.

*The form of the invoice is recommended to all collectors as containing much information of service in labeling and cataloguing a collection. It is desirable to add to the data furnished in this invoice the exact date when the various objects are collected, as this item will be of special value in the remote future in shedding light on the history and progress of the various tribes represented in the Ethnological collections of the National Museum.

Many of the articles in Mr. Fisher's collection are restorations of archaic and obsolete forms, and in reproducing them materials have been employed that are not strictly appropriate, as they have been introduced since the use of the articles has been discontinued. This is particularly the case with some of the bead-work, in making which beads of modern origin have been used.—EDITOR.

3. Kmi-ju-dat. Collar worn around throat by women.
4. U-a-mich-kat. Necklace worn by women.
5. Bracelets. Tei-ag-nach-gu-dit for wrists.
6. Anklets. Tshi-nilch-gudit.
7. Na-ko-gun. Belt worn around the waist by women.
8. A-luk-tshuch-wa. Cap worn by young men at dances and festivals.

TAN-ICH-NAG-MIUTE TRIBE ON LESNOI ISLAND, NEAR KODIAK ISLAND.

9. Head-dress formerly worn by women at dances and festivals Ng-na-dshak.
10. Bracelets. Tei-ach-nach-gudit.
11. Necklace. } Tei-ach-nach-gudit.
12. Necklace. }
13. Head-dress worn by men at dances and festivals. Na-djak.
14. Cap worn by men every day.

The Lesnoi Island natives do not wear any of these articles at present, having adopted our customs and modes altogether.

NA-NU-ACH-PACH-MIUTE TRIBE ON ALIASKA PENINSULA, NEAR ILIAMNA BAY.

15. Cap worn by young men at dances and festivals.
16. Head band, worn by men.
17. Bracelet worn by women.
18. Ear-rings. Jai-ki-ah-ja.
19. Knife sharpener.
20. Necklace worn by women. Sa-nuk-hja-ga.
21. Nose ornament. Generally made out of two *Dentalium dentalis* shells, which are prized very highly by these natives, and are preferred in payment to money. I have been unable to get the native names of some of the above articles.

KEI-ICH-WICH-MIUT TRIBE AT KATMAI SETTLEMENT, ALIASKA PENINSULA.

22. Head-dress worn by women at dances and feasts. Na-djak.
23. Hunting cap worn by men. A-luk-tshuch-wak.

KIA-TICH-MYNT TRIBE, NEAR MALTSHATNA RIVER, ALIASKA PENINSULA.

24. Hunting cap worn by men. A-luk-tshuch-wak.

TSHU-AT-TSHIG-MJNT TRIBE, INHABITING COUNTRY AROUND NUCHEK, HINCHINBROOK ISLAND, PRINCE WILLIAM SOUND, ALASKA.

25. Necklace worn by women. Ko-bi-shin-wak.
26. Um-nak. Ugashagmjut tribe. Used for tying up bundles in lieu of rope.

27. Puh-noch-pak. Ugashagmjut tribe. Line attached to seal-spear.
28. Pun-gat. Ugashamjut tribe. Line attached to small seal-spear.
29. Puh-noch-pak. Kei-ich-wich-mjut tribe, Katmai. Line attached to a seal and sea-otter spear.
30. Ak-fju-dat. Kei-ich-wich-mjut. Woman's work-bag for sewing implements.
31. Same.
32. Same.
33. Ka-gi-wik. Man's hunting-pouch.
34. Same.
35. Chi-la-wik. Man's pouch for arrow heads, caps, &c.
36. Kalli-nak. Man's pouch for tobacco, &c.
37. Ak-fju-dak. Tan-ich-nag-mjute tribe. Man's hunting pouch.
38. Ka-gi-wik. Man's hunting pouch.
39. Ka-gi-wing-tshnk. Tan-ich-nag-mjute tribe. "Tshnk" added indicates a small or little pouch.
40. Ku-ta-tshik. Kenai Indians. Settlement at Tyonak, Sutshitua River. Woman's moccasins.
41. Kenai Indians. Settlement at Kneek River. Woman's moccasins.
42. Tshan-jak. Ugashagmjvnt tribe. Native drum.

43. Chi-na-chut. } Ugashamjunt tribe. Masks worn by women at
44. Chi-na-chut. } dances.

45. } Ugashamjunt tribe. Wands held by men over
Kneeh-gau-dit. } dancers.
46. }

47. Kli-tshat. A-fan-ach-mjute tribe. Settlements on Afognak Island. Native fox trap.

48. } At-cha-ak. Ugashagmjut tribe. Ermine trap.
At-cha-ak. }
49. } Ermine a-mi-ta-duk.

50. N-gat-tu-ng-gach-shu-dit. Iga-ge-mjitt tribe. Settlement at Orlova (Eagle Harbor), Kodiak Island. One dozen traps used for snaring *Fratercula corniculata*. The snares are set in front of the holes in the clefts frequented by these birds. Their skins are made into coats, &c. The bills used for ornaments.
51. Nuh-tshu-tak. I-ga-ge-mjut tribe. Fire-drill, not now used. Superseded by matches.
52. I-nich-shun. Ugashamjute tribe. Snow-spectacles.
53. Uch-chlu-ak. I-gia-gich-mjut tribe. Settlements near Igiagich River, Bristol Bay. Bow.
54. Man-kuhl-gat. Two arrows to above bow.

NATIVE NAMES OF DIFFERENT PARTS OF BOW AND ARROW.

Ktulch-kak. Sinew on back of bow.
Klun. Bow-string.

At-chjak. Bow. Wooden part.
Uch-chlu-ak Bow complete.
Kchuht. General name for all kinds of arrows.
Ku-chluak. Arrow point.
Pun-cha-ak. Line attached to arrow and stick.
Tshu-lut. Feathers on arrow-stick.
Up-chut. Notch in end of stick.
Ka-ki-shroik. Bone-socket for arrow-point.

55. Pi-shu-dak. Ki-a-tich-mjut tribe. Sea-otter spear.

NAMES OF DIFFERENT PARTS OF SPEAR.

Kag-li-shwik. Bone socket for arrow.
Ak-tshuk. Bladder.
Puhn-ak. Line attached to bladder.
Tu-puh-gat. Wooden stick.
Tshi-guik. Arrow.

56. Nu-gak. Throwing-stick used in throwing the above spear.
57. Tsha-ki-un. I-ga-ge-mjut tribe at Orlova.
Ax. The iron was introduced by the Russians. The handle is native, and same kind was formerly attached to stone axes.
58. Al-lu-gun. Igagemut tribe. Horn spoon.
59. Al-lu-gun. Horn spoon. Most every family possesses a few of these.
60. Spoons. These spoons are used now by many natives.
61. Spoons.
62. Spoons.
63. Spoons.
64. Spoons. Ka-loch-mjute tribe. Settlements on Karluk River, Kodiak Island.
65. Spoons. Kodiak Island.
66. Spoons. Kodiak Island.
67. Spoons. Kodiak Island.
68. Al-lu-gun. Bone spoon. Kodiak Island.
69. Al lu-gun. Bone spoon. Kodiak Island.
70. Al-lu-gun. Kei-ich-wich-mjut tribe, Katmai.
71. Al-lu-gun. Bone spoons, now in use.
72. Al-lu-gun. Wooden spoons. Now used by them.
73. Kchi-ak. Kei-ich-wich-mjut tribe, Katmai. Knife-sharpener.
74. Kchi-ak. Same. Knife-sharpener.
75. Lu-shkan-dak. Same. Tobacco box.
76. Ik-kwich-ku-dak. Same. Bone button for pouch.
77. Ka-bech-shun. Ingagemjut tribe, Orlova.
78. Ka-bech-shun. Scrapers used in preparing skins, now used.
79. Ulugak. Ingagemjut tribe, Orlova. Fish knife.
80. U-lu-gak. Ingagemjut tribe, Katmai. Fish knives from old dwelling.

81. Kpun. Ingagemjut tribe, Katmai. Stone ax. From old dwelling.
82. Tsha-ki-un. Same. Stone hatchet.
83. Kuk-i-glu-ak. Stone arrow-head from a small unnamed island off Kukak Bay, in Shelikof Straits. I was informed by the native who collected this relic that he saw a great many skulls and other relics on the summit of the islands; also a great many skulls and other human bones, as well on the top as also on the foot of the hill. This island is said to have been a refuge by the natives formerly when invasions were made by natives from the westward. The native told me that he reached the top by climbing an old wooden ladder formerly in use, and that there are a great number of depressions in the ground, indicating former dwellings. The reason he did not bring more was that his comrades objected to it, fearing bad luck in their hunt after sea-otters.
84. Kuk-i-glu-ak. Stone arrow in bone socket, collected by a native on Semidi Islands (South Island), near sea-lion rookeries.
85. Ka-bu-tak. Ka-loch-mjut tribe. Karluk. Kodiak Island. Stone chisel.
86. Agai-uch-ku-dat. Kei-ich-wich-mjut tribe. Katmai. Wooden masks (ancient).
87. Agai-uch-ku-dat. Wooden masks (ancient).
88. Agai-uch-ku-dat. Wooden masks hidden in caves near beaches.
89. Sha gu-jak. Igagemut tribe. Orlova. Wooden hunting hat worn on sea by otter-hunting parties.
110. Tshau-jak. Musical instrument. Tau-ich-nag-mjut tribe. Lesnoi Island.

ON THE COLLECTION OF MAINE BUILDING STONES IN THE UNITED STATES NATIONAL MUSEUM.*

By GEORGE P. MERRILL.

The large extent of coast-line of the State of Maine, composed of granitic rocks of a kind suitable for building purposes, renders possible the shipment and transportation of the quarried rock at rates much lower than would otherwise be attainable, the quarries being frequently situated so near the water's edge that little, if any, handling is necessary prior to loading upon the vessel. This favorable circumstance, together with the excellent quality of the rock obtainable, led to the early opening of very numerous quarries both on the mainland and the adjacent islands, and hence at the present time we find Maine granites in very general use in nearly every city of importance in the country, even as far west as California, frequently to the almost entire exclusion of perhaps equally good material close at hand.

---

* Collected under the superintendency of the Tenth Census, 1880.

According to the returns furnished by the special agents in the employ of the building-stone department of the Tenth Census, there were during the years 1880–'82 some eighty-three quarries of various kinds of building stone in the State, situated chiefly either immediately on the coast or within easy reach of tide-water. The product of these quarries, as may readily be imagined by one at all acquainted with the geological features of the State, is largely granitic; slate is, however, quarried quite extensively in the eastern part of the State (Piscataquis County), and quarries of diabase are worked in a few cases. All the varieties of rock at present regularly quarried and used for building purposes may be classed under the following heads:

Biotite granite.
Biotite muscovite granite.
Hornblende granite.
Hornblende biotite granite.
Biotite gneiss.
Biotite muscovite gneiss.
Diabase.
Olivine diabase.
Argyllite or slate.

Representative specimens of all these varieties have been received at the National Museum and properly dressed for purposes of exhibition and comparison. Thin sections have also been prepared and submitted to microscopic examination, with the results given in the following pages. It is perhaps to be regretted that tests of the compressive strength of these stones could not have been made in this connection. It is, however, safe to say that, so far as can be judged from the specimens received at the Museum, any and all of them are of sufficient strength for all ordinary purposes of construction. There is, indeed, scarcely a poor stone in the collection, although of course some are much better than others.

GRANITE.

Of the eighty-three quarries already mentioned seventy-four are of granite or gneiss. All the Maine granites, so far as observed, are composed of three principal minerals, quartz, orthoclase, and plagioclase,* besides which there is always present, in such abundance as to give specific character to the rock, one or more of the minerals muscovite, biotite, or hornblende, while apatite and magnetite can nearly always be detected in microscopic proportions. As a common though not so constant an accessory, there is also frequently present, in quantities so small as to require the microscope for their determination, one or more

* No attempt has been made to determine the exact species of triclinic feldspars in these rocks; hence they are referred to (microcline excepted) under the general term *plagioclase*.

of the minerals zircon, epidote, sphene, rutile, microcline, and iron pyrites.

In color these granites vary from very light to dark gray or nearly black, according to the amount and kind of mica or hornblende they contain, or from light pink to red, according to the color of the included orthoclase. In texture they vary from fine even-grained rocks, in which the various mineral ingredients are not easily distinguishable by the naked eye, to coarsely granular rocks, in which twin crystals of orthoclase an inch or more in length are frequently seen. The quartz of these rocks never occurs in perfect crystals, but rather as crystalline grains filling the interspaces of the other minerals. As seen under the microscope in thin sections, it presents always a perfectly fresh and undecomposed appearance, and frequently contains numerous inclusions of small transparent crystals, the exact nature of which cannot be determined. In nearly every case it contains innumerable minute cavities or pores, some of which are empty while others contain the usual liquid and rapidly-moving bubble.

In the majority of these granites orthoclase is the prevailing constituent, and not infrequently the one above all others to produce color and structural variations, as when in coarse, red crystals it gives color to the red granites of Calais, Jonesborough, and other localities; or as large snowy-white crystals, twinned after the Carlsbad law it produces the porphyritic structure so often seen in the granites of Mount Waldo and East Blue Hill.

As seen under the microscope, the orthoclase always presents a more perfect crystalline form than the quartz, having evidently been the first to crystallize when the cooling process began, and hence its growth in any particular direction was less impeded. It is often quite turbid and opaque through decomposition, and included impurities, such as shreds of mica, hornblende, or opaque granules of unknown nature. When the light is shut off from below the stage of the microscope, and the section viewed by reflected light only, it appears as a white, snowy mass, in strong contrast with the black, glassy surface of the quartz. The triclinic feldspars (microcline excepted) occur usually in smaller crystals than the orthoclase, and are much less opaque through impurities and decomposition.

Hornblende, when present, is rarely in perfect crystals, but more often in imperfect and distorted forms, bearing numerous inclusions of biotite, apatite, and magnetite. In thin sections it varies from light yellow to deep green in color.

The micas usually occur in irregular laminæ, destitute of crystalline outline, though the muscovite is frequently met with in slender rhombic prisms, which are often inclosed in the orthoclase. Biotite is the more common mica in the Maine rocks, and in its unaltered state is of a smoky brown or yellow color in thin sections and strongly dichroic. Frequently, however, it is more or less altered into a greenish chloritic

product, when its dichroic properties are greatly lessened. It bears numerous inclosures of apatite and magnetite.

Apatite, which is present more or less in nearly all the granites and gneisses, occurs nearly always in minute colorless hexagonal prisms, frequently inclosed in the mica or hornblende, and showing usually one or more lines of fracture at right angles with their length. Epidote appears either as minute colorless perfect crystals or as larger irregular grains of a faint greenish color, and slightly pleochroic, as is seen in the hornblendic granite of Mount Desert. Zircons occur rather sparingly in many of these granites in the form of square prisms, too minute to allow an accurate determination of their optical properties, but nevertheless easily recognizable by their strong relief and peculiar iridescent polarization colors.

Magnetite is present, so far as observed, in all the Maine granites, occurring as small opaque grains, often without crystalline form, or again in small perfect octahedrons. It is usually present only in microscopic proportions, though occasionally in sufficient abundance to be visible to the unaided eye as opaque lusterless grains on a polished surface. It is found in greatest abundance in those rocks which bear hornblende or biotite as their characterizing accessory, while in those in which muscovite is a prevailing constituent it is almost entirely lacking. In but few of the rocks examined does iron pyrites occur in sufficient quantity to be of any practical importance. It can ordinarily be seen only with the microscope, though occasionally visible to the naked eye as small glistening brassy-yellow specks on a broken surface of the stone.

Sphene is a very common accessory in many of the Maine granites, occurring usually as small grayish rounded or irregular grains without crystalline form, though occasionally the characteristic wedge-shaped crystals are seen. It is but faintly pleochroic, and polarizes in dull colors.

Biotite granite.—The great majority of the Maine granites are of this kind. They vary usually from light to dark gray in color, though pinkish and red varieties are quarried in a few instances. At Red Beach, near Calais, there is quarried a coarse reddish rock, very compact and hard, which from a simple examination with the unaided eye is seen to be composed of coarse red orthoclase, a nearly white or cream-colored plagioclase, smoky quartz, and a few small shreds of mica. An examination of a thin section with the microscope does not greatly increase the number of constituent minerals. The feldspars are seen to be quite opaque, as is the case with all the red granites, and the quartz is quite free from the minute colorless inclusions above referred to. The mica, which is usually of a greenish color, in thin sections, is very evenly disseminated throughout the rock and in very small shreds, bearing numerous inclosures of magnetite. A few small apatite crystals are as usual present. The rock is quite poor in plagioclase. This beautiful rock is fully equal if not superior in beauty and durability to much of

the so-called Scotch granite so extensively used for monuments and ornamental work.

The red granite of Jonesborough in general appearance agrees closely with the Red Beach rock, and under the microscope is found to differ only in its increased amount of plagioclase. The evenness of the grain and the occurrence of the mica only in small amount and in minute flakes are matters of practical importance, since they allow the production of a more perfect surface and lasting polish than would otherwise be possible. These granites are both used extensively for monumental purposes, and have but few blemishes, chief among which are the black patches to be noticed later.

At West Sullivan a compact gray granite of medium texture is extensively quarried, which is used largely for building and paving purposes. It is an excellent stone, and corresponds in general appearance very closely with that produced at the quarries of the Blaisdell Bros., in the town of Franklin.

The Somesville, Mount Desert, granite is of coarse texture and of a slight pinkish tinge, due to the orthoclase which is often present in crystals of sufficient size to give the rock a slight porphyritic structure. The feldspars as seen under the microscope are quite turbid and opaque, and the mica is often greenish, occurring only in small, ragged shreds. Very many magnetite granules were noticed in this rock, as well as a few zircons and irregular grains of sphene, which are often partially inclosed in the mica folia. A red granite is also found at Somesville which is hornblendic, and will be noticed further under the head of hornblende granites.

From the vicinity of East Blue Hill have been received some of the most beautiful of the gray granites quarried in the State. As a general thing these granites are of rather coarse texture and uniform gray color, though many of them are rendered porphyritic through the prevalence of large snow-white twin crystals of orthoclase scattered throughout the finer gray groundmass composing the rock. For monumental purposes this porphyritic variety is one of the most beautiful of our gray granites. A portion of the granite from this region is of a pinkish color, similar to that of Mount Desert. As seen under the microscope, the biotite in the East Blue Hill rock is often altered into a faint bluish-green product scarcely at all acted upon by polarized light, and bearing very numerous inclosures of black opaque grains and needle-like bodies, which are doubtless magnetite. All stages of alteration are found, from the strongly dichroic smoky-brown biotite, with scarcely a trace of magnetite, to the greenish, almost isotropic substance penetrated in every direction by the magnetite needles. A little muscovite is often present, as well as a few zircons.

The Deer Isle granite is quite coarse and of a gray color. Large pinkish orthoclase crystals make up the bulk of the rock, and but little mica is present. The rock bears a strong resemblance to that of the

coarser varieties of Vinalhaven and that of Hurricane Island, for which it might readily be mistaken. It however differs microscopically in containing muscovite, garnet, and epidote, and no hornblende, as do both of these rocks.

Two varieties of granite are quarried at Mount Waldo, in the town of Frankfort. Both are light-gray rocks, frequently porphyritic through large white orthoclase crystals. Both varieties are of the same mineral composition, the difference being simply one of texture, one being quite coarse and somewhat porphyritic, while the other is much finer and of more even texture. As would naturally be expected, the finer grade is the better and more durable rock, the coarser variety being more liable to crumble. The mica occurs in large flakes, which the microscope shows to be frequently pierced by small crystals of apatite. A part of the mica is greenish in color and contains a few small faintly pleochroic grains of epidote. An occasional flake of white mica was noticed in this rock, and there is present the usual sprinkling of magnetite granules, together with an occasional cube of pyrite. Quarries were opened at Mount Waldo in 1853, and single blocks 80 by 40 by 20 feet have been taken out and afterward cut up. It is estimated that blocks 150 by 50 by 12 feet could be obtained if desired. The rock has been used largely in the building of forts on the coast of Maine, but is also used for all purposes, both ornamental and otherwise, to which granite is usually applied. It is a beautiful stone when polished.

The granites from the numerous quarries about Vinalhaven all have biotite as the characterizing accessory, though in many of them more or less hornblende is present.* They vary in texture from very fine to coarse, and are mostly dark gray in color, though the coarser varieties are sometimes of a pinkish tinge, owing to the presence of a flesh-colored orthoclase. In thin sections the feldspar of this rock is seen to be nearly all orthoclase, but little plagioclase being present. The microscope brings to light small apatite, magnetite, and zircon crystals, invisible to the unaided eye. These are all compact, safe working stones, and take a good polish. They are extensively used both for building and ornamental purposes in all the leading cities throughout New England and the West. Quarries were first opened at Vinalhaven about the year 1850. The largest single block ever taken out was the obelisk for the General Wool monument at Troy, N. Y., which measured when dressed 60 by 5½ by 5½ feet. It is stated that at the "Harbor Quarry" a single block 240 feet long by 32 feet wide and 8 feet in thickness might be obtained if desired.

The rock of Hurricane Island closely corresponds to that of Vinal-

* In Hitchcock's "Report on the Geology and Natural History of Maine," 1862, p. 265, the Vinalhaven rock is referred to as a "peculiarly fine-grained syenite of good color," &c. In none of the specimens received at the Museum from this locality, however, does hornblende play more than a secondary part, and in the majority of cases does not appear at all. Hence, all are classed as biotite granites.

haven, especially to the coarser variety from the "Harbor Quarry." Like the Vinalhaven rock, it too contains a small amount of hornblende, with zircon, apatite, sphene, and magnetite in microscopic proportions. The minute fluidal cavities in the quartz of this rock are often seen arranged in regular wavy lines. A single block now loosened from the quarry, 80 feet long by 40 feet deep and 25 feet wide, shows the immense masses in which this stone occurs.

The Swanville granite is a very pretty, fine, dark-gray stone, so closely resembling the finer varieties from Vinalhaven that a special description is unnecessary.

At South Thomaston two varieties of biotite granite are quarried. The one a dark-gray rock of medium fineness of texture, closely resembling the finer varieties of the Saint George rock and also that of Round Pond, in Lincoln County, in external appearance; the other a coarse gray rock containing large white feldspars and much mica in folia of considerable size. The finer variety contains, in microscopic crystals, microcline, muscovite, epidote, apatite, sphene, and magnetite, while the coarser differs in its lack of microcline and in containing small quantities of hornblende and pyrite. The variety from the locality known as Spruce Head, in spite of its coarse texture and abundant mica, is said to weather well and hold its color most excellently.

The Dix Island granite is a coarse, gray rock, containing scattering crystals of a flesh-colored feldspar. It contains a large proportion of quartz, and is consequently hard and rather brittle. A part of the feldspar of this rock shows under the microscope the peculiar network structure characteristic of microcline. Muscovite, epidote, sphene, and magnetite are present in small proportions, visible only with the microscope.

The Wayne granite is a coarse stone of quite uneven texture, containing large crystals of faintly flesh-colored orthoclase and an abundance of mica. Some hornblende is also present, which accounts for the name syenite as locally applied. The specimen received from this locality is rather below the average of the Maine granites. It is not extensively quarried. Its use is principally local.

The Canaan granite is coarse, dark gray, and of rather uneven texture. It contains a large amount of black mica and scattering crystals of hornblende. It is not a handsome stone, although it works well and takes a good polish. It is used principally for underpinnings in the near vicinity.

At Brunswick two varieties of granite, a coarse and a fine, are quarried on a small scale, principally for local use. The color of the finer variety is very uniform but of a slight yellowish cast on a polished surface. Both varieties contain muscovite in considerable abundance. The finer stone from the quarry of N. Cripps has been used in the construction of the Bowdoin College chapel, First Parish church, Portland, and several other large buildings in the State.

The granite quarried at Pownal is a beautiful, fine, even-grained gray

stone, easy to work and apparently admirably adapted for all kinds of work, both ornamental and otherwise. Considerable discretion is however needed in selecting this rock, since in many portions of the quarry the *sap* has penetrated to a depth of several inches and entirely ruined the stone for architectural purposes. Much of the granite in this locality also is so charged with iron pyrites that a short exposure to the atmosphere causes it to become spotted with innumerable iron-rust stains that are very unsightly. This stone was extensively used in the construction of the new capitol building at Albany, N. Y., but owing to the defects already mentioned its principal use is for paving in cities in the near vicinity. The stone occurs in the quarry usually in thin sheets, and splits out very readily. A single slab 90 feet in length, 4 feet in width, and 20 inches in thickness, has been split out, and much larger could be obtained if desired.

The granites from the various Biddeford quarries are all practically identical. They are coarse, gray rocks of quite even texture and good working qualities, closely resembling the granites from East Blue Hill. The chief accessory minerals are muscovite, apatite, magnetite, and pyrite. These granites are extensively used in the construction of Forts Preble and Scammel and in various light-houses and sea-walls along the coast of New England.

The rock quarried at Bryant's Pond, in Oxford County, is a fine, dark-gray granite containing much black mica and a little hornblende, together with an abundance of plagioclase. Thin sections of this rock show numerous grains of sphene of a brownish-gray color, and usually of a rounded or very irregular form. Magnetite, apatite, and zircon occur in microscopic proportions. This stone is employed chiefly for railroad work.

The Saint George granites are all of fine, even texture, and of a gray color, being very similar in every respect to the South Thomaston stone just mentioned. They are compact and free-working stones, taking a good polish, and are extensively used for building, paving, and ornamental work. A dark-gray hornblendic rock is also quarried here. This will be noticed later.

The Waldoborough, Lincoln County, granite is of a fine texture and in color varies from light to dark gray. It is a good working stone and takes a good polish, but is not extensively quarried, and is used principally for underpinnings and cemetery work. The lighter variety contains much white mica, and might well be classed under the head of biotite muscovite granite. The Round Pond rock is much darker, finer, and of a somewhat gneissoid structure. It contains a large amount of black mica, which, however, is evenly disseminated in small laminæ throughout the mass of the rock. By the microscope small shreds of muscovite, together with scattering crystals of apatite, zircon, sphene, magnetite, and iron pyrites are brought to light, the pyrites frequently being visible to the naked eye as small, brassy-yellow specks on a broken face of the rock.

The Kennebunkport rock is a coarse, dull-gray granite, in which the feldspar is nearly all orthoclase and very impure and muddy. The small cavities in the quartz are very abundant. Biotite occurs only in small, very ragged shreds, often altered into a greenish product, and bearing numerous irregular inclosures of yellowish-green epidote. Sphene abounds in well-defined wedge-shaped crystals, which stand out in bold relief from the surface of the section. Apatite, zircon, and magnetite are present in small scattering crystals. The stone works well and takes a good polish. Its principal markets are the larger cities in Maine and New Hampshire.

Very many of these biotite granites contain numerous masses or nodules of a darker color and finer texture than the rock itself, they frequently appearing as black patches on a polished surface. These are of all sizes up to a foot in diameter. They sometimes occur with sharp, distinct outlines, or again merge gradually into the surrounding rock with no definite line of demarkation. Some of them possess a fine, even texture, while others are rendered slightly porphyritic in structure through included crystals of plagioclase of considerable size. Under the microscope they are all found to consist essentially of the same minerals as the rocks in which they occur, although in a more finely crystalline state and different proportions; biotite usually prevails and causes the dark color of the patch. Very many of them, however, are penetrated in every direction by innumerable, minute, colorless, needle-like crystals, an exact determination of which, on account of their small size, is impossible. Many of the included larger crystals of feldspar, which, so far as observed, are always triclinic, have their angles rounded away, and are reduced to mere oval grains. Such nodules are usually regarded as of concretionary origin.* The finer texture and darker color of these patches render them very conspicuous, and in some of the quarries many fine blocks of granite are rendered entirely unsuited for finely finished or polished work on account of their abundance.

Hornblende granite.—This is rather a rare building-stone in Maine, though extensively quarried in other States. Its production is at present confined to Otter Creek, Mount Desert, where a beautiful coarse red rock is quarried, which on a superficial examination somewhat resembles the biotite granites of Calais and Jonesborough, though lacking the cream-colored feldspar and consequent speckled appearance characteristic of these rocks. Orthoclase predominates over all other constituents, and is deep-red in color. Under the microscope the feldspars are so opaque that their optical properties can be determined only approximately. The hornblende occurs in small broken fragments and

* See "On Concretionary Patches and Fragments of other Rocks contained in Granite," by J. A. Phillips, Quarterly Journal of the London Geological Society, Vol. XXXVI, 1880, pp. 1–22. Also, "On the Black Nodules in the Maine Granites," by G. P. Merrill, this vol., p. 137.

very imperfect crystals of a deep-green or yellowish color, and often much altered into a greenish-yellow chlorite. Numerous small square prisms of zircon are included in the hornblende or scattered about in close proximity. Epidote is abundant in quite large irregular masses or flakes. It is of a faint, greenish-yellow color, and plainly pleochroic. Magnetite in this rock is not particularly abundant, though occurring in rather large grains. The quartz contains very numerous cavities, which are, however, exceedingly minute.

This rock is very compact and hard, but works well and takes an excellent surface and polish. It is of finer texture than the Scotch red granites, and bears a closer resemblance to red granite of the Bay of Fundy than to any other at present in the collection. If the specimen received at the Museum is a fair sample of the rock at the quarry, it is certainly a most excellent stone.

Hornblende biotite granite.—The quarrying of this variety of granite is confined to rather limited areas, specimens having been received from but two localities, Saint George and Lincoln. The Saint George rock is of fine texture, and dark gray in color, nearly black on a polished surface, the dark color being due to the abundance of hornblende and black mica. By the unaided eye the rock is readily seen to be composed principally of quartz, feldspar, hornblende, and biotite, with scattering grains of magnetite and iron pyrites. It is quite poor in quartz, and under the microscope the prevailing feldspar is seen to be a triclinic variety. Hornblende is very abundant, and occurs in quite perfect crystals, which are deep green and yellow in thin sections and strongly dichroic. Biotite is less abundant than the hornblende, and it incloses numerous magnetite grains and apatite crystals. It is quite pure, and of a light straw color in thin sections, varying to deep brown as the stage of the microscope is revolved. Occasional grains of epidote and sphene were noticed, and, more rarely, shreds of chlorite, resulting from the alteration of the hornblende. Numerous grains of calcite are readily distinguished in the thin section occupying the interspaces of the other minerals, and the powdered rock effervesces distinctly in dilute acids. So large an amount of this mineral must have an important action upon the weathering properties of the rock.

Lincoln. The rock quarried at Lincoln, although of nearly the same mineral composition, is wholly unlike that of Saint George in appearance, being of much lighter color and coarser texture. Large white and slightly flesh-colored twin crystals of orthoclase, quartz, hornblende, mica, and in a few instances grains of pyrite, are all readily distinguishable by the naked eye, while with the microscope are brought to view the usual amounts of apatite and magnetite, with, more rarely, small zircons, wedges of sphene, and irregular grains of epidote. The sphene is brownish in color, and the crystals quite large. The hornblende is deep green and yellow, in thin sections, and some of the smaller crystals show quite perfect basal outlines. Biotite is very abundant and in large

flakes. In external appearance this rock is very much like the coarser varieties of the Biddeford granite.

Muscovite biotite granites.—The granite of Augusta and Hallowell has long been justly celebrated for its beauty and fine working qualities. It is a fine, light-gray rock, the uniformity of whose texture is often broken by the presence of large white crystals of microcline, which inclose small, rounded grains of quartz. Biotite and muscovite occur in abundance, and in about equal proportions, but in small flakes, the muscovite appearing as small, silvery-white, glistening particles on a broken surface of the rock. Under the microscope three feldspars are readily distinguished—orthoclase in imperfect crystals and irregular grains, an abundance of plagioclase, and microcline in large plates filled with cavities and inclosures of muscovite and quartz. In the thin sections the quartz inclosures are usually circular in outline and are pierced in every direction by minute, thread-like crystals of rutile, in polarized light showing up in strong contrast with the beautiful basket-work structure of the inclosing microcline. All the feldspars are quite fresh and pure. The quartz is in small, irregular grains, containing but few cavities, but innumerable threads of rutile. The biotite occurs in small shreds, without any attempt at crystalline form, while the muscovite, although usually in larger, irregular laminæ, is also sometimes found in small, perfect, rhombic prisms. A few apatite crystals are present, together with occasional garnets, which in thin sections are always destitute of crystalline form, appearing as rounded or oval nearly colorless bodies traversed by many irregular lines of fracture. They are quite free from impurities, though occasionally containing inclosures of biotite. As is usual in muscovite-bearing rocks but little magnetite is present; in two cases only grains of pyrite were noticed.

This is one of the best working of the Maine granites, and is used very extensively, not only for building and monuments, but is carved into statues like marble. The rock is properly a gneiss, but showing no signs of stratification in the hand specimen is classed here as a granite. As illustrative of the great extent of the quarries, it is stated that blocks 200 feet in length, by 40 feet in width and 8 feet in thickness, can be broken out in a single piece if so desired.

The rock quarried at North Jay is practically identical with that of Hallowell, and need not be further noticed here. The Lincolnville rock is a trifle darker, but otherwise appears nearly the same. All closely resemble the well-known granite of Concord, N. H.

GNEISS.

The composition of gneiss is identical with that of granite, from which it differs only in structural modifications, its characterizing feature being that it possesses a laminated or stratified appearance due to the arrangement of the individual crystals constituting the accessory minerals (mica and hornblende). It is therefore scarcely necessary to go into a special

description of any of these, since what has been said in regard to the granites will apply equally well to the gneisses. At present they seem to be quarried only to a limited extent and in but few localities. At Turner a biotitic gneiss of medium texture is quarried, in which a few grains of sphene were noticed. At Jefferson a fine gray gneiss is quarried which contains both biotite and muscovite, the latter occurring frequently as slender prisms inclosed in the orthoclase. Epidote is also present in irregular grains as well as a little apatite.

At Chesterville a fine gray gneiss is quarried, which somewhat closely resembles the Jefferson stone both in appearance and mineral composition.

On account of its laminated structure gneiss splits readily from the quarry in slabs of any desirable thickness. Its distinct grain, however, causes it to work unevenly in different directions, and it is not so well suited for purposes of general construction as granite. It is best suited for curbing and the rough work of foundations.

DIABASE.

Under the name of black granite, diabase is quarried at three localities in the State—Indian River, in the town of Addison, Addison Point, and Vinalhaven.

The Indian River rock is nearly black in color and of a texture too fine to allow an accurate determination of its true character by the unaided eye. Under the microscope it is found to consist essentially of plagioclase and augite, although considerable hornblende and mica are present. The hornblende, without doubt, results from the alteration of the augite, since abundant examples are to be seen in which the centers of crystals are nearly colorless, unaltered augite, while the borders are plainly hornblendic. The mica is sufficiently abundant to be recognizable to the naked eye, and is of a smoky-yellow, or at times copper-red, color, in thin sections. Apatite is abundant in the usual colorless prisms.

The Addison Point rock closely resembles that of Indian River in external appearance, but shows a marked difference in structure under the microscope. Olivine is present in abundant, rounded, colorless grains, traversed by numerous irregular curvilinear lines, and frequently much altered into serpentine. Hornblende and chlorite are both present as in the Addison Point rock, and evidently derived from the augite. Titanic iron is abundant and often much altered, taking on fan-shaped and other fantastic forms.

An olivine-bearing diabase is also quarried at Vinalhaven. It is a hard, compact rock, quite fresh-appearing in thin sections, although containing a little of both hornblende and chlorite as alteration products. Some mica is also present.

Magnetite is so abundant in all these diabases as to be very noticeable as black, lusterless grains on a polished surface of the rock.

Vol. VI, No. 12. Washington, D. C. Oct. 5, 1883.

Owing to their fine, homogeneous texture these rocks are great favorites for monuments and ornamental work, for which they are extensively used. Their somber colors, however, render them rather undesirable for general building purposes.

SLATE.

Slates of very good quality are extensively quarried at Munson and Brownville, Piscataquis County. So far as observed they are blue-black in color, of fine, even texture, tough, and split readily into thin plates suitable for roofing purposes, for which they are principally used. They are also well adapted for mantels and fire-places, and at one time quite a business was carried on in the manufacture of these from the so-called "marbleized slate," but which has since been discontinued.

April 5, 1883.

Table showing the varieties of building stone quarried

Location of quarry.		Owner or lessee.	Specific variety of stone.		Color.
Town.	County.		Popular name.	Scientific name.	
Red Beach	Washington	Maine Red Granite Company.	Red granite	Biotite granite	Red
Jonesborough	do	Bodwell Granite Company.	do	do	do
Do	do	Not quarried	Trap	Diabase	Green
Addison	do	H. B. Nash	Black granite	do	Nearly black
Addison Point	do	Pleasant River Black Granite Company.	do	Olivine diabase.	do
Harrington	do	Not quarried	Granite	Biotite granite	Gray
Millbridge	do	do	do	do	do
West Sullivan	Hancock	Crabtree & Harvey	do	do	do
Do	do	J. H. West	do	do	do
Do	do	J. H. Stimpson	do	do	do
Do	do	Abbott Quarry Company.	do	do	do
Franklin	do	Blaisdell Brothers	do	do	do
Somesville, Mount Desert.	do	C. J. Hall	do	do	Pinkish gray
Otter Creek, Mount Desert.	do	do	do	Hornblende granite.	Red
Somesville, Mount Desert.	do	Whiting & Allen	do	Biotite granite	Pinkish gray
East Blue Hill	do	Collins Granite Company.	do	do	Gray
Do	do	G. W. Collins & Co.	do	do	do
Do	do	Chase & Hall	do	do	do
Do	do	Point Pleasant Quarry Company.	do	do	do
Deer Isle	do	Paul Thurlow & Co.	do	do	do
Do	do	Owens & McGee	do	do	do
Do	do	Goss & Goss	do	do	do
Do	do	J. & C. A. Byard	do	do	do
Frankfort	Waldo	Mount Waldo Granite Works.	do	do	do
Prospect	do	Edward Avery	do	do	do
Swanville	do	Oak Hill Granite Company.	do	do	do
Lincolnville	do	Beach Grove Granite Company.	do	Muscovite-biotite granite.	do
Lincoln	Penobscot	Jewell Granite Company.	do	Hornblende-biotite granite.	do
Vinalhaven	Knox	Bodwell Granite Company.	do	Biotite granite	do
Do	do	J. S. Black, Harbor Quarry.	do	do	do
Do	do	Bodwell Granite Company.	do	do	do
Do	do	Bodwell Granite Company, East Boston Quarry.	Black granite	Olivene diabase.	Dark gray
Do	do	Bodwell Granite Company.	Granite	Biotite granite	Gray
Do	do	John S. Hopkins	do	do	do

in Maine, and their mineral composition.

Structure.		Geological age of formation.	Component minerals.	
As regards texture.	As regards stratification.		Essential.	Accessory and accidental.
Coarse	Massive	Archæan	Quartz, orthoclase, plagioclase, biotite.	Magnetite, zircon.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Apatite, zircon, epidote, sphene, magnetite, chlorite.
Fine	....do	....do	Plaigoclase, augite	Chlorite, magnetite, apatite, titanic iron.
....do	....do	Devonian	....do	Hornblende, biotite, apatite, magnetite, titanic iron, chlorite.
....do	....do	....do	Plagioclase, augite, olivene	Hornblende, biotite, apatite, magnetite, titanic iron, serpentine chlorite.
Coarse	....do	Archæan	Quartz, orthoclase, plagioclase, biotite.	Sphene, epidote, zircon, magnetite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Magnetite, zircon.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Apatite, magnetite.
....do	....do	....do	Quartz, orthoclase, plagioclase biotite.	Do.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Do.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Do.
....do	Massive	... do	Quartz, orthoclase, plagioclase, biotite.	Epidote, magnetite, zircon, apatite.
....do	....do	... do	Quartz, orthoclase, plagioclase, biotite.	Magnetite, zircon, chlorite, sphene, orthite.
... do	... do	....do	Quartz, orthoclase, plagioclase, hornblende.	Epidote, zircon, magnetite, chlorite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Magnetite, zircon, chlorite, sphene, orthite.
Porphyritic	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, zircon, magnetite, chlorite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, zircon, magnetite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, garnet, magnetite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, garnet, magnetite.
Coarse	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, garnet, magnetite, epidote, sphene.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, garnet, magnetite, epidote, sphene.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, magnetite, epidote, sphene.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, magnetite, epidote, sphene.
Coarse and fine porphyritic.	Massive	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, magnetite, apatite, pyrite, zircon, sphene, orthite.
Coarse	....do	....do	Quartz, orthoclase, plaglo-clase, biotite.	Microcline, apatite, magnetite, epidote.
Fine	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, apatite, magnetite, epidote, hematite scales, orthite, zircon.
....do	....do	....do	Quartz, orthoclase, plagioclase, muscovite, biotite.	Microcline, apatite, magnetite, zircon.
Coarse	....do	... do	Quartz, orthoclase, plagioclase, hornblende, biotite.	Sphene, magnetite, apatite, zircon, pyrite.
Fine	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Apatite, magnetite, zircon.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Apatite, magnetite.
Coarse	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, apatite, magnetite, zircon.
Medium fine	Massive	Mesozoic	Plagioclase, augite, olivine	Magnetite, black mica, hornblende, apatite, titanic iron.
....do	Indistinctly laminated.	Archæan	Quartz, orthoclase, plagioclase, biotite.	Magnetite, apatite.
Coarse	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Do.

Table showing the varieties of building stone quarried

Location of quarry.		Owner or lessee.	Specific variety of stone.		Color.
Town.	County.		Popular name.	Scientific name.	
Hurricane Island.	Knox	Gen. Davis Tilson	Granite	Biotite granite	Gray
Dix's Island	do	Dix's Island Granite Company.	do	do	do
South Thomaston.	do	M. T. Jameson & Co.	do	do	do
South Thomaston.	do	N. Stanton	do	do	do
South Thomaston.	do	Bodwell Granite Company.	do	do	do
South Thomaston.	do	M. Sawyer	do	do	do
South Thomaston, 4 m. e.	do	Ward & Woodard	do	do	do
Saint George	do	Atlantic Granite Company.	do	do	do
Do	do	Long Cove Granite Company.	do	do	do
Do	do	Long Cove Granite Company.	Black granite	Hornblende-biotite granite.	Nearly black
Do	do	Clark's Island Granite Company.	Granite	Biotite granite	Gray
Do	do	Wild Cat Granite Company.	do	do	do
Waldoborough	Lincoln	Day & Otis	do	do	do
Round Pond	do	Brown, McAllister & Co.	do	do	do
Jefferson	do	J. C. Glidden	do	Muscovite-biotite gneiss.	do
Wayne	Kennebec	J. F. Gordon	Syenite	Biotite granite	do
Hallowell	do	Hallowell Granite Company.	Granite	Muscovite-biotite granite.	Light gray
Augusta	do	Kennebec Granite Company.	do	Muscovite-biotite granite.	do
Norridgewock	Somerset	Lawton Brothers	do		
Canaan	do	S. L. Fowler	do	Biotite granite	Gray
Chesterville	Franklin	J. H. Plummer	do	Biotite gneiss	do
North Jay	do	A. W. Woodman	do	Muscovite-biotite granite.	do
Do	do	M. C. R. R. Co	do	Muscovite-biotite granite.	do
Do	do	Emerson & Bryant	do	Muscovite-biotite granite.	do
Bryant's Pond	Oxford	Grand Trunk Railway.	do	Biotite granite	Dark gray
Turner	Androscoggin.	C. H. Barrell	do	Biotite gneiss	Gray
Brunswick	Cumberland	Hiram Cripps	do	Biotite granite	do
Do	do	A. P. Woodside	do	do	do
Pownal	do	T. S. Reed	do	do	do
Biddeford	York	Gordon & Welch	do	Biotite	do
Do	do	C. H. Bragdon	do	Biotite granite	do

in Maine, and their mineral composition—Continued.

Structure.		Geological age of formation.	Component minerals.	
As regards texture.	As regards stratification.		Essential.	Accessory and accidental.
Coarse	Indistinctly laminated.	Archæan	Quartz, orthoclase, plagioclase, biotite.	Hornblende, apatite, zircon, magnetite, sphene.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, apatite, magnetite, epidote.
Fine	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, epidote, apatite, sphene, magnetite.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, epidote, apatite, sphene, magnetite.
Medium	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, sphene, epidote, apatite, magnetite, pyrite.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, sphene, epidote, apatite, magnetite, pyrite.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, sphene, epidote, apatite, magnetite, pyrite.
Fine	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, magnetite, apatite, rutile-like needles in quartz.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, magnetite, apatite, rutile-like needles in quartz.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclose, hornblende, biotite.	Apatite, sphene, epidote, magnetite, pyrite, calcite.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, magnetite, apatite, rutile-like needles in quartz.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, magnetite, apatite, rutile-like needles in quartz.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, magnetite, apatite.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, zircon, sphene, magnetite, pyrite.
....do	Laminated	....do	Quartz, orthoclase, plagioclase, muscovite, biotite.	Apatite, epidote, pyrite.
Coarse	Massive	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, apatite, zircon, magnetite, sphene.
Fine	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, muscovite, biotite.	Microcline, apatite, garnets, very little magnetite, pyrite, rutile needles in quartz.
....do	Indistinctly laminated.	... do	Quartz, orthoclase, plagioclase, muscovite, biotite.	Microcline, apatite, garnets, very little magnetite, pyrite, rutile needles in quartz.
Medium	Massive	....do	Quartz, orthoclase, plagioclase.	
Coarse	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, epidote, magnetite, sphene.
Fine	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Microcline, muscovite, garnet, apatite, magnetite.
....do	Massive	....do	Quartz, orthoclase, plagioclase, muscovite, biotite.	Microcline, garnet, rutile needles in quartz.
....do	....do	....do		Microcline, garnet, rutile needles in quartz.
....do	....do	....do		Microcline, garnet, rutile needles in quartz.
....do	Indistinctly laminated.	....do	Quartz, orthoclase, plagioclase, biotite.	Hornblende, apatite, sphene, magnetite
Medium	Laminated	....do	Quartz, orthoclase, plagioclase, biotite.	Apatite, magnetite, zircon.
Fine	Massive	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, magnetite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Muscovite, apatite, magnetite.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Apatite, magnetite, pyrite.
Coarse	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Do.
....do	....do	....do	Quartz, orthoclase, plagioclase, biotite.	Do.

Table showing the varieties of building stone quarried

Location of quarry.		Owner or lessee.	Specific variety of stone.		Color.
Town.	County.		Popular name.	Scientific name.	
Biddeford	York	C. H. & A. Goodwin	Granite	Biotite granite	Gray
Do	do	Gooch & Haine	do	do	do
Do	do	J. M. Andrews	do	do	do
South Berwick, 7 m. n. w.	do	A. L. Goodwin	do	do	do
Kennebunkport, 8 m. n.	do	George W. Ross	do	do	do
Kennebunkport, 8 m. n.	do	Francis Day	do	do	do
Kennebunkport	do	Leavitt & Downs	do	do	do
Do	do	Smith & Walker	do	do	do

NOTE.—The matter given in the first four, eighth, and ninth columns of

in Maine and their mineral composition—Continued.

Structure.		Geological age of formation.	Component minerals.	
As regards texture.	As regards stratification.		Essential.	Accessory and accidental.
Coarse	Massive	Archæan	Quartz, orthoclase, plagioclase, biotite.	Apatite, magnetite, pyrite.
do	do	do	Quartz, orthoclase, plagioclase, biotite.	Do.
do	do	do	Quartz, orthoclase, plagioclase, biotite.	Do.
do	Indistinctly laminated.	do	Quartz, orthoclase, plagioclase, biotite.	
do	Massive	do	Quartz, orthoclase, plagioclase, biotite.	Apatite, sphene, zircon, magnetite.
do	do	do	Quartz, orthoclase, plagioclase, biotite.	Apatite, sphene, zircon, magnetite.
do	do	do	Quartz, orthoclase, plagioclase, biotite.	Apatite, sphene, zircon, magnetite.
do	do	do	Quartz, orthoclase, plagioclase, biotite.	Apatite, sphene, zircon, magnetite.

the table is from the returns furnished by the special agent of the Census.

ON THE MACROCHEILUS OF PHILLIPS, PLECTOSTYLUS OF CONRAD, AND SOLENISCUS OF MEEK & WORTHEN.

By CHARLES A. WHITE.

Among the somewhat numerous species of fossil shells which have been published from North American Devonian and Carboniferous rocks, especially the latter, and which have been referred to the genus *Macrocheilus* of Phillips, are certain forms which plainly do not answer the description of that genus as it was originally given or as its characteristics have usually been stated by authors. The differences between these species and those which I regard as true *Macrocheilus* pertain mainly to the columella and inner lip, but they also possess a more massive test than those which are referred to *Macrocheilus* proper. Some of the American species which have been referred to *Macrocheilus* have a plain, more or less sinuous inner lip, which is only slightly covered with callus, and destitute of any trace of ridges or folds. These I assume to be typical forms of that genus, and the following, among others, may be mentioned as examples: *Macrocheilus hebe* and *M. hamiltoniæ* Hall, of the Devonian, and *M. angulifernus* White, of the Carboniferous. My present belief is that all the Devonian forms which have been referred to *Macrocheilus* will fall into this group, but it will properly include only a very small part of those which have been referred to that genus from Carboniferous strata.

With the very few exceptions referred to, I think that all the numerous North American Carboniferous forms which various authors have referred to *Macrocheilus* constitute a distinct natural group, which ought to be designated by one and a different generic name. I also think the form for which Meek and Worthen proposed the generic name of *Soleniscus* should be included in this group.

The shells of this group are characterized by a more or less thickened inner lip, which also bears one more or less distinct revolving fold. This fold, when the outer lip is entire, is usually visible only as an obtuse prominence near the anterior end of the inner lip, but upon breaking away the outer lip the fold is usually found to be distinct and often sharp and prominent. Sometimes also there is upon the posterior side of the fold a broad, concave depression, which ends at and deepens the inward flexure of the inner lip, the posterior border of which depression is sometimes so well defined as to appear like a second revolving fold. This depression, which is sometimes a tolerably distinct groove, is excavated out of the callus which covers the columella and inner lip, in such cases quite thickly, between the depression and the posterior angle of the

aperture. Forward of the fold there is little and sometimes no accumulation of callus, the anterior end of the outer lip, where it joins the inner lip, being usually thin and more or less prominent when entire. There is, therefore, in unbroken shells a rather broad, short, more or less distinct anterior canal, too broad and short to really deserve the name of canal, strongly recalling the corresponding part of *Nassa*. The anterior border of this short canal, however, is prominent, and not emarginate, as in *Nassa*.

From the fact that the columellar fold upon these Carboniferous shells is distinct only within the aperture, and the latter is usually filled with the imbedding matrix, this distinguishing feature seems to have usually escaped notice. It has not always done so, however; both those eminent paleontologists, Professors Hall* and Geinitz,† having referred to it in published descriptions. Meek and Worthen also observed that the inner lip is "usually provided with an obtuse revolving fold"; but none of these authors appear to have regarded that feature as separating such shells generically from those which are destitute of it. Mr. Conrad, however, so early as 1842, proposed the generic name of *Plectostylus* to include shells possessing this character, but that name was previously used by Beck for another group of mollusks. Mr. S. A. Miller, also, in his Catalogue of American Paleozoic Fossils, refers the *Macrocheilus halli* of Geinitz to *Soleniscus* Meek and Worthen. In 1881 I described‡ two similar species from the Carboniferous rocks of New Mexico, and also referred them to *Soleniscus*.

Notwithstanding the conscientious accuracy which is apparent in all the work of those authors, I suspected that the anterior portion of Meek and Worthen's type species of *Soleniscus* is not so prominent as it is represented to be by the restored part of their figures.

Applying to Mr. Worthen for permission to examine the type-specimen, I learned that it was inaccessible, but he sent me for examination an authentic duplicate example. A careful examination of this specimen satisfies me that the anterior portion of the shell in this species is only a little more prominent than it is in several of those forms which have been referred to *Macrocheilus*, and that that portion is not produced into a proper beak. Meek and Worthen's figures show that the anterior portion of their type-specimen was broken off, and if the line of the restored part had been continued with the curve of the outer lip it would agree with the lines of growth which are observable upon the specimen sent me by Mr. Worthen. Moreover, their figure shows a prominence of the fold upon the inner lip which did not appear on the one just referred to until I had dug out the stony material which had filled the aperture. Their

* Geology of Iowa, 1858, Part II, pages 719 and 720.

† Carbonformation und Dyas in Nebraska, 1866, page 6, Pl. 1, Fig. 7.

‡ Expl. and Sur. West of the 100th Merid., supp. to Vol. III, pp. xxviii and xxix, Pl. IV, Figs. 4 and 5.

figure appears to represent the outer lip as unbroken; but to exhibit the columellar fold so prominently as that figure shows it to be, the outer lip must have been largely removed.

Understanding the real characters of the type-species of *Soleniscus* to be such as I have here indicated, it is, I think, necessary to regard it as congeneric with the greater part, if not all, of those forms which are figured with it on Plate VIII, and with most of those Carboniferous shells which have been by different authors referred to *Macrocheilus*. The principal differences, according to my observations, which that species presents from the others referred to, are its more than usually elongate form, a little greater than the usual prominence of the anterior part of the aperture, and a smaller accumulation of callus upon the inner lip.

These forms, as before remarked, are regarded as constituting a natural group, which, it appears to me, well deserve a generic designation distinct from *Macrocheilus*. If it were not that Conrad's name, *Plectostylus*, was preoccupied by Beck, that name would be appropriately retained for this group, to which it was really applied. Conrad's name not being available, the next generic name that has been used for any member of the group ought to be used for the whole group. As *Soleniscus* is regarded as a member of this group, that name should be properly used for it because no other available name has priority.

The following species which have been hitherto referred to *Macrocheilus* have been found to possess the prominent columellar fold and other characteristics of the group here discussed, and I would therefore refer them to *Soleniscus: Macrocheilus fusiformis* Hall, *M. newberryi* Hall, *M. planus* White, *M. ventricosus* Hall (=*Soleniscus brevis* White), *M. texanus* Shumard? *M. paludinæformis* Hall, and *M. halli* Geinitz. All except the last are figured on Plate VIII.

It is not to be denied that there are certain forms among those Carboniferous species which have usually been referred to *Macrocheilus* that possess at best only an obtuse fold upon the columella. They are, however, much more closely related by all their characteristics to the species just referred to *Soleniscus* than are those Devonian and other species which I have referred to *Macrocheilus* proper. Among these species are the three following, which are represented with the others on Plate VIII: *Macrocheilus ponderosus* Swallow? *M. medialis* Meek & Worthen, and *M. primigenius* Conrad. These I regard as at best no more than subgenerically different from those which I refer to *Soleniscus*.

As to the family relations of the shells of this group I am inclined to adopt the views suggested by Meek, that they belong to the *Actæonidæ*. Those shells which I have referred to the genus *Macrocheilus* proper are perhaps not suggestive of such a relationship, but they do not appear to differ from the *Soleniscus* group any more than some recognized genera of the *Actæonidæ* do from certain other genera of that family.

EXPLANATION OF PLATE VIII.*

SOLENISCUS? (MACROCHEILUS) PONDEROSUS Swallow?

FIGS. 1, 2.—Opposite views of a large example from Southern Iowa. The outer lip and a portion of the columella have been broken away so that the obtuse fold is not clearly shown. Professor Swallow's species was never figured; and this form is doubtfully identified by means of his description. (Museum No. 9142.)

SOLENISCUS? (MACROCHEILUS) PRIMIGENIUS Conrad.

FIG. 3.—Lateral view of a damaged example from Illinois, showing the thickened columella, but only a slight trace of a fold. (Museum No. 747.)

SOLENISCUS (MACROCHEILUS) FUSIFORMIS Hall.†

FIGS. 4, 5, 6.—Different views of two examples from Illinois, showing some variation in the outward form of the shell, and also the character of the columella. Fig. 5 shows the character of the inner lip at mature growth; and Fig. 6 shows the columella with its fold and broad groove after a portion of the last volution has been removed.

SOLENISCUS (MACROCHEILUS) NEWBERRYI Hall.

FIGS. 7, 8.—Opposite views of an example from Illinois, showing the outward form, the accumulation of callus upon the inner lip, and the columellar fold and broad groove.

SOLENISCUS PLANUS White.

FIGS. 9, 10.—Opposite views of an example from Illinois, showing the outward form, and the columella with its fold and groove. This form is possibly identical with the *Macrocheilus newberryi* of Hall; but it seems to be different.

SOLENISCUS (MACROCHEILUS) VENTRICOSUS Hall.

FIGS. 11, 12.—Lateral views of two Illinois examples. Fig. 11 represents an apertural view of a nearly perfect shell; and Fig. 12, another shell from which a large part of the last volution has been removed, to show the columella with fold and groove. (Museum Nos. 9372 and 12210.)

SOLENISCUS (MACROCHEILUS) TEXANUS Shumard.

FIGS. 13, 14.—Opposite views, showing the outward form of the shell, and the character of the calumella with its fold and groove. Dr. Shumard's species was never figured, and this form from the Coal Measures of Illinois has been doubtfully identified by means of his description.

SOLENISCUS? (MACROCHEILUS) MEDIALIS Meek & Worthen.

FIGS. 15, 16.—Opposite views of an example from Indiana, showing the outward form and the columella, which bears only a slight trace of a fold.

SOLENISCUS (MACROCHEILUS) PALUDINÆFORMIS Hall.

FIG. 17.—Lateral view of an example from Indiana, with a part of the last volution removed, showing the columellar fold and broad groove.

SOLENISCUS TYPICUS Meek & Worthen.

FIGS. 18, 19.—Copies of Meek & Worthen's figures of their type-specimen.

All figures on this plate are natural size.

---

* This plate is also to appear in the annual report of the Indiana State Geological Survey; and the use of a part of the examples here figured have been courteously loaned for the purpose by Prof. John Collett, State Geologist.

† The name *Macrocheilus fusiformis* was preoccupied by Sowerby. Professor Hall's species belongs to the group which I refer to *Soleniscus*. If this view is accepted, and Sowerby's species also belongs to that group, the name of the American species must be changed.

A REVIEW OF THE AMERICAN CARANGINÆ.

By DAVID S. JORDAN and CHARLES H. GILBERT.

The purpose of the present paper is to furnish a catalogue of the species of *Carangina* found in American waters, with an outline of the synonymy of each, and a key by which the species may be distinguished. The subfamily *Carangina*, as understood by us, includes the *Selenina*, *Carangina*, and *Chloroscombrina* of Dr. Gill (Proc. U. S. Nat. Mus., 1882, 492), or the genera *Trachurus*, *Carangichthys*, *Caranx*, *Argyreiosus*, and *Micropteryx* of Dr. Günther (Cat. Fish. Brit. Mus., ii, 418). In Dr. Lütken's classification (Spolia Atlantica, 196) this group would correspond to the genera *Trachurus*, *Megalaspis*, *Decapterus*, *Caranx*, *Gallichthys*, *Selene*, and *Micropteryx*.

The division of this group into genera offers numerous difficulties, inasmuch as the various characters of form, squamation, dentition, and armature are subject to almost complete intergradation. A division based on any of these characters would be imperfect from the presence of intermediate forms connecting one group with another.

A minute subdivision has been attempted by Dr. Bleeker and Dr. Gill, and numerous generic names have been proposed, which have not met with general acceptance because the distinctive characters disappear as our knowledge of the species increases, and the adoption of these genera would necessitate the making of still others for species more or less aberrant.

For the present we venture to divide the group into six genera, as follows:

1. Megalaspis;
2. Decapterus;
3. Trachurus;
4. Caranx;
5. Selene;
6. Chloroscombrus.

This division is not wholly natural, inasmuch as the differences between the extremes among the species of *Caranx* are greater than those separating some of these species from related genera, while, on the other hand, the characters separating *Trachurus* and *Selene* from *Caranx* are technical only, and have little real value. Under the head of *Caranx* we recognize a number of subgenera, which seem to intergrade too closely to permit us to consider any of them as of full generic rank.

ANALYSIS OF GENERA OF CARANGINÆ.

COMMON CHARACTERS.—Premaxillaries protractile; maxillary with a supplemental bone; anal fin similar to soft dorsal, its base longer than

abdomen; pseudobranchiæ persistent; pectoral fins elongate; scales small.

a. Dorsal outline more strongly curved than ventral outline.
b. Dorsal and anal each followed by 8 or 9 finlets....MEGALASPIS (Asiatic species).
bb. Dorsal and anal each with a single detached finlet; body slender.
DECAPTERUS, 1.
bbb. Dorsal and anal without finlets.
c. Lateral line armed posteriorly with bony shields, or scutes.
d. Scutes well developed along entire length of lateral line.....TRACHURUS, 2.
dd. Scutes well developed along straight posterior portion of lateral line only.
CARANX, 3.
cc. Lateral line without shields; body short and deep, strongly compressed.
SELENE, 4.
aa. Dorsal outline less strongly curved than ventral outline; body greatly compressed, its edges everywhere trenchant; armature of lateral line obsolete, or nearly so .....CHLOROSCOMBRUS, 5.

GENUS 1.—DECAPTERUS Bleeker.

DECAPTERUS Bleeker, Natuurk. Tydskr., 1855, v, 417 (*kurra*).
EUSTOMATODUS Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261 (*kurroides*).
GYMNEPIGNATHUS Gill, *l. c.*, 261 (*macrosoma*).
EVEPIGYMNUS Gill, *l. c.*, 261 (*hypodus*).

Type CARANX KURRA C. & V.

ANALYSIS OF SPECIES OF DECAPTERUS.

a. Shields of lateral line numerous (40 to 50 in number); depth, 5 in length; teeth present on jaws, vomer, and palatines; none on tongue.
b. Dorsal with 30 soft rays; lateral line anteriorly, with about 12 distinct, small black points.....PUNCTATUS, 1.
bb. Dorsal with 27 soft rays.....SCOMBRINUS, 2.
aa. Shields of lateral line few (25 to 35) in number.
c. Lateral line anteriorly with black points; teeth "almost insensible"; caudal keel of about 35 shields; depth, 5¼ (in total); pectorals, 6 in total length.....SANCTÆ-HELENÆ, 3.
cc. Lateral line without dark points.
d. Teeth distinct on lower jaw and tongue; caudal keel of 30 distinct shields; depth, 5½ in length .....HYPODUS, 4.
dd. Teeth obsolete; caudal keel of 25 shields; depth, 5¾ in length.
MACARELLUS, 5.

1. **Decapterus punctatus** (Agassiz) Gill.—*Cigar-fish; Round Robin; Scad.*

Scomber hippos Mitchill, Trans. Lit. & Phil. Soc. N. Y., 1, 1815, pl. 5, f. 5 (New York; not of L.).
Caranx punctatus Agassiz, Spix, Pisc. Bras., p. 108, tab. 56a, f. 2 (Brazil).
Caranx punctatus Cuv. & Val., ix, 38, 1833 (Martinique); Günther, ii, 426.
Decapterus punctatus Poey, Syn. Pisc. Cubens., 368; Poey, Enum. Pisc. Cubens., 79; Jor. & Gilb., Syn. Fish. N. A., 432.
? *Caranx suareus* (Risso) C. & V., ix, 33 (Mediterranean).

Habitat.—Cape Cod to Brazil; occasional northward; common on the coasts of Florida and in the West Indies.

2. Decapterus scombrinus (Valenciennes) Jordan & Gilbert.

Caranx scombrinus Valenciennes, Voyage de la Vénus, 1846, 332, pl. 7, f. 1, (Galapagos Islands); Günther, ii, 426.

Habitat.—Galapagos Islands.

We have not seen the original description of this species. There is nothing in the short account given by Dr. Günther to indicate that it is distinct from *D. punctatus*.

3. Decapterus sanctæ-helenæ (Cuvier & Valenciennes) Poey.

Caranx sanctæ-helenæ Cuvier & Valenciennes, ix, 37, 1833 (St. Helena).
Decapterus sanctæ-helenæ Poey, Syn. Pisc. Cubens., 1868, 368 (Cuba); Poey, Enum. Pisc. Cubens., 79.

Habitat.—Tropical parts of the Atlantic; St. Helena; Cuba.

This species is unknown to us. According to Poey it differs from *D. punctatus* in having its scutes subdenticulate, less narrow, and beginning much behind the origin of the anal.

4. Decapterus hypodus Gill.

Decapterus hypodus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 358.

Habitat.—Cape San Lucas.

Four specimens of this species are known, all obtained by Mr. Xantus at Cape San Lucas. It is probably a subspecies of *D. macarellus*, as already noted by us, the differences being of minor importance and of doubtful permanence.

5. Decapterus macarellus (Cuvier & Valenciennes) Gill.—*Antonino.*

Caranx macarellus Cuv. & Val., ix, 40, 1833 (Martinique); Günther, ii, 426.
Decapterus macarellus Poey, Enum. Pisc. Cubens., 79; Jordan & Gilbert, Syn. Fish. N. A., 1883, 433.

Habitat.—West Indies, occasionally northward to Cape Cod; rare on the coasts of the United States.

Genus 2.—TRACHURUS Rafinesque.

Trachurus Rafinesque, Indice d' Ittiol. Siciliana, 1810, 20 (*trachurus*, etc.).
Trachurus Cuv. & Val., ix, 6, 1833 (*trachurus*).

Type Scomber trachurus L. = Trachurus saurus Raf.

ANALYSIS OF AMERICAN SPECIES OF TRACHURUS.

a. Body elongate, little compressed, the depth 5 in length; scutes about 96 (50 + 46 to 48) in number, the height of the anterior scutes one-third that of the posterior and about $2\frac{1}{2}$ in diameter of eye; curved part of lateral line scarcely shorter than straight part; maxillary $2\frac{2}{3}$ in head, reaching just beyond vertical from front of eye; lining of opercle scarcely blackish ..... Picturatus, 6.

aa. Body comparatively deep and compressed, the depth 4 to $4\frac{1}{6}$ in length; scutes about 72 (34 to 36 + 36 to 38) in number, the anterior scutes scarcely lower than the posterior, their height about $1\frac{1}{2}$ in diameter of eye; length of curved part of lateral line $1\frac{2}{3}$ to $1\frac{3}{4}$ in straight part; maxillary reaching past front of pupil, $2\frac{1}{4}$ to $2\frac{1}{3}$ in head; lining of opercle blackish ..... Saurus, 7.

6. Trachurus picturatus (Bowdich) Jordan & Gilbert.

Caranx amia Risso, Ichth. Nice, 1810, 174 (Nice; not *Scomber amia* L. = *Lichia amia*).

Seriola picturata Bowdich, Excursion to Madeira, 1825, 123, f. 27 (Madeira).

Caranx picturatus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 269 (Monterey; Santa Barbara; San Pedro; Cape San Lucas).

Trachurus picturatus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 358, and in Syn. Fish. N. A., 911.

Caranx trachurus "deuxième subdivision," Cuv. & Val., iii, 17, 1833 (Mediterranean; Valparaiso).

? *Trachurus trachurus* Hutton, Fishes New Zealand, 1872, 16.

Caranx cuvieri Lowe, Trans. Zoöl. Soc. Lond., ii, 183, 1837 (Madeira); Steindachner, Ichthyol. Berichte, v. 34, 1868 (Portugal; Teneriffe; Madeiras; Canaries).

Caranx (Trachurus) *cuvieri*, Steindachner, Ichthyol. Beitr., ii, 16, 1875 (Talcahuano; Callao; Juan Fernandez; Galapagos Islands).

Trachurus cuvieri Lütken, Spolia Atlantica, 1880, 126 (Azores; West Indies).

Caranx symmetricus Ayres, Proc. Calif. Acad. Nat. Sci., i, 62, 1855 (San Francisco).

Trachurus symmetricus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 261 (Cape San Lucas).

Trachurus fallax Capello, Catal. Peix. Portugal, 1867, 310–318 (Lisbon).

Trachurus rissoi Giglioli, Catalogo degli Antibi e Pesci Italiani 1880, 27 (on *Caranx amia* Risso).

Habitat.—Warm seas; Mediterranean, Portugal, Madeiras, *Canaries*, *Azores*, West Indies, Pacific coast of Southern California, Mexico, Peru and Chili, San Francisco to Valparaiso.

7. Trachurus saurus Rafinesque.

Scomber linea laterali curva omnino loricata, etc., Artedi, Genus 31, No. 3 (in part, includes also *T. mediterraneus* and *T. picturatus*).

Scomber trachurus Linnæus, Syst. Nat., ed. x and xii (after Artedi and others; "habitat in Mediterraneo").

Scomber trachurus Bloch, Naturgesch. Fische Deutschlands, ii, 138, taf. 36, 1784 (excellent figure and description of the northern species; other species involved in the synonymy).

Caranx trachurus Cuv. & Val., ix, 11, 1833 (description: La Manche); Steindachner, Ichthyol. Berichte, v, 32, 1868; Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 269 (Pensacola, Newport).

Trachurus trachurus Günther, ii, 419, 1860 (includes all species of the genus).

?? *Caranx comorus plumierianus* La Cépède, Hist. Nat. Poiss., iii, 84, pl. 11, 1802 (unidentifiable; from a figure by Plumier, supposed to have been made in the West Indies).

Trachurus saurus Rafinesque, Indice d' Ittiol. Siciliana, 1810, 20 (no description; based on *Scomber trachurus* L.; hence, includes all species; the name *trachurus*—and constructively *saurus* also—restricted to the present species by Bloch and by Cuvier); Jor. & Gilb., Syn. Fish. N. A., 911, 1882.

Caranx semispinosus Nilson, Prodr. Ichth. Scand., 1832, 84.

? *Trachurus europæus* Gronow, Syst. Ichthy., 2 ed. Gray, 1854, 125 (not diagnostic).

Trachurus linnai Malm, Bohusläns Fauna, 421 (Sweden); Lütken, Spolia Atlantica, 1880, 125 (Denmark; Faroë Islands; Naples).

Trachurus declivis Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 358 (Cape San Lucas; —not *Caranx declivis* Jenyns).

Habitat.—Coasts of Northern Europe, south to Spain, Naples; Newport, R. I.; Pensacola; Cape San Lucas; chiefly of the Northeastern Atlantic; but four American specimens being known.

Genus 3.—CARANX La Cépède.

Caranx (Commerson) La Cépède, Hist. Nat. Poiss., iii, 72, 1802 (*carangus*, etc.).
Gallus La Cépède, Hist. Nat. Poiss., iv, 583, 1803 (*virescens* = *gallus*; name preoccupied in ornithology).
Citula Cuvier, Règne Animal, ii, 1817 (*armata*).
Blepharis Cuvier, Règne Animal, ii, 1817 (*indicus* = *ciliaris*; name used in botany).
Vomer Cuvier, Règne Animal, ii, 1817 (*browni* = *setipinnis*).
Olistus Cuvier, Règne Animal, ed. 2d, 1829 (*atropus*).
Scyris Cuvier, Règne Animal, ed. 2d, 1829 (*indica* = *gallus*).
Gallichthys Cuvier & Valenciennes, Hist. Nat. Poiss., ix, 168 (*major* = *gallus*; name a substitute for *Gallus*).
Hynnis Cuvier & Valenciennes, Hist. Nat. Poiss., ix, 195 (*gorcensis*).
Platysomus Swainson, Nat. Hist. Classn. Fish. ii, 1839, 250 (*browni* = *setipinnis*).
Selar Bleeker, Verhandl. Batav. Genootsch, xxiv, Makreele, 1851 (*boops*, etc.).
Carangoides Bleeker, *l. c.* (*plagiotænia*).
Leioglossus Bleeker, *l. c.* (*Leioglossus carangoides*).
Uraspis Bleeker, *l. c.* (*Uraspis carangoides*).
Caranx Bleeker, *l. c.* (*carangus*, etc.; earliest restriction).
Gnathanodon Bleeker, *l. c.* (*speciosus*).
Leptaspis Bleeker, *l. c.* (*leptolepis*).
Selaroides Bleeker, *l. c.* (*leptolepis*).
Carangichthys Bleeker, Bijdragen Ichthyol. Faun. Celebes, iii, 760, about 1852, (*typus*).
Caranx Girard, Proc. Ac. Nat. Sci. Phila., 1858, 168 (*speciosus*, etc.).
Carangus Girard, *l. c.* (*esculentus* = *carangus* = *hippos*).
Hemicaranx Bleeker, Versl. Kon. Ak. Wet., xiv, 134, 1862 (*marginatus*).
Alectis (Rafinesque, Analyse de la Nature, 1815, *nomen nudum?*) Gill, Proc. Ac. Nat. Sci. Phila., 1862, 239 (*gallus*, etc.).
Trachurops Gill, Proc. Ac. Nat. Sci. Phila., 1862, 431 (*crumenophthalmus*).
Paratractus Gill, *l. c.* (*pisquetus*).
Carangops Gill, *l. c.* (*falcatus* = *amblyrhynchus*).
Blepharichthys Gill, *l. c.* (*crinitus*; substitute for *Blepharis*).

Type Scomber carangus Bloch = Scomber hippos L.

We see no sufficient reason for setting aside the earliest restriction of the genus *Caranx*, and therefore, with Bleeker, consider *Caranx hippos* (*carangus*) as the type. The reasons which have led Professor Gill to regard *Caranx speciosus* as the type are given in full in the Proc. Ac. Nat. Sci. Phila., 1862, 433, to which the reader is referred.

The species here associated in the genus *Caranx* differ widely in form, *C. crumenophthalmus* standing at one extreme, and *C. setipinnis* at the other. The gradation from one type to the other is unusually perfect, and we find it quite impossible to introduce any satisfactory lines of generic division. We may, however, recognize a number of subgenera of unequal, and for the most part of low, value, as follows:

1. Trachurops (*crumenophthalmus*).
2. Hemicaranx (= *Carangops* Gill;) (*amblyrhynchus; atrimanus*).
3. Uraspis (*vinctus; leucurus; dentex; platessa; ruber*).

Vol. VI, No. 13. Washington, D. C. Oct. 5, 1883.

4. CARANX (*Carangus* Grd. = *Carangichthys* Bleeker = *Paratractus* Gill;) (*caballus; chrysus; latus; hippos; lugubris; melampygus*).
5. GNATHANODON (= *Caranx* Gill;) (*speciosus*).
6. CARANGOIDES (*orthogrammus*).
7. CITULA (*otrynter*).
8. BLEPHARIS (= *Gallus, Scyris, Gallichthys, Hynnis, Alectis*, and *Blepharichthys;*) (*crinitus*).
9. VOMER (= *Platysomus;*) (*setipinnis*).

Our arrangement of the Carangoid genera agrees with that given by Lütken (Spolia Atlantica, 1880, 124), with the following exceptions:

We do not regard *Gallichthys* (*Blepharis*) as a genus distinct from *Caranx*, as neither of the two characters assigned by Lütken to the former genus (partial or total absence of scales and disappearance of the spinous dorsal) is diagnostic. Neither can be used to draw a line between *Caranx otrynter* and *Caranx crinitus*. We refer the subgenus *Vomer* to *Caranx* rather than to *Selene*, as it really possesses the lateral shields of the former.

ANALYSIS OF AMERICAN SPECIES OF CARANX.*

a. Shoulder-girdle with a deep cross-furrow at its junction with the isthmus, above which is a fleshy projection; body elongate, the depth about 3½ in length (*Trachurops* Gill).

b. Teeth, feeble, in a narrow band above, the outer slightly enlarged; eye very large, with large adipose eyelid, its diameter about 3 in head; interopercle and branchiostegals truncate behind; breast scaly; lateral line scarcely arched, its plates small, about 40 in number; soft dorsal and anal slightly falcate, with conspicuous basal sheath; pectoral shorter than head; 2d D. 1, 25; A. 1, 21.

CRUMENOPHTHALMUS, 8.

aa. Shoulder-girdle normal, its surface even.

c. Teeth of jaws in few series, unequal or at least not forming villiform bands, the outer series above usually enlarged, the lower teeth usually uniserial.

* We are unable to place the following species in the key, on account of imperfections in the description:

Caranx peruanus Tschudi.

Caranx peruanus Tschudi, Fauna Peruana, Ichthyologie, 1845, 19 (Peru).

This species remains thus far unidentified. The following is an outline of the description, which seems to be erroneous in some respects:

D. IX, 1. 28. Depth 6½ in length (with caudal); head 4 (without caudal). Mouth not extending to eye. Teeth all fine and villiform. Teeth on tongue, vomer, and palatines. Eye large. Lateral line sharply bent. Second dorsal highest in front. Pectoral extending to first ray of soft dorsal. Color, dark bluish above; belly not very pale.

d. Dorsal and anal fins not falcate, their bases with a conspicuous sheath of scales; teeth small; breast scaly.

e. Maxillary very narrow, its greatest width scarcely one-fourth eye; head small; lateral line strongly arched in front; teeth uniserial, those on vomer and palatines minute or obsolete (*Hemicaranx* Bleeker).

f. Arch of lateral line very strong, its height more than one-third its length, which is much less than half the length of the straight part; upper lobe of caudal falcate, much longer than lower; mouth small, reaching little past front of eye; head 4⅓ in length; depth 2½; 2d D. 1, 28; A. 1, 25; shields 50; pectoral little longer than head, its base dusky.

AMBLYRHYNCHUS, 9.

ff. Arch of lateral line strong, its height less than one-third its length, which is about half the straight part; caudal lobes subequal; mouth small, reaching scarcely past front of eye; head 4; depth 2⅔; 2d D. 1, 29; A. 1, 25; shields 60; pectoral half longer than head, its basal part and axil jet-black.

ATRIMANUS, 10.

ee. Maxillary broad; head rather large (*Uraspis* Bleeker).

g. Lateral line strongly arched, its arch much shorter than its straight portion.

h. Teeth on vomer, palatines, and tongue; arch of lateral line not half as long as straight portion; breast scaly; lateral scutes strong, about 48 in number; head 3½; depth 3; 2d D. 1, 24; A. 1, 19; sides with dark bars; a black, opercular spot..VINCTUS, 11.

hh. Teeth on vomer, palatines, and tongue obsolete; arch of lateral line a little more than half length of straight part; head 3½; depth 2; 2d D. 1, 28, A. 1, 24; scutes 57; sides with dark bars; a black opercular spot.....LEUCURUS, 12.

gg. Lateral line little arched, its curved part not shorter than its straight part; maxillaries scarcely reaching front of eye.

i. Opercular spot distinct; body deep, compressed, the depth about 3 in length; small teeth on vomer and palatines, disappearing with age.

j. Snout 2½ in head; head 3⅜ in length; depth 3⅖; 2d D. 1, 26; A. 1, 21; shields 24 to 29.....DENTEX, 13.

jj. Snout 2⅘ in head; head 3½ in length; depth 3; 2d D. 1, 27; A. 1, 22; shields 25 to 29.....PLATESSA, 14?

ii. Opercular spot obsolete; body rather elongate, the depth 3 to 3½ in length; teeth on vomer and palatines persistent; snout 3 in head; head 3⅓ in body; 2d D. 1, 26; A. 1, 22; shields 25 to 29..RUBER, 15.

dd. Soft dorsal and anal elevated in front and more or less falcate; upper teeth in a band, the outer enlarged; lower teeth in one series; teeth on vomer, palatines, and tongue; maxillary broad; dorsal sheath of scales not greatly developed (*Caranx*).

k. Body subfusiform, the depth less than one-third the length; breast scaly; teeth of outer series small, not canine-like; a black opercular spot; no spot on pectoral; arch of lateral line about half straight part.

l. Pectoral fin very long, considerably longer than head; head $3\frac{3}{4}$ in length; depth $3\frac{1}{2}$; 2d D. 1, 22; A. 1, 20; scutes 40 ..... CABALLUS, 16.

ll. Pectoral moderate, about as long as head; head $3\frac{3}{4}$ in length; depth $3\frac{1}{4}$; D. 1, 24; A. 1, 19; scutes 50. CHRYSUS, 17.

kk. Body oblong-ovate, the depth more than $\frac{1}{3}$ the length; outer teeth rather strong.

m. Vertical fins pale; general color silvery.

n. Breast scaly; lower teeth scarcely canine-like; opercular spot very small or obsolete; no pectoral spot; pectoral 3 in length; head $3\frac{2}{5}$; depth $2\frac{3}{4}$; 2d D. 1, 20; A. 1, 17; scutes 30 .. LATUS, 18.

nn. Breast naked, except a small rhombic area before ventrals; two small canines in front of lower jaw; opercular spot large; adult with a black spot on pectoral; pectoral 3 in length; head $3\frac{1}{4}$; depth about 3; 2d D. 1, 20; A. 1, 16; scutes (developed) about 25 ..... HIPPOS, 19.

mm. Vertical fins chiefly black; general color brassy or blackish; lower teeth not canine-like; breast scaly.

o. Anterior profile gibbous; head very large; curve of lateral line less than $\frac{2}{3}$ straight part; second dorsal and anal strongly falcate; anterior lobe of dorsal about $\frac{2}{3}$ head; pectoral very long, $2\frac{3}{4}$ in length; color nearly uniform black; head $3\frac{1}{3}$; depth $2\frac{2}{5}$; 2d D. 1, 21; A. 1, 18; scutes 28 ..... LUGUBRIS, 20.

oo. Anterior profile scarcely gibbous; curve of lateral line a little more than $\frac{2}{3}$ straight part; soft dorsal and anal strongly falcate; anterior rays of dorsal $\frac{2}{3}$ head; pectoral a little more than $\frac{1}{2}$ body; color dark olivaceous or brassy; sides with many small dark brown spots; head $3\frac{1}{3}$; depth $2\frac{3}{4}$; 2d D. 1, 22; A. 1, 19; scutes about 35 ..... MELAMPYGUS, 21.

ee. Teeth of jaws equally small; if present, forming villiform bands; maxillary broad; body compressed.

p. Teeth very minute, disappearing early, none on vomer or palatines (*Gnathanadon* Bleeker); breast scaly; body broadly ovate, strongly compressed; vertical fins somewhat falcate; the lobe of dorsal about half head; color silvery, with dusky cross-bands; opercular spot obsolete; head 3; depth 2; 2d D. 1, 20; A. 1, 16; scutes weak, about 15 ..... SPECIOSUS, 22.

pp. Teeth persistent; minute teeth on vomer and palatines; breast naked.

q. Second dorsal and anal more or less elevated in front or falcate; spinous dorsal disappearing with age.

r. Soft dorsal with none of its rays produced in filaments (*Carangoides*), the longest ray about one-third head; dorsal and anal very long; no naked area above lateral line; lateral line nearly straight, its scutes small; body oblong; head 2¾; depth 3⅓; 2d D. 1, 32; A. 1, 26; scutes 17; color dusky olivaceous; vertical fins blackish.....ORTHOGRAMMUS, 23.

rr. Soft dorsal with one or more rays produced in long filaments; dorsal and anal rather short; a partly naked area above lateral line.

s. Soft dorsal with the first ray only produced in a filament (*Citula*); lateral line not strongly arched, its scutes weak; body broad-ovate, its edges but little trenchant; head 3; depth 2¼; 2d D. 1, 18; A. 1, 16; scutes about 25; color pale, without markings.....OTRYNTER, 24.

ss. Soft dorsal with 3 to 6 of its anterior rays produced in long filaments (*Blepharis*); dorsal and anal rather short; lateral line moderately arched, its shields very feeble; body very broadly ovate, its edges more or less trenchant; head 3; depth 2 (1 in young); 2d D. 1, 19; A. 16; scutes 17; color silvery, nearly plain.....CRINITUS, 25.

qq. Soft dorsal and anal extremely low, not at all falcate; body broad-ovate, very strongly compressed, its outlines everywhere sharply trenchant; head extremely gibbous above the eyes; its anterior profile nearly vertical; lateral line strongly arched anteriorly; its shields small and weak; scales very small, non-imbricate (*Vomer*); 2d D. 1, 22 to 1, 25; A. 19 or 20; scutes about 20; depth, about half length in adult, much more in young..SETIPINNIS, 26.

8. **Caranx crumenophthalmus** (Bloch) La Cépède.—*Goggler: Goggle-eye Jack; Chicharro.*

Scomber crumenophthalmus Bloch, Ichthyol., taf. 343 (Guinea).

Caranx crumenophthalmus La Cépède, iv, 107, 1803; Cuv. & Val., ix, 62; Günther, ii, 429; Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 358 (Cape San Lucas), and of recent writers generally.

Trachurops crumenophthalmus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261.

Scomber plumieri Bloch, taf. 344 (Antilles).

Caranx plumieri C. & V., ix, 65.

Scomber balantiophthalmus Bloch & Schneider, Syst. Ichthyol., 1801, 29 (Guinea).

Caranx daubentoni La Cépède, Hist. Nat. Poiss., iv, 107, 1803 (Antilles).

Caranx macrophthalmus Agassiz, Spix, Pisc. Bras., 107, 1829 (Brazil).

Trachurops brachychirus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261 (Cape San Lucas).

Trachurops plumieri Poey, Enum. Pisc. Cubens., 78.

Habitat.—Atlantic coasts of United States, Central America, South America, Africa, West Indies, Cape San Lucas, Panama.

According to Streets, the East Indian representative of the type of *Trachurops* (*Caranx mauritianus* Quoy & Gaim.), is a different species from the American form. It is, perhaps, doubtful to which species the name *crumenophthalmus* was originally applied, as we find no definite record of the occurrence of our species on the coast of Guinea, the locality assigned by Bloch. This species is common in the West Indies, and ranges occasionally northward to Cape Cod. Numerous specimens have been taken at Cape San Lucas and at Panama. We do not see that these differ from the Atlantic type.

9. Caranx amblyrhynchus Cuvier & Valenciennes.—*Segundo.*

Caranx amblyrhynchus Cuv. & Val., Hist. Nat. Poiss., ix, 100, pl. 248, 1833; Günther, ii, 441, and of authors (West Indies, &c.).
Caranx falcatus Holbrook, Ichth. S. Car., 1860, 94 (Charleston).
Carangops falcatus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 431.
? *Caranx secundus* Poey, Memorias Cuba, ii, 223, 1860.
Carangops secundus Poey, Syn. Pisc. Cub., 1867 (Cuba); Poey, Enum. Pisc. Cubens., 78
Caranx heteropygus Poey, Memorias Cuba, ii, 344, 1860 (Cuba).
Carangops heteropygus Poey, Enum. Pisc. Cubens., 77.

Habitat.—Cape Hatteras to Brazil. Common in the West Indies.

There is nothing in the description of *C. secundus* to show that it differs from *C. amblyrhynchus*. As Poey considered them different, we place it in the synonymy of the latter with doubt.

10. Caranx atrimanus Jordan & Gilbert.

Caranx atrimanus Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 309 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This rare species is as yet known only from Panama.

11. Caranx vinctus Jordan & Gilbert.—*Cocinera.*

Caranx vinctus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 349 (Mazatlan).
Caranx sp. Lay & Bennett, Beechey's Voyage, 1849, 55 (San Blas, Mazatlan).

Habitat.—Pacific coast of Mexico, Mazatlan, San Blas, Punta Arenas.

This well-marked species is abundant about the entrance to the Gulf of California, its range extending thence to the coast of Central America, specimens having been taken by Professor Gilbert at Punta Arenas.

12. Caranx leucurus Günther.

Caranx leucurus Günther, Proc. Zool. Soc. Lond., 1864, 24, and Fish. Centr. Amer., 1869, 430 (Panama).
Caranx fürthi Steindachner, Ichth. Beitr., iv, 12, 1875 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This species we have not examined. The five known specimens are from Panama, and all are immature. There can, we think, be no doubt of the identity of *fürthi* with *leucurus*.

13. Caranx dentex (Bloch & Schneider) Cuvier & Valenciennes.

? *Scomber ascensionis* Osbeck, Reise in China, 1760 (Ascension Island).
Scomber dentex Bloch & Schneider, Syst. Ichthyol., 30, 1801 (Brazil).

Caranx dentex Cuv. & Val., ix, 1833, 87 (Rio Janeiro); Günther, ii, 441 (Madeira; (?) New Orleans); Steindachner, Ichthyol. Bericht. v, 36, pl. 1 (Cadiz, Gibraltar, Malaga, Canary Islands).

Caranx luna Geoffroy St. Hilaire, Descr. Egypt. Poiss., 1809, pl. 23 (Egypt); Cuv. & Val., ix, 80.

? *Trachurus imperialis* Rafinesque, Caratteri di Alcuni Nuovi Generi, 42, 1810 (Sicily).

Citula banksi Risso, Eur. Mérid., 1826, 422 (Nice).

Caranx solea Cuv. & Val., ix, 1833, 86 (Brazil).

Caranx analis Cuv. & Val., ix, 1833, 88 (St. Helena).

Habitat.—Both coasts of Atlantic Ocean, Brazil, Mediterranean Sea, Madeiras, and Canaries.

We have made no study of this species, but follow authors in identifying the *Caranx luna* of the Mediterranean with the Brazilian species (*dentex*). The *Scomber ascensionis* of Osbeck, wrongly identified by Forster with *Caranx lugubris*, is probably this species, but the meager description does not authorize a change of name. *Caranx solea*, although not hitherto identified, seems to be certainly the present species.

14. Caranx platessa Cuvier & Valenciennes.

Caranx platessa Cuv. & Val., ix, 84, 1833 (East Indies).

Caranx georgianus Cuv. & Val., ix, 85, 1833 (Australia); Günther, ii, 440 (Australia, New Zealand, Raoul Island, Norfolk Island); Günther, Voyage Challenger, Shore Fishes, 24, 1880 (Juan Fernandez, identified with *Caranx chilensis*).

Caranx chilensis Gay, Hist. Chili Zool., 1850, ii, 235 (Juan Fernandez); Steindachner, Ichth. Beitr., ii, 17, 1875 (Juan Fernandez).

Habitat.—South Pacific, New Zealand, Australia, coast of Chili.

We follow Dr. Günther in identifying the Chilian *C. chilensis* with the Australian species, there being no discrepancies in the description. We have compared the detailed descriptions of this species and of *C. dentex* given by Steindachner, and can find no difference likely to be permanent. The sole difference indicated by Dr. Günther ("This species is closely allied to *C. dentex*, from which it differs by the presence of teeth on the palate") has been shown by Steindachner and Vinciguerra to be fallacious, being dependent on age. It is therefore probable that *C. platessa* is identical with *C. dentex*, as well as with *C. chilensis*, but we hesitate to formally unite them here in the absence of specimens.

15. Caranx ruber (Bloch) Jordan & Gilbert.—*Cibi amarillo; Cibi carbonero.*

Scomber ruber Bloch, Ichth., taf. 342; Bloch & Schneider, Syst. Ichth., 1801, 29 (Ste. Croix).

Caranx blochii Cuv. & Val., ix, 69, 1833 (Ste. Croix: same type); Günther, ii, 430 (West Indies).

? *Caranx bartholomæi* Cuv. & Val., ix, 100, 1833 (St. Bartholomew).

Caranx cibi Poey, Memorias Cuba, ii, 224, 1860 (Cuba); Jordan, Proc. U. S. Nat. Mus., 1880, 486 (Cuba); Jordan & Gilbert, Syn. Fish. N. A., 436.

Carangoides cibi Poey, Syn. Pisc. Cub., 1867, 366; Enum. Pisc. Cubens., 77.

? *Caranx iridinus* Poey, Memorias Cuba, ii, 226, 1860 (Cuba).

? *Carangoides iridinus* Poey, Syn. Pisc. Cub., 1867, 366; Enum. Pisc. Cubens., 77.

Caranx beani Jordan, Proc. U. S. Nat. Mus., 1880, 486 (Beaufort, N. C.); Jordan & Gilbert, Syn. Fish. N. A., 436.

Habitat.—West Indies; North Carolina to Brazil.

We have united under the above head a number of nominal species from the West Indies, which from the published descriptions we are unable to distinguish.

Since the description by Professor Jordan of *Caranx beani*, we have examined the young of various species, and have now little doubt that the much greater depth of the body in *beani*, as distinguished from *cibi*, is due to the immaturity of the types of the former. There is nothing in Poey's description of *C. iridinus* to distinguish it from *C. cibi* (color plumbeous instead of yellow, &c.), and our notes on types of the two preserved in the National Museum likewise fail to indicate any difference. *C. bartholomæi* is said to have 33 to 35 lateral shields, and is moreover compared with *C. chrysus*. The description otherwise agrees fully with *C. cibi*, and it is possible that 5 or 6 of the smaller scales were included in the enumeration of the scutes. So far as we can see, *C. blochii*, as described by Günther and Cuvier & Valenciennes, agrees with *C. cibi*. The earlier name *ruber*, although inappropriate, the original redness of the type coming from spoiled alcohol, and having been intensified into carmine by the artist, can hardly be set aside.

16. Caranx caballus Günther.—*Jurel.*

Trachurus boops Girard, U. S. Pac. R. R. Expl., Fish, 1859, 108 (San Diego; not *Caranx boops* C. & V.).

Caranx boops Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261.

Caranx caballus Günther, Fish. Centr. Amer., 1869, 431 (Panama); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456; 1881, 46, 232; 1882, 359 (Porto Escondido; Cape San Lucas; Mazatlan; Panama). Jordan & Gilbert, Syn. Fish. N. A., 435.

?*Caranx caballus* Günther, Voyage Challenger, Shore Fishes, 1880, 10 (Bermuda, probably an error).

Caranx girardi Steindachner, Ichthyol. Notizen, ix, 25, 1869 (based on *Trachurus boops* Grd.).

Habitat.—Pacific coast of tropical America, San Diego to Panama. ??Bermuda Islands.

This species is closely related to *C. chrysus*, of which it is a representative on the Pacific coast.

17 Caranx chrysus (Mitchill) De Kay.—*Hard Tail; Jurel; Yellow Mackerel; Cojinera.*

Scomber crysos Mitchill, Trans. Lit. and Phil. Soc. N. Y., 1, 424, 1815 (New York).

Caranx chrysos De Kay, N. Y. Fauna, Fishes, 1842, 121; Günther, ii, 445; Jordan & Gilbert, Syn. Fish. N. A., 1883, 970; Jordan & Gilbert, Proc. U. S. Nat. Mus., 1883.

Caranx pisquetus Cuv. & Val., ix, 97, 1833; Jordan & Gilbert, Syn. Fish. N. A., 435.

Paratractus pisquetus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 432; Poey, Syn. Pisc. Cub., 1868, 366.

Trachurus squamosus, Gronow, Syst. ed. Gray, 1856, 125.

Caranx hippos Holbr., Ichth. S. Car., 1860, 90.

Habitat.—Cape Cod to Brazil; generally abundant.

This species is abundant farther north than any of the others. It has not been reported from the Pacific, being there replaced by C. *caballus*.

18. Caranx latus Agassiz.—*Jurel.*

? *Scomber kleinii* Bloch, Ichthyol. 1787, taf. 347; Bloch & Schneider, Syst. Ichthyol. 1801, 30 (description insufficient; may be *C. hippos*).

? *Caranx sexfasciatus* Quoy & Gaimard, Zool. Voy. Freycinet, Poiss., 358, pl. 65, f. 4, 1824 (young; perhaps of some other species); C. & V., ix, 110, 1833 (Vanicolo; Wagiow; Batavia).

Caranx latus Agassiz, Pisc. Bras. 1829, 105 (Brazil).

? *Caranx lepturus* Agassiz, Pisc. Bras. 1829, 106; Günther, ii, 447.

? *Scomber heberi* Bennett, Fishes Ceylon, 1830, pl. 26.

Caranx fallax Cuv. & Val., ix, 95, 1833 (Antilles; Brazil); Poey, Rep. Fis. Nat. Cuba, 1, 328; ii, 14 (Cuba); Jordan & Gilbert, Syn. Fish. N. A., 1882, 437; Jordan & Gilbert, Bull. U. S. Fish Comm., 1882, 110 (Mazatlan; Panama) and of most recent writers.

Carangus fallax Gill, Proc. Ac. Nat. Sci. Phila., 1862, 433, and elsewhere; Poey, Syn. Pisc. Cub., 364, 1868; Poey, Enum. Pisc. Cubens., 1875, 75.

Caranx sem C. & V., ix, 105 (Pondicherry).

Caranx forsteri C. & V., ix, 107 (East Indies); Bleeker, Natuurk. Tydskr. Nederl. Ind., 1852, iii, 164 (East Indies).

? *Caranx xanthopygus* C. & V., ix, 109 (East Indies).

? *Caranx peroni* C. & V., ix, 112 (East Indies).

? *Caranx lessoni* C. & V., ix, 113 (Malabar).

? *Caranx belengeri* C. & V., ix, 116 (Malabar).

? *Caranx ekala* C. & V., ix, 117 (Malabar).

Caranx flavocæruleus Schlegel, Fauna Japonica, 1850, 110 (Japan).

Caranx paraspistes Richardson, Voy. Erebus and Terror, 136 (Port Essington).

Caranx hippos Günther, ii, 449, 1860 (East and West Indies; China; Madagascar); Günther, Fishes Centr. Amer. 1869, 431 (Panama); Günther, Fische der Südsee, 1876, 131, f. 84 (Pacific); Day, Fishes of Malabar, 1865, 86 (not *Scomber hippos* L.).

Caranx richardi Holbrook, Ichth. S. Car., 1860, 96, pl. xiii, f. 1 (South Carolina).

Carangus marginatus Gill, Proc. Ac. Nat. Sci. Phila., 1863, 166 (Panama).

? *Carangus aureus* Poey, Enum. Pisc. Cubens., 1875, 76.

Habitat.—All warm seas, north to Mazatlan and Virginia; very abundant in tropical America.

19. Caranx hippos (Linnæus) Jordan & Gilbert.—*Cavally; Cavallé; Jack; Toro; Jiguagua.*

? *Scomber cordula* Linnæus, Syst. Nat., ed. x, 1758. (In part; apparently confused with *Megalaspis rottleri*.)

Trachurus cordyla Gronov., Syst. Ichth., ed. Gray, 124, 1856.

Scomber hippos Linnæus, Syst. Nat., ed. xii, 1, 494, 1766 (Charleston).

Carangus hippos Gill, Proc. Ac. Nat. Sci. Phila., 1862, 433, and elsewhere.

Caranx hippus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 269; Jordan & Gilbert, Syn. Fish. N. A., 1883, 437, and elsewhere.

Scomber carangus Bloch, Ichthyol., taf. 340, 1787 (on a drawing by Plumier).

Caranx carangus C. & V., ix, 91, 1833 (West Indies); Günther, ii, 448, and of authors.

Caranx crithrurus La Cépède, iii, 68, 1802 (based on *S. hippos* L.).

Caranx carangua La Cépède, iii, 74, 1802 (on a drawing by Plumier).

Caranx defensor De Kay, N. Y. Fauna Fishes, 1842, 120 (New York); Holbrook, Ichth. S. Car., 87, 1860 (Charleston).

Carangus esculentus Girard, U. S. Mex. Bound. Surv. 1859, 23 (Texas).

Carangus chrysos Gill, Proc. Ac. Nat. Sci. Phila., 1862, 434 (young).

Carangus hippos Poey, Enum. Pisc. Cubens., 1875, 75.

Caranx caninus Günther, Fish. Centr. Amer., 1869, 432 (Panama).

Habitat.—Both coasts of tropical America, north to Cape Cod and Mazatlan. East Indies. More abundant northward than any other species except C. *chrysus.*

20. Caranx lugubris Poey.—*Tiñosa.*

Scomber ascensionis Forster MSS; Bloch & Schneider, Syst. Ichthyol., 1801, 33; Forster, Descr. Anim. ed. Lichtenstein, 412, 1844 (Ascension Island; not of Osbeck).

Caranx ascensionis C. & V., xi, 102 (Ascension); Günther, ii, 1860, 432; Günther, Fische Südsee, xi, 132, 1876, taf. 85 (St. Helena; Society Islands; Kingsmill); Günther, Voy. Challenger, Shore Fishes, 1880, 4, 5 (St. Paul's Rocks; Ascension).

Carangus ascensionis Streets, Bull. U. S. Nat. Mus., vii, 88, 1877 (Fanning Islands).

Caranx lugubris Poey, Memorias Cuba, ii, 222, 1860 (Cuba); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 227 (Clarion Island).

Carangus lugubris Poey, Syn. Pisc. Cub., 1868, 365.

Caranx frontalis Poey, Memorias Cuba, ii, 222, 1860 (Cuba).

Habitat.—Rocky islands in the tropics; Clarion Island (Revillagigedos); West Indies; Mid-Atlantic; Mid-Pacific.

We have compared our specimen from Clarion Island with one of Poey's types and with the specimens obtained by Dr. Streets. These differ somewhat in form and in the height of the fins, but we have no doubt that all belong to the same species. The name *ascensionis* should not be retained for this species, having evidently been first given to some other, probably to *C. dentex.*

21. Caranx melampygus Cuvier & Valenciennes.

Caranx melampygus C. & V., ix, 1833, 116 (East Indies); Günther, ii, 440, 1860; Günther, ii, 440, 1860; Günther, Fische der Südsee, 133, 1876, pl. 86 (Polynesia, &c.); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 230 (Socorro Island; Revillagigedos).

Carangus melampygus Streets, Bull. U. S. Nat. Mus., vii, 1877, 69 (Honolulu).

Caranx stellatus Eydoux & Souleyet, Voy. Bonite. Poiss., 167, 1840 (Sandwich Islands).

Caranx bixanthopterus Rüppell, Neue Wirbelthiere, 1837, 49.

Habitat.—Pacific Ocean generally, about islands in mid-ocean. Revillagigedo Islands.

22. Caranx speciosus (Forskål) La Cépède.—*Mojarra; Dorada.*

Scomber speciosus Forskål, Descr. Anim., 1775, 54 (Red Sea).

? *Caranx speciosus* La Cépède, Hist. Nat. Poiss., iii, 72, 1802.

Caranx speciosus C. & V., ix, 130, 1833 (East Indies); Günther, ii, 44; Günther, Fish. Centr. Amer., 1869, 431 (Panama); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 375.

Gnathanodon speciosus Bleeker, Verh. Bat. Gen., xxiv, Makreele, 72, 1852.

Caranx panamensis Gill, Proc. Ac. Nat. Sci. Phila., 1863, 166 (Panama).

Habitat.—Tropical parts of the Pacific Ocean, East Indies, Mazatlan, Panama.

This species is generally common on the Pacific coast of tropical America. Our specimens agree fully with the descriptions of the East Indian form.

23. Caranx orthogrammus Jordan & Gilbert.

?? *Scomber ferdau* Forkål, Descr. Anim., 1775, 55 (Red Sea).

? *Caranx ferdau* Günther, Fische der Südsee, 1876, 134 (Red Sea; Polynesia).

Caranx orthogrammus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 226 (Clarion Island, Revillagigedos).

Habitat.—Islands off the Pacific coast of tropical America. ?Polynesia.

It is possible that this species may prove to be identical with *Caranx ferdau*, or some related species. The single large specimen known, however, differs materially from all the published descriptions of species of this type.

24. Caranx otrynter* nom. sp. nov.

Carangoides dorsalis Gill, Proc. Ac. Nat. Sci. Phila., 1863, 166 (Panama; not *Vomer dorsalis* Gill).

Caranx dorsalis Günther, Fish. Centr. Amer., 1869, 432 (Panama); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 375 (Panama).

Habitat.—Pacific coast of tropical America; Mazatlan; Panama.

This species marks the transition from "*Caranx*" to "*Blepharis*." The adult would be referred to the latter genus, while the young might find place in *Carangoides* if these petty subdivisions should be retained. The relations of *C. otrynter* with *C. armatus* (Forskål) are rather close, but the two seem to be satisfactorily separated.

Compared with typical species of *Caranx* (as *C. hippos*), *C. otrynter* differs strikingly in many respects, among others the following: The greater compression and elevation of the body, the greater length and sharpness of the breast, the much greater depth of the preorbital region, the greater prominence and sharpness of the frontal and occipital keel, the more oblique position of the bones of the head, the feebleness and uniformity of the teeth, the approximation below of the mandibular rami, the reduction in size of the scales and scutes, and the increase of the naked areas, the reduction or loss (in the adult) of the dorsal and anal spines, the increase in length of the lobes of the dorsal, anal, and caudal, and, finally, the increase in the difference between the old and the

* *Οτρυντηρ*, a driver, in allusion to the whip-like ray of the second dorsal.

young. Not one of these features can, however, be used for generic distinction, as they increase by easy transitions from species to species.

On the other hand, comparing *Caranx otrynter* with *Selene vomer*, we find that in almost every one of the differences above noted the latter species carries these characters to a still greater extreme, and differs from *Caranx otrynter* in just the respects in which the latter differs from *Caranx hippos*. *Caranx setipinnis* is, in some regards, a species still more extreme than *Selene vomer*, although it has not quite lost the lateral scutes.

25. Caranx crinitus (Mitchill) Jordan & Gilbert.

? *Zeus gallus* L., Syst. Nat., x (includes *Selene*, &c.).
? *Caranx gallus* Günther, ii, 455 (East Indies).
? *Zeus ciliaris* Bloch, Ichthyol., vi, 29, taf. 29, 1788 (East Indies; young of *C. gallus*?).
? *Caranx ciliaris* Günther, ii, 454, 1860 (East Indies); ? Günther Fische der Südsee, 1876, 135, taf. 89; ? Day, Fishes Malabar, 90, 1865.
Gallichthys ciliaris Lütken, Spolia Atlantica, 1880, 139, 197.
Scomber filamentosus Mungo Park, Trans. Linn. Soc., iii, 36, 1797 (Sumatra).
? *Gallus virescens* La Cépède, iv, 583, 1803 (after Linnæus).
Zeus crinitus Mitchill, Amer. Jour. Sci. Arts, xi, 144, 1826 (Shoreham).
Blepharis crinitus De Kay, N. Y. Fauna Fish, 1842, 123; Jordan & Gilbert Syn. Fish. N. A., 438.
Blepharichthys crinitus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 262 (Cape San Lucas).
Caranx crinitus Jor. & Gilb., Proc. U. S. Nat. Mus., 1882, 359.
Gallichthys crinitus Lütken, Spolia Atlantica, 1880, 131, 197.
? *Scyris indica* C. & V., ix, 145 (East Indies).
? *Blepharis indicus* C. & V., ix, 154.
Blepharis sutor C. & V., ix, 161 (Caribbean Sea).
Caranx sutor Günther, ii, 454.
Blepharis major C. & V., ix, 163 (West Indies).
? *Gallichthys major* C. & V., ix, 168 (East Indies).
? *Gallichthys chevola* C & V., ix, 175 (East Indies).
? *Carangoides blepharis* Bleeker, Verhand. Batav. Genoots. xxiv, Makr., 67, 1852 (East Indies).
? *Carangoides gallichthys* Bleeker, l. c., 68 (East Indies).
? *Hynnis cubensis* Poey, Mem. Cuba, ii, 535, 1860 (Cuba); Enum. Pisc. Cubens., 79.
Scyris analis Poey, Syn. Pisc. Cub., 1868, 369 (Cuba); Enum. Pisc. Cubens., 79.

Habitat.—Tropical America on both coasts, north to Cape Cod and Mazatlan. ? East Indies.

The many nominal species of this type have been reduced by Lütken to three or four: *C. gallus* and *C. ciliaris* of the East Indies, *C. alexandrinus* of North Africa, and *C. crinitus* of America. We have not examined the East Indian forms, but see no reason for doubting that *ciliaris* is the young of *gallus*, as has been supposed by Dr. Day and others. Our young specimens of *C. crinitus*, moreover, agree fully with the figures of *C. ciliaris*. We think it, therefore, extremely probable that all the nominal species of this type (except *C. alexandrinus*) are

forms of *Caranx gallus*. We, however, follow Lütken in retaining the American name until specimens can be actually compared. As has been shown by Lütken (Spolia Atlantica, 197), the nominal genera *Scyris*, *Blepharis*, *Gallichthys*, and *Hynnis* are simply stages in the development of the individuals, their characters changing with age.

26. Caranx setipinnis (Mitchill) Jordan & Gilbert.—*Bluni-nosed Shiner; Jorobado; Moon-fish; Horse-fish.*

§ (*Setipinnis.*)

Zeus setipinnis Mitchill, Trans. Lit. and Phil. Soc. N. Y., 1, 384, pl. 1, f. 9, 1815 (New York).
Argyreiosus setipinnis Günther, ii, 459, 1860.
Vomer setipinnis Gill, Proc. Ac. Nat. Sci. Phila., 1862, 436, and elsewhere.
Selene setipinnis, Lütken, Spolia Atlantica, 1880, 135; Steindachner, Beitr. Kenntniss. Fische Afrikas, ii, 10, 1882; Jordan & Gilbert, Syn. Fish. N. A., 440.
Caranx setipinnis Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882.
Vomer browni Cuv. & Val., ix, 189, pl. 256, 1833, and of various writers.
Platysomus browni, spixi, and *micropteryx* Swainson, Nat. Hist. Classn. Fishes, ii, 1839, 405.
Argyreiosus unimaculatus, Batchelder, Proc. Bost. Soc. Nat. Hist., ii, 78 (Maine: young); Storer, Hist. Fish. Mass., 78, pl. xiv, f. 2.
Vomer sanctæ-marthæ, columbiensis, martinicensis, dominicensis, noveboracensis, sanctæ-petri, brasiliensis, cayennensis, and *cubæ* Guichénot, Ann. Soc. Linn. Maine et Loire, 1865, 38 to 44.
Vomer curtus Cope, Proc. Am. Philos. Soc. Phila., 1870, 119 (Rhode Island).

§ § (?Var. *gabonensis.*)

Argyriosus setipinnis, var. A, Günther, ii, 459.
Vomer gabonensis Guichénot, l. c., 42 (Gaboon).
Argyreiosus gabonensis Steindachner, Fisch-fauna des Senegals, 1869, 38.

§§§ (?Var. *dorsalis.*)

Argyreiosus setipinnis, var. B, Günther, ii, 459.
Vomer dorsalis Gill, Proc. Ac. Nat. Sci. Phila., 1862, 436.
Vomer senegalensis and *gorcensis* Guichénot, l. c., 35, 37.

Habitat.—Tropical America and Western Africa; Cape San Lucas to Peru; Maine to Brazil.

This species is generally abundant within its range. Some local variations occur, but most of the above nominal species are based on the changes due to age, or on individual peculiarities shown by single specimens. It is possible that *C. gabonensis* (having the depth more than half the total length) and *C. dorsalis* (slenderer, with the rays of the second dorsal, I, 25) are really distinct species. It seems, however, very unlikely. The remaining species of M. Guichénot, as well as his family *Vomeridæ*, seem to be wanton synonyms, without excuse.

Genus 4.—SELENE La Cépède.

Selene, La Cépède, Hist. Nat. Poiss., iv, 560, 1803 (*argentea*).
Argyreiosus La Cépède, Hist. Nat. Poiss., iv, 566, 1803 (*vomer*).
Selene Lütken, Spolia Atlantica, 1880, 124.

Type Selene argentea La Cépède = adult of Zeus Vomer L.

We separate this genus from *Caranx* on the character, certainly of little value, of the entire absence of bony scutes. Two species are known. The variations depending on age are in this group extreme.

ANALYSIS OF SPECIES OF SELENE.

a. Dorsal with about 18 soft rays; anal with about 15; anterior profile of head curved; bones of head lower and less oblique than in *S. vomer*.....Oerstedi, 27.
aa. Dorsal with about 23 soft rays; anal with about 18; anterior profile of head, from base of snout to occiput almost perfectly straight.....Vomer, 28.

27. Selene oerstedi Lütken.

Selene oerstedi Lütken, Spolia Atlantica, 1880, 144 (Punta Arenas).

Habitat.—Pacific coast of tropical America.

Lütken's type came from Punta Arenas. Specimens have been obtained by Professor Gilbert at Mazatlan and at Panama.

28. Selene vomer (Linnæus) Lütken.—*Moon-fish; Jorobado; Horse-fish; Look-down; Horse-head.*

Zeus vomer Linnæus, Syst. Naturæ and elsewhere (young).
Argyreiosus vomer La Cépède, iv, 566, 1863; C. & V., ix, 177; Günther, ii, 458; Gill, Proc. Ac. Nat. Sci. Phila., 1862, 437, and elsewhere, and of most recent writers.
Selene vomer Lütken, Spolia Atlantica, 1880, 547 (with figures showing the changes undergone with age); Jordan & Gilbert, Syn. Fish. N. A., 439.
Zeus niger Bloch & Schneider, Syst. Ichth., 1801, 98 (confounded with *Pomacanthus arcuatus*).
Selene argentea La Cépède, iv, 560, 1803, pl. 9, f. 2 (adult); Brevoort, Ann. Lyc. Nat. Hist. N. Y., v, 68, pl. 4, 1853; Gill, Proc. Ac. Nat. Sci. Phila., 1862, 436; Poey, Enum. Pisc. Cubens., 80; and of various authors.
Zeus capillaris Mitchill, Trans. Lit. & Phil. Soc., 1, 383, 1815 (young).
Argyriosus capillaris Gill, Proc. Ac. Nat. Sci. Phila., 1862, 437.
Zeus rostratus Mitchill, l. c., 384 (young).
Zeus geometricus Mitchill, Amer. Monthly Mag., 1818, ii, 245 (adult).
Argyriosus triacanthus, filamentosus, and *setifer* Swainson, Nat. Hist. Classn. Fish., 1839, 250, 407, 409 (young).
Argyriosus mauricei Swainson, l. c., 408 (adult).
Argyriosus mitchilli De Kay, N. Y. Fauna Fish., 1842, 126 (young).
Argyriosus spixi Castelnau, Anim. Nouv. Rares, 23 (adult).
Argyriosus brevoorti Gill, Proc. Ac. Nat. Sci. Phila., 1863, 83 (Panama; young).
Argyreiosus pacificus Lockington, Proc. Ac. Nat. Sci., 1876, 84 (Lower California; adult).

Habitat.—Tropical America, on both coasts; Cape Cod to Brazil; Lower California to Peru.

Our observations of this species tend to confirm the correctness of

Dr. Lütken's views (Spolia Atlantica, 139) as to the transformations incident to its growth. We see no difference between Atlantic and Pacific coast specimens.

Genus 5.—CHLOROSCOMBRUS Girard.

Micropteryx Agassiz. Spix, Pisc. Bras. 1829, 104 (*cosmopolita*; name a substitute for *Seriola* used in botany; *Micropteryx* is, however, preoccupied, according to Dr. Gill).

Chloroscombrus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 168.

Type Micropteryx cosmopolita Agassiz = Scomber chrysurus L.

ANALYSIS OF SPECIES OF CHLOROSCOMBRUS.

a. Curved part of lateral line (chord) about as long as head (measured from tip of lower jaw), and $1\frac{2}{3}$ to $1\frac{3}{4}$ in length of straight part; lateral shields wholly obsolete; coloration rather pale ..... Chrysurus, 29.

aa. Curved part of lateral line considerably longer than head, $1\frac{1}{3}$ to $1\frac{2}{3}$ in straight part; lateral line armed posteriorly with small bony shields; coloration rather dusky, the fins largely tipped or edged with blackish ..... Stirurus, 30.

29. Chloroscombrus chrysurus (Linnæus) Gill.—*Bumper; Casabe.*

Scomber chrysurus L., Syst. Nat. (Charleston, S. C.).
Micropteryx chrysurus Günther, ii, 460.
Chloroscombrus chrysurus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 437; Jordan & Gilbert, Syn. Fish. N. A., 441.
Scomber chloris Bloch, Ichth., taf. 339.
Micropteryx cosmopolita Agass., Spix, Pisc. Bras., 104.
Seriola cosmopolita C. & V., ix, 219, pl. 256, and of authors.
Chloroscombrus cosmopolitus Girard, Proc. Ac. Nat. Sci. Phila., 1858, 168.
Scomber latus Gronov., Syst. ed. Gray, 1856, 127.
Chloroscombrus caribbæus Girard, l. c., 168.

Habitat.—Tropical parts of the Atlantic; Cape Cod to Brazil and Western Africa; abundant in the West Indies.

30. Chloroscombrus stirurus Jordan & Gilbert.

Chloroscomberus stirurus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1883 (Panama).

Habitat.—Pacific coast of tropical America; Magdalena Bay to Panama.

This species represents *C. chrysurus* on the Pacific coast of tropical America. It is very similar to the latter, and will probably be considered as a geographical variety of it when these fishes are better known.

RECAPITULATION.

We have in this paper admitted 30 species of *Caranginæ*. More or less doubt is attached to the nomenclature or systematic position of several of these. We therefore repeat the list here, with the nature of the doubts remaining to be solved in each case. The general distribution of the species is indicated by the letters W. (Western Atlantic), A. (Western Africa), P. (Eastern Pacific, Panama, &c.), E. (East Indies).

Genus 1.—DECAPTERUS.

1. *Decapterus punctatus* (W.).
2. *Decapterus scombrinus* (P.). (Doubtful species; perhaps identical with *D. punctatus.*)
3. *Decapterus sanctæ helenæ* (W.). (Insufficiently described.)
4. *Decapterus hypodus* (P.). (Probably a variety of, or identical with, *D. macarellus.*)
5. *Decapterus macarellus* (W.).

Genus 2.—TRACHURUS. (Perhaps unworthy of retention.)

6. *Trachurus picturatus* (A. P.).
7. *Trachurus saurus* (A. W.). (Name to be retained somewhat questionable.)

Genus 3.—CARANX.

8. *Caranx cramenophthalmus* (A. W. P.). (Originally described from Africa; if American type should prove different it would stand as *C. plumieri.*)
9. *Caranx amblyrhynchus* (W.). (Possibly includes two species—*amblyrhynchus* and *secundus.*)
10. *Caranx atrimanus* (P.).
11. *Caranx vinctus* (P.).
12. *Caranx leucurus* (P.).
13. *Caranx dentex* (A. W.). (Should perhaps stand as *C. ascensionis.*)
14. *Caranx platessa* (P. E.). (Probably not different from *C. dentex;* possibly the Chilian form is distinct both from *dentex* and *platessa,* and should stand as *C. chilensis.*)
15. *Caranx ruber* (W.). (Name objectionable; possibly more than one species has been included by us. *Cibi, iridinus,* and *beani* are all possibly distinct from *ruber,* but not probably.)
16. *Caranx caballus* (P.). (The name *C. girardi* is of same year; we are not sure which is entitled to priority.)
17. *Caranx chrysus* (W.).
18. *Caranx latus* (W. P. E.). (Name to be adopted not definitely settled, some other names of more or less doubtful application being older.)
19. *Caranx hippos* (W. P. E. A.).
20. *Caranx lugubris* (W. P. E.).
21. *Caranx melampygus* (P. E.).
22. *Caranx speciosus* (P. E.).
23. *Caranx orthogrammus* (P.). (Possibly identical with *C. ferdau.*)
24. *Caranx otrynter* (P.). (The name *dorsalis* should be retained if the subgenus *Vomer* be recognized as a genus distinct from *Caranx.*)
25. *Caranx crinitus* (W. P.). (Probably identical with *C. ciliaris,* which in turn is probably the young of *C. gallus.*)
26. *Caranx setipinnis* (A. W. P.). (Possibly separable generically from *Caranx;* possibly includes three species, *setipinnis, gabonensis,* and *dorsalis.*)

Genus 4.—SELENE. (Possibly unworthy of retention.)

27. *Selen ærstedi* (P.).
28. *Selene vomer* (W. P.).

Genus 5.—CHLOROSCOMBRUS.

29. *Chloroscombrus chrysurus* (A. W.).
30. *Chloroscombrus stirurus* (P.). (Perhaps to be considered a geographical variety of *C. chrysurus.*)

INDIANA UNIVERSITY, *April* 7, 1883.

NOTE ON THE GENERA OF PETROMYZONTIDÆ.

By DAVID S. JORDAN and CHARLES H. GILBERT.

In the Proceedings of the National Museum for 1882, p. 521, is a review of the genera of Lampreys, by Dr. Gill. In the analysis of the genera several characters not hitherto recognized have been noticed, and the paper is a substantial addition to our knowledge of these animals. The characters drawn from the dentition of the supraoral lamina are, however, unreliable for the distinction of genera. Thus in *Petromyzon* and *Ammocœtes* this lamina is said to be bicuspid, while in *Ichthyomyzon* and *Entosphenus* it is described as tricuspid. In *Petromyzon* and *Entosphenus*, so far as we have noticed, the description given by Professor Gill fully applies. In *Ichthyomyzon* the supraoral lamina is bicuspid in the common species, *I. argenteus*, but tricuspid in *I. castaneus* and *I. hirudo*, species not generically distinct from *I. argenteus*, and whose specific validity, indeed, may be questioned. *Ammocœtes* usually has a broad supraoral lamina, with a tooth at each end, but very often, at least in our common species *A. niger*, there is also a median cusp, as in *Entosphenus*. We have no doubt that *Ammocœtes* (as understood by Dr. Gill) should be generically separated from *Petromyzon*. The characters of *Ichthyomyzon* and of *Entosphenus* are, however, of less importance. The teeth of *Ichthyomyzon* are all essentially as in *Petromyzon*, but proportionately smaller, weaker, and with less developed points and serræ. The same is nearly true of the teeth of *Ammocœtes* in comparison with those of *Entosphenus*. *Petromyzon* and *Entosphenus* are large marine species, ascending fresh waters only to spawn (or occasionally land-locked), while *Ichthyomyzon* and *Ammocœtes* are their respective fresh-water representatives, smaller, weaker, and less specialized. Convenience is probably best served by recognizing all four groups as genera.

INDIANA UNIVERSITY, *April* 8, 1883.

DESCRIPTION OF A NEW MURÆNOID EEL (SIDERA CHLEVASTES) FROM THE GALAPAGOS ISLANDS.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Sidera chlevastes sp. nov. (20385).

Body little elongate, strongly compressed. Head rather small, somewhat compressed. Teeth rather strong, most of them slender and sharp; their edges entire. Teeth of lower jaw uniserial, directed strongly backwards, close set, slightly increasing in size posteriorly; about 14 on each side.

Teeth of upper jaw biserial, for most of its length; the teeth of the

Vol. VII, No. 14. Washington, D. C. Oct. 5, 1883.

inner series longer and depressible, longer than teeth of lower jaw. Vomer with a long, slender, median canine.

Anterior nostril in a moderate tube; posterior without tube, above front of eye. Mouth capable of being completely closed. Tip of lower jaw included. Eye rather large, placed midway between tip of snout and angle of mouth, its length about half that of snout; cleft of mouth about half length of head.

Dorsal fin rather high, beginning well in front of gill opening. Head $2\frac{2}{3}$ in trunk. Head and trunk a little shorter than tail.

Color rather light yellowish brown, with about 20 blackish rings, which are usually about three times the breadth of the interspaces; these rings are somewhat irregular, broadest above, becoming narrow below. They extend over the fins, and are very rarely confluent with each other. Tip of tail black. Head with $3\frac{1}{2}$ rings, which do not meet below. Tip of snout in one ring, the top and front of snout on median line pale.

The typical specimen, 9 inches in length (20385 U. S. Nat. Mus.), was obtained at the Galapagos Islands by Captain Herendeen.

We here use the name *Sidera* for those species of *Muræna* which have the posterior nostrils without tubes and the teeth all sharp. It is, therefore, equivalent to the subgenus *Gymnothorax* of Günther, but as the proper type of *Gymnothorax* Bloch is *Muræna helena* L., the name should not be used for this division.

The species of *Sidera* known from the Pacific coast of America may be thus compared:

a. Dorsal beginning considerably before gill-opening.

b. Body with many broad, blackish rings; teeth entire, those of upper jaw mostly biserial; of lower, uniserial; body strongly compressed..CHLEVASTES.

bb. Body without dark bands or rings; teeth mostly uniserial; body not strongly compressed.

c. Body and fins closely covered with irregular pale spots, around which the dark color forms reticulations; dorsal and anal edged with black; angle of mouth black; larger teeth serrated on posterior margin; head $1\frac{1}{3}$ in trunk.....OCELLATA.*

cc. Body with small yellowish spots; nasal tubes short; teeth entire....DOVII.†

ccc. Body without distinct pale spots or bands.

* *Gymnothorax ocellatus* Agassiz, Spix, Pisc. Bras., 1828, 91. West Indies, Gulf of Mexico, Brazil, Panama? (Günther) (not seen by us on Pacific coast).

† ? *Muræna dorii* Günther, Cat. Fish. Brit. Mus., viii, 103, 1870; *Muræna pintita* Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 346. Mazatlan (Gilbert); Espiritu Santo Island (Belding); Panama (Günther); Galapagos Islands (Herendeen). Two or three species may perhaps be here confounded, but more probably the markings are very variable.

d. Dorsal fin without distinct light or dark margin; head more than one-third trunk; teeth entire.

e. Body dark brown, vaguely reticulated with narrow pale streaks and spots; belly with crosswise streaks of dark; a dark line on each side of base of anal, with short cross-branches; a black blotch on gill-opening; teeth strong ..... MORDAX.*

ee. Body uniform chestnut-brown; no dark spot at gill-opening; sides of mandible with about 18 teeth; body rather stout ..... CASTANEA.†

dd. Dorsal fin with a black margin, its edge narrowly white; anal white-edged; head less than one-third trunk; sides of mandible with about 13 teeth; body slender; size small (?) ..... VERRILLI.‡

aa. Dorsal not beginning before gill-opening; teeth mostly biserial.

f. Color plain brown; dorsal beginning nearly over gill-opening; inner teeth of sides of upper jaw long, slender, close-set; anterior teeth strong, serrate behind; mouth short; about 20 teeth on each side of lower jaw; size small (?) ..... PANAMENSIS.§

ff. Color blackish, with rather distant yellow spots, confluent on the throat; dorsal beginning at end of first third of body (?). Fresh waters (exclusively?) ..... AQUÆ-DULCIS.‖

INDIANA UNIVERSITY, *July* 11, 1883.

DESCRIPTION OF A NEW SPECIES OF RHINOBATUS (RHINOBATUS GLAUCOSTIGMA) FROM MAZATLAN, MEXICO.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Rhinobatus glaucostigma sp. nov.

Rhinobatus productus Streets, Bull. U. S. Nat. Mus., vii, 1877, 55. (Excl. Syn.; not of Ayres. San Bartholomé Bay, Lower California.)

Rhinobatus leucorhynchus Jordan & Gilbert, Bull. U. S. Fish Comm., 1882, 105. (Mazatlan; no descr.; not of Günther.)

Allied to the California species (*Rhinobatus productus* Ayres), and to the Panama species (*Rhinobatus leucorhynchus* Günther), but with the snout shorter than in either and the coloration different.

Disk comparatively long and narrow, the snout produced, but not acutely pointed, the anterior margins being very nearly straight. Greatest width of disk slightly less than its length to end of base of pectorals; length of snout from eye 2½ in length of disk; interorbital width 3½ in snout, a little less than length of eye and spiracle. Spiracle large, rather smaller than eye, with two conspicuous folds on its posterior border. Width of body opposite posterior part of base of ventrals, a little less

* *Muræna mordax* Ayres, Proc. Cal. Acad. Nat. Sci., 1859, 30. Point Conception to Cerros Island.

† *Sidera castanea* Jor. & Gilb., Proc. U. S. Nat. Mus., 1883. Mazatlan (Gilbert).

‡ *Sidera verrilli* Jor. & Gilb., Proc. U. S. Nat. Mus., 1882. Panama (Bradley).

§ *Muræna panamensis* Steindachner, Ichth. Beitr., v, 1876, 19. Panama (Steind.); Pearl Islands (Bradley).

‖ *Muræna aquæ-dulcis*, Hayden's Rept. Geol. Surv. Montana for 1871, 474, 1872. Rio Grande at San José de Costa Rica (Cope). This species is unknown to us.

than length of snout; width of head at front of eye equal to distance from tip of snout to posterior border of orbit. Rostral ridges moderately separated, slowly convergent anteriorly, but remaining separate as far as they can be traced.

Mouth nearly straight, its breadth $2\frac{1}{3}$ in its distance from tip of snout. Length of nostril $1\frac{2}{3}$ in breadth of mouth, its anterior valve narrow, extending but a slight distance towards the inner margin. Vent somewhat nearer tip of snout than base of caudal.

Dorsal fins similar, subequal, separated by an interspace which is $2\frac{3}{4}$ times the length of the first. Distance from posterior root of base of ventrals to first dorsal about equal to length of snout. Sides of tail with a conspicuous fold.

Skin everywhere rough, with a fine, nearly uniform, shagreen. No spines along the rostral cartilages; a row of very small superciliary spines; one or two blunt spines on the shoulder-girdle; a series of low, bluntish spines along the median line of the back, becoming larger and farther apart posteriorly. Females without fimbriated appendage above tip of snout.

Color light olivaceous gray; translucent spaces on each side of snout becoming whitish in spirits, as in related species. Disk with a number of round, clear, slate-colored spots, as large as eye, these arranged symmetrically; one on middle of snout; one at the base of each rostral cartilage; a series of 6 or 7 forming an elliptical figure around each orbit; one at base of each pectoral behind and outside each shoulder. Vertical fins and caudal fold pale. Lower side of disk pale; a large oblong, blackish blotch on lower side of tip of snout, extending backward nearly half way to mouth. Blackish blotches below on edge of base of snout sometimes present.

This species is abundant in the astillero or estuary at Mazatlan, where it is known to the fishermen as "Guitarro." Several specimens were obtained by Professor Gilbert, the largest $2\frac{1}{2}$ feet in length, all of them being females. These are numbered 28205, 28206, 29547, and 29602 on the Museum Register. This species was at first identified by us with *R. leucorhynchus*, but the discovery by Professor Gilbert of the latter species at Panama shows that the Mazatlan form is distinct, although closely related.

The color of *R. glaucostigma* is very peculiar and distinctive. The bluish spots do not disappear in spirits.

INDIANA UNIVERSITY, *April* 25, 1883.

LIST OF DUPLICATE MARINE INVERTEBRATES DISTRIBUTED BY THE UNITED STATES NATIONAL MUSEUM.

SERIES IV.—EDUCATIONAL SERIES NO. 2.

PREPARED BY R. S. TARR, UNDER THE DIRECTION OF RICHARD RATHBUN.

CRUSTACEA.

DECAPODA.

1. **Gelasimus pugnax** Smith.
FIDDLER CRAB.
U. S. F. C.—Wood's Holl, Mass., shore.

2. **Gelasimus pugilator** Latr.
FIDDLER CRAB.
U. S. F. C.—Wood's Holl, Mass., shore.

3. **Platyonichus ocellatus** Latr.
LADY CRAB.
U. S. F. C.—Vineyard Sound, Mass.

4. **Cancer irroratus** Say.
ROCK CRAB.
U. S. F. C.—Vineyard Sound, Mass.

5. **Hyas coarctatus** Leach.
U. S. F. C.—Coast of New England, 45 fath.

6. **Libinia emarginata** Leach.
SPIDER CRAB.
U. S. F. C.—Vineyard Sound, Mass.

7. **Zoeas** and **Megalops** of **Crabs.**
U. S. F. C.—Vineyard Sound, Mass., surface.

8. **Euprognatha rastellifera** Stimp.
U. S. F. C.—Off Martha's Vineyard, Mass., 67 to 79 fath.

9. **Hippa talpoida** Say.
SAND-BUG; BAIT-BUG.
U. S. F. C.—Wood's Holl, Mass., shore.

10. **Eupagurus pollicaris** Stimp.
HERMIT CRAB.
U. S. F. C.—New Haven, Conn.

11. **Eupagurus longicarpus** Stimp.
HERMIT CRAB.
U. S. F. C.—Narragansett Bay, 6 to 12 fath.

12. **Eupagurus bernhardus** Brandt.
HERMIT CRAB.
U. S. F. C.—Cape Cod Bay, Mass., 15 fath.

13. **Eupagurus politus** Smith.
DEEP-SEA HERMIT CRAB.
U. S. F. C.—Off Chesapeake Bay, 300 fath.

14. **Catapagurus sharreri** A. M.-Edw.
DEEP-SEA HERMIT CRAB.
U. S. F. C.—Off Martha's Vineyard, Mass., 120 to 146 fath.

15. **Parapagurus pilosimanus** Smith.
U. S. F. C.—Off Martha's Vineyard, Mass., 319 fath.

16. **Munida**, sp.
U. S. F. C.—Off Martha's Vineyard, Mass., 67 to 71 fath.

17. **Homarus americanus** M.-Edw.
AMERICAN LOBSTER.
U. S. F. C.—Vineyard Sound, Mass.

18. **Cambarus affinis** Erichs.
CRAY FISH.
U. S. F. C.—Potomac River.

19. **Crangon vulgaris** Fabr.
COMMON SHRIMP.
U. S. F. C.—Off Cape Cod, Mass., 26 fath.

20. **Pandalus leptoceros** Smith.
DEEP-WATER PRAWN.
U. S. F. C.—Off Martha's Vineyard, Mass., 46 fath.

21. **Palæmonetes vulgaris** Stimp.
COMMON PRAWN.
U. S. F. C.—Narragansett Bay, R. I., shore.

SCHIZOPODA.

22. **Mysis mixta** Lillje
U. S. F. C.—Cape Cod Bay, Mass., 27 fath.

AMPHIPODA.

23. **Orchestia agilis** Smith.
SAND FLEA; BEACH FLEA.
U. S. F. C.—Newport, R. I., shore.

24. **Talorchestia longicornis** Smith.
LARGE SAND FLEA.
U. S. F. C.—New Haven, Conn., shore.

ISOPODA.

25. **Cirolana concharum** Harger.
U. S. F. C.—Wood's Holl, Mass.

26. Ligia oceanica Fabr.
MARINE SOW BUG.
U. S. F. C.—Newport, R. I., shore.

ENTOMOSTRACA.

27. Artemia gracilis Verrill.
BRINE SHRIMP.
U. S. F. C.—New Haven, Conn.

CIRRIPEDIA.

28. Lepas anatifera Linné.
GOOSE BARNACLE.
U. S. F. C.—Off Martha's Vineyard, Mass., surface.

29. Balanus balanoides Stimp.
ROCK BARNACLE; ACORN SHELL.
U. S. F. C.—New Haven, Conn., shore.

ANNELIDA.

CHÆTOPODA.

30. Lepidonotus squamatus Kinb.
U. S. F. C.—Buzzard's Bay, Mass.

31. Lætmatonice armata Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 225 to 319 fath.

32. Nereis virens Malmg.
CLAM WORM; BAIT WORM.
U. S. F. C.—Southern New England, shore.

33. Hyalinœcia artifex Verrill.
DEEP-SEA TUBE-DWELLING WORM.
U. S. F. C.—Off Martha's Vineyard, Mass., 250 fath.

34. Hyalinœcia artifex Verrill.
TUBES ONLY.
U. S. F. C.—Off Martha's Vineyard, Mass., 250 fath.

35. Euglycera dibranchiata Verrill.
U. S. F. C.—Southern New England, shore.

36. Chætopterus pergamentaceus.
U. S. F. C.—Wood's Holl, Mass., shore.

37. Chætopterus pergamentaceus.
TUBES ONLY.
U. S. F. C.—Wood's Holl, Mass., shore.

38. Trophonia affinis Verrill.
U. S. F. C.—Narragansett Bay, R. I., 10 to 20 fath.

39. Cirratulus grandis Verrill.
U. S. F. C.—Southern New England, shore.

40. Potamilla reniformis Malmg.
U. S. F. C.—Vineyard Sound, Mass.

41. Spirorbis borealis Daud.
U. S. F. C.—Wood's Holl, Mass.

GEPHYREA.

42. Phascolosoma Gouldii Dies.
SIPUNCULOID WORM.
U. S. F. C.—Wood's Holl, Mass., shore.

43. Phascolion Strombi Theel.
SIPUNCULOID WORM.
U. S. F. C.—Off Newport, R. I., 12 to 19 fath.

CHÆTOGNATHA.

44. Sagitta elegans Verrill.
U. S. F. C.—Vineyard Sound, Mass., surface.

MOLLUSCA.

CEPHALOPODA.

45. Loligo Pealei Lesueur.
SQUID.
U. S. F. C.—Southern coast New England.

46. Loligo Pealei Lesueur.
SQUID (EGGS).
U. S. F. C.—Southern coast New England.

GASTROPODA.

47. Buccinum undatum Linné.
WHELK.
U. S. F. C.—New England coast.

48. Fulgur carica Conrad.
PERIWINKLE.
U. S. F. C.—Vineyard Sound, Mass.

49. Sycotypus canaliculatus Gill.
PERIWINKLE.
U. S. F. C.—Vineyard Sound, Mass.

50. Tritia trivittata H. & A. Adams.
U. S. F. C.—Buzzard's Bay, Mass.

51. Ilyanassa obsoleta Stimp.
BLACK MUD-SNAIL.
U. S. F. C.—Newport, R. I., shore.

52. Urosalpinx cinera Stimp.
U. S. F. C.—Wood's Holl, Mass., shore.

53. Purpura lapillus Lam.
PURPLE SEA SNAIL.
U. S. F. C.—Wood's Holl, Mass., shore.

54. Lunatia heros H. & A. Adams.
SEA SNAIL.
U. S. F. C.—Vineyard Sound, Mass.

55. Neverita duplicata Stimp.
SEA SNAIL.
U. S. F. C.—Vineyard Sound, Mass.

56. Littorina littorea Menke.
PERIWINKLE.
U. S. F. C.—Wood's Holl, Mass., shore.

57. Littorina palliata Gould.
U. S. F. C.—Wood's Holl, Mass., shore.

58. Littorina rudis Gould.
U. S. F. C.—Wood's Holl, Mass., shore.

59. Bittium nigrum Stimp.
U. S. F. C.—Wood's Holl, Mass., shore.

60. Crepidula fornicata Lam.
BOAT SHELL; DOUBLE DECKER.
U. S. F. C.—Buzzard's Bay, Mass.

61. Acmæa testudinalis Han.
LIMPET.
U. S. F. C.—Eastport, Me., shore.

62. Melampus lineatus Say.
SALT MARSH SNAIL.
U. S. F. C.—Newport, R. I., shore.

63. Pleurobranchia tarda Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 100 to 124 fath.

LAMELLIBRANCHIATA.

64. Ensatella americana Verrill.
RAZOR SHELL.
U. S. F. C.—Long Island Sound shore.

65. Mya arenaria Linné.
LONG CLAM.
U. S. F. C.—Wood's Holl, Mass., shore.

66. Clidiophora trilineata Carp.
U. S. F. C.—Buzzard's Bay, Mass.

67. Callista convexa H. & A. Adams.
U. S. F. C.—Narragansett Bay, R.I.

68. Tottenia gemma Perkins.
U. S. F. C.—Provincetown, Mass., shore.

69. Cyprina islandica Lam.
U. S. F. C.—Off Newport, R. I.

70. Nucula proxima Say.
U. S. F. C.—Southern coast New England.

71. Scapharca transversa Ad.
U. S. F. C.—Buzzard's Bay, Mass.

72. Mytilus edulis Linné.
COMMON MUSSEL.
U. S. F. C.—Buzzard's Bay, Mass.

73. Modiola plicatula Lam.
RIBBED MUSSEL.
U. S. F. C.—Wood's Holl, Mass., shore.

74. Pecten irradians Lam.
COMMON SCOLLOP.
U. S. F. C.—Southern coast New England.

75. Pecten tenuicostatus Mighels.
SMOOTH SCOLLOP.
U. S. F. C.—Off Martha's Vineyard, Mass., 46 fathoms.

76. Pecten tenuicostatus Mighels.
SMOOTH SCOLLOP.
U. S. F. C.—Off Martha's Vineyard, Mass.

77. Anomia glabra Verrill.
SILVER-SHELL; GOLD-SHELL; JINGLE-SHELL.
U. S. F. C.—Southern coast New England.

TUNICATA.

78. Molgula manhattensis Verrill.
U. S. F. C.—Southern coast New England, shore.

79. Halocynthia partita Verrill.
U. S. F. C.—Wood's Holl, Mass., shore.

80. Boltenia Bolteni Linné.
STEMMED SEA-PEACH.
U. S. F. C.—Eastport, Me.

81. Botryllus Gouldii Verrill.
U. S. F. C.—Wood's Holl, Mass.

82. Perophora viridis Verrill.
U. S. F. C.—Wood's Holl, Mass.

83. Amorœcium pellucidum Verrill.
U. S. F. C.—Vineyard Sound, Mass.

84. Amorœcium constellatum Verrill.
U. S. F. C.—Vineyard Sound, Mass.

85. Amorœcium stellatum Verrill.
U. S. F. C.—Wood's Holl, Mass.

86. Leptoclinum albidum Verrill.
U. S. F. C.—Vineyard Sound, Mass.

87. Salpa Caboti Desor.
U. S. F. C.—Vineyard Sound, Mass., surface.

88. Salpa, sp. (large species).
U. S. F. C.—Off Martha's Vineyard, Mass., surface.

MOLLUSCOIDA.

POLYZOA.

89. Cellularia ternata Johnston.
U. S. F. C.—Off Cape Cod, Mass., 18 fath.

90. Gemellaria loricata Busk.
U. S. F. C.—Off Cape Cod, Mass., 24 to 30 fath.

91. Bugula turrita Verrill.
U. S. F. C.—Narragansett Bay, R. I., 4 to 6 fath.

92. Electra pilosa Fisch.
U. S. F. C.—Southern coast New England.

93. Discopora nitida Verrill.
U. S. F. C—Vineyard Sound, Mass.

ECHINODERMATA.

HOLOTHURIOIDEA.

94. Thyone Briareus Selenka.
SEA CUCUMBER.
U. S. F. C.—Wood's Holl, Mass., shore.

95. Leptosynapta Girardii Verrill.
U. S. F. C.—Wood's Holl, Mass., shore.

ECHINOIDEA.

96. Strongylocentrotus dröbachiensis A. Ag.
COMMON SEA-URCHIN; SEA EGG.
U. S. F. C.—Off Newport, R. I.

97. Arbacia punctulata Gray.
PURPLE SEA-URCHIN.
U. S. F. C.—Vineyard Sound, Mass.

98. Echinarachnius parma Gray.
SAND DOLLAR.
U. S. F. C.—Off Martha's Vineyard, Mass., 26 fath.

ASTERIOIDEA.

99. Asterias Forbesii Verrill.
COMMON STAR-FISH.
U. S. F. C.—Vineyard Sound, Mass.

100. Leptasterias compta Verrill.
U. S. F. C.—Off Newport, R. I., 27 fath.

101. Ctenodiscus crispatus D. & Kor.
VELVET STAR.
U. S. F. C.—Massachusetts Bay.

102. Archaster americanus Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 89 to 202 fath.

103. Odontaster hispidus Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 89 fath.

OPHIUROIDEA.

104. Ophiopholis aculeata Gray.
VARIEGATED SERPENT-STAR.
U. S. F. C.—Off Martha's Vineyard, Mass., 146 fath.

105. Amphiura macilenta Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 63 fath.

106. Ophiocantha millespina Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 234 fath.

107. Ophioglypha Sarsii Lyman.
SARS' SERPENT-STAR.
U. S. F. C.—Off Martha's Vineyard, Mass. 46 to 100 fath.

108. Ophioglypha Sarsii Lyman.
SARS' SERPENT-STAR.
U. S. F. C.—Off Martha's Vineyard, Mass.

109. Astrophyton Agassizii Stimp.
BASKET-FISH.
U. S. F. C.—Off Cape Cod, Mass.

CRINOIDEA.

110. Antedon dentatum Verrill.
FEATHER STAR.
U. S. F. C.—Off Martha's Vineyard, Mass., 146–183 fath.

CŒLENTERATA.

ANTHOZOA.

111. Pennatula aculeata Dan.
SEA FEATHER.
U. S. F. C.—Off Martha's Vineyard, Mass., 207 fath.

112. Acanella Normani Verrill.
JOINTED BUSH CORAL.
U. S. F. C.—Off Martha's Vineyard, Mass., 200 fath.

113. Metridium marginatum Ed. and H.
COMMON SEA-ANEMONE.
U. S. F. C.—Newport, R. I., shore.

114. Urticina nodosa Verrill.
WARTY SEA ROSE.
U. S. F. C.—Off Martha's Vineyard, Mass., 192 to 245 fath.

115. Bolocera Tuediæ Gosse.
SEA ROSE.
U. S. F. C.—Off Martha's Vineyard, Mass., 245 fath.

116. Sagartia abyssicola Verrill.
DEEP-WATER SEA ROSE.
U. S. F. C.—Off Martha's Vineyard, Mass., 164 to 229 fath.

117. Epizoanthus paguriphila Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 319 fath.

118. Epizoanthus americanus Verrill.
U. S. F. C.—Off Martha's Vineyard, Mass., 193 fath.

HYDROIDEA.

119. Obelia geniculata Hincks.
U. S. F. C.—Off Martha's Vineyard, Mass., 97 fath.

120. Sertularella polyzonias Gray. (Var.)
U. S. F. C.—Off Cape Cod, Mass., 27 fath.

121. Sertularella tricuspidata Hincks.
U. S. F. C.—Off Cape Cod, Mass., 18 fath.

122. Globiceps tiarella Ayres.
U. S. F. C.—Buzzard's Bay, Mass.

PORIFERA.

123. Cliona sulphurea Verrill.
BORING SPONGE.
U. S. F. C.—Vineyard Sound, Mass.

124. Microciona prolifera Verrill.
RED SPONGE; OYSTER SPONGE.
U. S. F. C.—Vineyard Sound, Mass.

THE LIFE COLORS OF CREMNOBATES INTEGRIPINNIS.

By ROSA SMITH.

The type specimens of this species were described (Proc. U. S. Nat. Mus., 1880, 147) after the color markings were changed from immersion in alcohol. The following description is made from two living examples: Ground color, light purplish brown; top of head and snout, greenish yellow; a broad streak of coralline pink, closely resembling the color of *Callithamnion heteromorphum*, from eye across cheek and opercles; the base of the pectoral fin is of this color, outlined by a black crescent, beyond which the tips are transparent and pale green, dotted with black. On the side of body below lateral line are three orange-colored, nearly circular blotches, the anterior one overlapped but not entirely covered by the tips of the pectoral, the first spot equaling or larger than the orbit, the two posterior ones somewhat smaller. Dorsal fin with eight nearly square purple spots, alternating with lighter spaces of similar size and shape; the seventh dark dorsal spot is a green ocellus (black in the preserved specimen) encircled with a narrow ring of orange color and surrounded with very dark green, the ocellus covering the twenty-fourth, twenty-fifth, and twenty-sixth dorsal spines. The lips are pale green. A white dot at base of occipital tentacle as large as pupil; minute white dots along lateral line from its origin to the pointof curvature, and a larger white dot close under the twenty-first or twenty-second dorsal spine. Anal fin marked with dark spots similarly to the dorsal and narrowly margined with white. Caudal transparent, pale green, dotted with black. Ventrals obscurely barred with black. Ventral surface lighter than sides of body.

Lower rays of pectorals projecting beyond membrane, the upper rays much less projecting.

Beginning of anal fin a little nearer tip of snout than base of caudal.

The number of fin rays and all other characters agree with the original description.

One of the present examples was taken February 6, 1883, with a dip-net, from a shallow tide pool about 4 by 6 feet in diameter, two or three miles distant from the locality where this species was discovered. The floor of the pool was of sand and no pools intervened between it and the sand beach, so that this one would be unsurrounded with water at

every medium low tide. *Plocamium*, coralline, and other algæ, as well as *Zostera*, were growing on sides and bottom of the pool. Total length, $2\frac{1}{8}$ inches.

A specimen, larger ($2\frac{1}{4}$ inches total length) than either of the type specimens, was collected at the first-known habitat on the 17th instant. It was in a large, deep pool, where the water was frequently changed by the breaking of the surf, under a heavy growth of "eel-grass" and sea-weeds. In addition to the species first found in company with *Cremnobates*, an adult example of *Heterostichus rostratus* (Grd.) was taken. This fine specimen of *Cremnobates* was brought a distance of 12 miles in about a pint of sea water, and lived 28 hours after it was captured.

San Diego, Cal., *April* 18, 1883.

NOTE ON THE OCCURRENCE OF GASTEROSTEUS WILLIAMSONI GRD., IN AN ARTESIAN WELL AT SAN BERNARDINO, CAL.

By ROSA SMITH.

Length, $1\frac{3}{5}$ inches to base of caudal. Head, $2\frac{1}{5}$ in length; depth, $3\frac{1}{5}$; eye, 3 in head.

Dorsal spines rather short; very slightly serrate; ventral spines reaching tip of pubic bone, serrate on both edges. The single specimen is so badly dried and decayed as to render it impossible to count the soft rays of any of the fins except the pectoral; the caudal fin is mostly broken off, and the anal spine is not discernible; the second dorsal spine has come off and the third is very small. Pectoral rounded, of 10 rays. The color is, of course, dark brown from drying. Some dark punctulations are seen, with a magnifying glass, on anterior part of body. Top of head, scapula, and suborbital bones, granulate; opercles, striate. The pubic process, extending upward from ventral to middle of the side, is perpendicularly striate.

After having become thoroughly dried the specimen was given to Mr. W. G. Wright, of San Bernardino, who preserved it in spirits. It is said to have emerged from the pipe of an artesian well from a depth of 191 feet. Mr. Wright informs me that the pipe is so situated as to make it impossible for any one to have placed the fish in the pipe, as, after rising from the well 9 feet from the ground surface, the pipe is returned underground and runs horizontally a distance of 50 feet and then feeds a tank inside a building, the supposition being that the fish found its way into the well from some subterranean stream.

The specimen has been presented to the United States National Museum.

The species is evidently a true *Gasterosteus* and not an "*Eucalia*." It is closely related to *G. microcephalus*, but lacks the lateral plates of that species.

San Diego, Cal., *April* 21, 1883.

LIST OF THE CRUSTACEA DREDGED ON THE COAST OF LABRADOR BY THE EXPEDITION UNDER THE DIRECTION OF W. A. STEARNS, IN 1882.

By SIDNEY I. SMITH.

The collection, the crustacea from which are here enumerated, was made in August, 1882, by an expedition under the direction of Mr. W. A. Stearns. The dredgings, which were all in shallow water, were made by Messrs. Stearns, B. S. Barrows, Edwin R. Flint, J. A. Allen, and Charles L. Flint, jr. The collection was made at different points along the coast from Forteau Bay to Dead Island. The principal localities are: Forteau Bay, about north latitude 51° 39′, west longitude 56° 55′; L'anse au Loup, about 51° 33′ and 56° 48′; Temple Bay, about 52° 2′ and 55° 55′; Henley Harbor, near the mouth of Temple Bay; Fox Harbor, on Saint Lewis Sound; and Dead Island, near Square Island, about 52° 48′ and 55° 48′. A part of the specimens were sent to the Museum of Yale College by Messrs. Barrows and Allen, of the Sheffield Scientific School, and the rest were sent to the National Museum by Mr. Stearns. Both parts of the collection are combined in the following list.

The preparation of this list has involved a more or less critical examination of the lists of crustacea of the same region given by Professor Packard, and, having had access to a set of the specimens upon which Professor Packard's work was based, I have attempted to revise the marine crustacea of his lists, and have embodied this revision in a catalogue of all the species known from the Labrador coast, which is given in the paper following the present list.

BRACHYURA.

Hyas araneus Leach.

Forteau Bay	20 fm	11 young.
L'anse au Loup	15 fm., sand	1 ♂, 1 ♀, large, and 8 small.
Henley Harbor	shallow water	1 ♂, 1 ♀, large.

Hyas coarctatus Leach.

Henley Harbor	8 fm	1 large ♂.
Henley Harbor	shoal water	1 large ♀, 2 small.
Temple Bay		1 large ♀.

ANOMURA.

Eupagurus pubescens Brandt.

L'anse au Loup	10 fm	1 large, 4 small.
L'anse au Loup	15 fm	3 small.
Henley Harbor	shoal water	2 large and small.
Temple Bay	10 fm	1 small.
Fox Harbor	3 fm., sand	1.
Dead Island	1–3 fm., rocky	1 large.

Eupagurus Kröyeri Stimpson.

Henley Harbor	3–8 fm	2 small.
Henley Harbor	10–15 fm	3 small.
Temple Bay	10 fm., rocky	4 small.
Dead Island	nullipore	1 small.

MACRURA.

Ceraphilus boreas Kinahan (*Crangon borcas* Fabricius).

L'anse au Loup	8–10 fm	3 ♀.
Henley Harbor		3 ♀.
Dead Island	1–3 fm., rocky	1 ♀.

Nectocrangon lar Brandt.

Henley Harbor	10 fm	1 ♀
Dead Island	nullipore	1 small.

Hippolyte Fabricii Kröyer.

Fonteau Bay	20 fm	5 young.
L'anse au Loup	rocky	6 small.
L'anse au Loup	15 fm., sand	2.
Henley Harbor	10–15 fm	4 small.
Fox Harbor	1 fm	2 ♂, 1 ♀.
Dead Island	3 fm	1 ♀.

The female from Fox Harbor has well-developed epipods on each of the second pair of legs. This specimen, which is normal in other respects, gives the following measurements: Length, 51^{mm}; length of carapax, including rostrum, 19.2; rostrum, 9.3; antennal scale, 9.1; sixth somite of abdomen, 6.6; telson, 8.4.

Hippolyte Gaimardii Milne-Edwards.

L'anse au Loup	11 and 15 fm	3 young.
L'anse au Loup	8 fm., rocky	5 large ♀, 3 ♂, 2 young.
Henley Harbor	10 fm	2 large ♀, 1 with eggs.

The female carrying eggs is 58^{mm} long and has the rostral formula $\frac{3+6}{3}$. One of the males from L'anse au Loup, 34^{mm} long, and with the rostral formula $\frac{3+3}{4}$, has a well-marked laterally compressed dorsal prominence on the third somite of the abdomen. A larger male from the same place, 37^{mm} long and with the rostral formula $\frac{3+3}{6}$, has the prominence much more conspicuous and approximating closely to the Kröyer's figure of *Hippolyte gibba*, which is undoubtedly only the adult form of the male of *H. Gaimardii*, as it has been regarded by Goës.

Hippolyte spinus White.

Henley Harbor (*a*)	shoal water	1 ♂, large.
Henley Harbor (*b*)	10–15 fm	1 large ♂, 2 ♀.
Temple Bay (*c*)	rocky	1 large ♂.

The three males and one of the females give the following measurements in millimeters:

Locality	*a.*	*b.*	*c.*	*b.*
Sex	♂	♂	♂	♀
Length	56	52	46	46
Length of carapax including rostrum	20.1	20.0	15.7	15.1
Length of rostrum	8.9	9.9	7.3	6.7
Length of antennal scale	8.3	8.4	7.0	6.6
Length sixth somite of abdomen	6.2	6.0	5.4	4.8
Length of telson	10.4	10.3	8.5	7.9

Hippolyte Phippsii Kröyer.

L'anse au Loup ..... 8 fm. .... 1 ♀.

Hippolyte polaris Ross.

Dead Island, 3 fathoms, seaweed—eight females, all carrying eggs. All the specimens have the dorsal edge of the rostrum just as in *H. Fabricii*, that is, wholly unarmed except near the base, nearly straight, and horizontal. Although all the specimens are rather large, seven of them have only three teeth on the dorsal crest, two on the carapax, and one on the rostrum, while the other specimen has but four teeth in all. Two of the specimens have a well-developed epipod at the base of one of the third pair of legs, one has a well-developed epipod at the base of each of the third pair of legs, while the other specimens are, as usual, without epipods at the bases of the third pair of legs. In other respects the specimens are normal. These characters, with the length, are shown for each specimen in the following table:

Length.	Rostral formula.	Legs of third pair.
mm.		
45	$\frac{2+1}{3}$	No epipods.
45	$\frac{2+1}{2}$	Epipod on right side.
46	$\frac{2+1}{3}$	No epipods.
47	$\frac{2+1}{3}$	Do.
48	$\frac{2+1}{3}$	Do.
48	$\frac{2+1}{2}$	Do.
57	$\frac{2+1}{3}$	Epipod each side.
59	$\frac{2+2}{3}$	Epipod on right side.

Four of the specimens give the following measurements in millimeters:

Length	46	48	57	59
Length of carapax including rostrum	17.1	17.0	21.5	22.7
Length of rostrum	7.8	8.6	10.4	10.9

Length of antennal scale	7.0	6.8	9.1	9.4
Length of sixth somite of abdomen	5.0	4.9	6.7	6.8
Length of telson	7.4	7.1	9.0	9.5

Hippolyte Grœnlandica Miers.

L'anse au Loup	10 to 15	1 ♀, 1 young.
Fox Harbor	1 fm	1 ♀
Dead Island	1–4 fm	11 ♂, ♀, young.

Pandalus Montagui Leach.

Forteau Bay	20 fm	1 young.
L'anse au Loup	8–15 fm	11, all small.
Temple Bay	rocky	3, all small.
Temple Bay	10 fm	1, small.

SCHIZOPODA.

Mysis oculata Kröyer.

A few fragments from Dead Island.

CUMACEA.

Diastylis Rathkii Bate.

Fox Harbor, 3 fathoms, sand; abundant.

AMPHIPODA.

Hyperia medusarum Bate.

Dead Island, 1 specimen.

Anonyx nugax Miers.

Henley Harbor	10–15 fm	1, imperfect.
Fox Harbor	3 fm	1, young.

Orchomene minutus Boek.

Henley Harbor, 10–15 fm., 1 specimen.

Pontoporeia femorata Kröyer.

Fox Harbor, 1–4 fm., 2 specimens.

Phoxus Holbölli Kröyer.

L'anse au Loup, 15 fm., 1 specimen.

Acanthozone cuspidata Boeck.

Temple Bay, 10 fm., 1 specimen.

Acanthonotozoma serratum Boeck.

Dead Island, shallow water, 1 specimen.

Acanthonotozoma inflatum Boeck.

L'anse au Loup, 8 fm., rocky, 1 specimen.

Œdiceros lynceus M. Sars.

Forteau Bay	20 fm	10 specimens.
L'anse au Loup	15 fm	6 specimens.
Henley Harbor	10–15 fm	4 specimens.
Temple Bay	10 fm	2 specimens.

Pleustes panoplus Bate.

L'anse au Loup, 10 fm., 1 specimen.

Gammaras locusta Fabricius.

Fox Harbor, 1–4 fm., abundant.

Melita dentata Boeck.

Henley Harbor	10–15 fm	2 specimens.
Temple Bay	10 fm	1 specimen.

Rhachotropis* **aculata** Lepechin sp.

Henley Harbor	10–15 fm	4
Temple Bay	10 fm	1

Ampelisca macrocephala Lilljeborg.

L'anse au Loup	10 fm	1
Henley Harbor	10–15 fm	2

Byblis Gaimardii Kröyer.

Henley Harbor	10–15 fm	1
Temple Bay		2
Dead Island	2–4 fm	1

Caprella septentrionalis Kröyer.

Henley Harbor, 1 specimen.

ISOPODA.

Phryxus abdominalis Lilljeborg (Kröyer).

L'anse au Loup, one specimen on a female *Hippolyte Gaimardii.*

Jæra albifrons Leach.

Fox Harbor, one specimen.

COPEPODA.

Lernæa branchialis Linn, var. **sigmoidea** Steenstrup and Lütken.

One specimen.

CIRRIPEDIA.

Balanus crenatus Bruguière.

L'anse au Loup, 10 fm.

RHIZOCEPHALA.

Peltogaster paguri Rathke.

Henley Harbor, one specimen on *Eupagurus pubescens* from shallow water.

NEW HAVEN, CONN., *May* 1, 1883.

---

* Ῥάχις et τρόπις, nom. nov., vice *Tritropis* Boeck, præoc.

REVIEW OF THE MARINE CRUSTACEA OF LABRADOR.

By SIDNEY I. SMITH.

Almost the only source of information in regard to the crustacean fauna of the coast of Labrador has been Professor Packard's "A list of the animals dredged near Caribou island, southern Labrador, during July and August, 1860" (Canadian Naturalist and Geologist, viii, pp. 401–429 (1–29), December, 1863), and his "View of the recent invertebrate fauna of Labrador" (Memoirs Boston Soc. Nat. Hist., i, pp. 262–303, pll. 7, 8, 1867). At the time these papers were written it was exceedingly difficult in this country to identify the marine invertebrata of our northern coast, and the lists of crustacea given by Professor Packard were necessarily very imperfect; the species described as new had apparently all been previously described by European authors; the identifications were in many cases incorrect; and in several cases the same species appears under different names. Of this last class of errors several are due to the fact that some of the Amphipoda were identified for Professor Packard by Dr. Axel Boeck, others were determined by comparison with Arctic specimens from Dr. Lütken, of Copenhagen, while still others were determined from the published descriptions by American and European authors. In the following pages I have attempted not only to revise Professor Packard's lists, but also to give a complete catalogue of all the species known from the Labrador coast. In determining Professor Packard's species I have been greatly aided by a set of his specimens collected in 1864 and labeled by him for the Museum of Yale College. This collection has enabled me to determine many of the species enumerated by Professor Packard which were otherwise indeterminable, and also to add a number of species overlooked or incorrectly determined by him. The nomenclature adopted for the Amphipoda is mainly that of Boeck (Skandinaviske og Arktiske Amphipoder), and for the Isopoda that of Harger (Marine Isopoda of New England, Report U. S. Fish Com., part iv, for 1878). I have not attempted to give synonymy except to show to what species the names in Professor Packard's lists are referred, but I have intended to insert references to all the names of marine species in each of his lists. For the distribution of the species along the Labrador coast I have thought it sufficient to indicate only whether the species has been found on the Gulf or Atlantic coast, or on both coasts, and for this purpose I arbitrarily divide the coast at 51° 50′ north latitude, a little south of Chateau and Temple Bays, regarding all south and west of this point as Gulf coast and all north of it as Atlantic coast. When not otherwise indicated the regions from which I have examined specimens are followed by a mark of affirmation (!).

BRACHYURA.

Cancer irroratus Say.

Cancer borealis Packard, Canadian Nat. and Geol., viii, pp. 402 (2), 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 303, 1867.

Straits of Belle Isle! (Packard). Packard also says that he was informed that it was found at Hamilton Inlet.

Chionœcetes opilio Kröyer.

Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863 (*Chionoecetes*); Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Straits of Belle Isle, 10 to 50 fathoms and Chateau Bay, 30 to 50 fathoms (Packard). Young specimens sent to the museum of Yale College by Packard are labeled "Henley Harbor."

Hyas araneus (Linn.).

Packard, Canadian Nat. and Geol., viii, pp. 419 (19), 425 (25), 1863 (*aranea*); Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867 (*aranea*).

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

Hyas coarctatus Leach.

Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863 (*coarctata*); Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867 (*coarctata*).

Gulf coast! (Packard); Atlantic coast! (Packard, Stearns exped.).

ANOMURA.

Eupagurus pubescens Kröyer (Brandt).

Packard, Canadian Nat. and Geol., viii, 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

Eupagurus Kröyeri Stimpson.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867. Whole coast (Packard); Atlantic coast! (Stearns exped.).

MACRURA.

Homarus Americanus Milne-Edwards.

Packard, Canadian Nat. and Geol., viii, pp. 402 (2), 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast, and rare at Henley Harbor (Packard).

Ceraphilus boreas Kinahan (Phipps).

Crangon boreas Fabricius (Phipps).—Packard, Canadian Nat. and Geol., viii, p. 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

Vol. VI, No. 15. Washington, D. C. Oct. 25, 1883.

Crangon vulgaris Fabricius (Linn.).

Packard, Canadian Nat. and Geol., viii, p. 425, 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Caribou Island, Straits of Belle Isle (Packard).

Sabinea septemcarinata Ross (Sabine).

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Atlantic coast (Packard).

Nectocrangon lar Brandt (Owen).

Argis lar Packard, Canadian Nat. and Geol., viii, pp. 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Atlantic coast! (Packard, Stearns exped.).

Hippolyte Fabricii Kröyer.

Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast! (Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

Hippolyte Gaimardii Milne-Edwards.

Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867 (*Gaimardi*).

Gulf and Atlantic coasts! (Packard, Stearns exped.).

Hippolyte spinus White (Sowerby).

Hippolyte spini Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863 (Caribou Island).

Hippolyte Sowerbyi Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867 (Square Island).

Gulf coast (Packard); Atlantic coast! (Packard, Stearns exped.).

Hippolyte Phippsii Kröyer.

Hippolyte Phippsii Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867 (Domino Harbor).

Hippolyte turgida Packard, loc. cit., p. 301, 1867 (Straits of Belle Isle).

Gulf coast! (Steans exped.); Atlantic coast (Packard).

Hippolyte macilenta Kröyer.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Atlantic coast! (Packard).

Hippolyte polaris Ross (Sabine).

Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast (Packard); Atlantic coast! (Packard, Stearns exped.). Only one specimen from Labrador was sent to the Museum of Yale Col-

lege by Packard. This specimen, a female 31mm long, differs from ordinary specimens in having the tip of the telson armed with five median ciliated spines, with two stout spines each side, making nine in all.

Hippolyte Grœnlandica Miers (J. C. Fabricius).

Hippolyte aculeata Packard, Canadian Nat. and Geol., viii, p. 424, 1863; Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

Pandalus Montagui Leach.

Pandalus annulicornis Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast! and Atlantic coast! (Packard, Stearns exped.).

SCHIZOPODA.

Mysis oculata Kröyer (O. Fabricius).

Mysis spinulosus Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863.
Mysis oculata Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

"Abundant along the whole coats" (Packard); Atlantic coast! (Stearns exped.).

CUMACEA.

Diastylis Rathkii Bate (Kröyer).

Alauna Goodsiri Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast! (Packard); Atlantic coast! (Packard, Stearns exped.).

PHYLLOCARIDA.

Nebalia bipes Fabricius.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Atlantic coast (Packard).

AMPHIPODA.

Hyperia medusarum Bate (Müller).

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Atlantic coast! (Packard, Stearns exped.). I have not seen Packard's specimens. He quotes as a synonym "*Metœcus medusarum* (Fabr.) Kr.," which is not an *Hyperia*, but the Greenlandic *Tauria medusarum* Boeck, which may possibly be the species to which Packard's specimens belong.

Anonyx nugax Miers (Phipps).

Anonyx ampulla Kröyer, Naturh. Tidssk. II, i, p. 578, 1844.
"*Anonyx ampulla* (Phipps), Voyage, 1873", Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.
Anonyx lagena Packard, loc. cit., p. 300.
Lysianassa appendiculata [*appendiculosa*] Packard, loc. cit., p. 301.

Atlantic coast! (Packard, Stearns exped.).

Cancer ampulla Phipps, was supposed by Kröyer to be this species, but it really belongs to Kröyer's genus *Siegoccphalus*, and is *S. ampulla*

Bell (*S. inflatus* Kröyer); so that it might appear doubtful what species Packard included under "*Anonyx ampulla* (Phipps)" were it not that he says that it was "compared with arctic specimens received from Copenhagen," which seems to leave no doubt that he really had in view *Anonyx nugax*, although he subsequently, as indicated above, enumerates this same species under two other names.

Anonyx pumulus Lilljeborg.

"*Anonyx producta*, fide Boeck," Packard, Mem. Bost. Soc. Nat. Hist., p. 301, 1867.

I have seen no specimens. The species is placed immediately after "*Anonyx Horringii*" by Packard, who says only "these two forms were found together in fifteen fathoms, sand," although under the first of the two species he has nothing except the remark, "A common form, occurring abundantly on the coast of Maine, in Casco Bay, ten fathoms."

Onisimus Edwardsii Boeck (Kröyer).

Atlantic coast! (Packard's collection.) This species is not mentioned by Packard, but a single specimen of it was sent, with *Anonyx nugax*, by him to the Museum of Yale College. In the form of the epimeron of the third somite of the abdomen, however, this specimen does not agree fully with Kröyer's figure in the Voyages en Scandinavie, nor with Boeck's diagnosis, but with Miers's description and figure (Ann. Mag. Nat. Hist., IV, xx, p. 99, 1877), the acute postero-lateral angle of the epimeron being slightly upturned.

Orchomene minutus Boeck (Kröyer).

Atlantic coast! (Stearns exped.). Not mentioned by Packard, but all the specimens sent to the Museum of Yale College as "*Anonyx Hörringii*" are apparently of this species, which occurs upon the New England coast, and is sometimes very abundant in Vineyard Sound in winter.

Tryphosa Höringii Boeck.

? "*Anonyx Hörringii*, fide Boeck," Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300.

Boeck undoubtedly had specimens of this species from Packard's collection, for he (Skandinaviske og Arktiske Amphipoder, p. 184) distinctly mentions it as having been found in Labrador by Packard, but, as just noticed, all the specimens sent by Packard under the above name to the Museum of Yale College belong to Boeck's genus *Orchomene*, so that it is very doubtful if the "common form, occurring abundantly on the coast of Maine," was the same species as the specimens sent to Boeck.

Pontoporea femorata Kröyer.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Gulf coast! (Packard); Atlantic coast! (Stearns exped.).

Phoxus Holbölli Kröyer.

Gulf coast! (Stearns exped.).

Acanthozone cuspidata Boeck (Lepechin)

Gulf coast! (Stearns exped.).

Acanthonotozoma serratum Boeck (O. Fabricius).

Atlantic coast! (Stearns exped.).

Acanthonotozoma inflatum Boeck (Kröyer).

Gulf coast! (Stearns exped.).

Œdiceros lynceus M. Sars.

Monoculodes nubilatus Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, pl. 8, fig. 4, 1867.

Gulf coast! (Stearns exped., Packard); Atlantic coast! (Packard, Stearns exped.).

Pleustes panoplus Bate (Kröyer).

Amphithonotus cataphractus Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Gulf coast! (Stearns exped.); Atlantic coast! (Packard).

Pleustes bicuspis Boeck (Kröyer).

A single specimen of this species was sent, with "*Atylus* (*Paramphitoe*) *inermis*" (see *Halirages fulvocinctus*), to the Museum of Yale College by Packard. No special locality was given for the specimens, but they were most likely from Henley Harbor, as that is the only locality given by Packard for the "*Atylus*."

Pontogenia inermis Boeck (Kröyer).

Atylus vulgaris Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Atlantic coast! (Packard).

Halirages fulvocinctus Boeck (M. Sars).

"*Atylus* (*Paramphitoe* [—*thoe*]) *inermis* (Kroyer, fide Boeck)," Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, pl. 8, figs. 3–3*b*, 1867.

Atlantic coast! (Packard).

The specimens sent to Europe and identified by Boeck as above quoted by Packard were undoubtedly *Pontogenia inermis*, but the species described and figured by Packard under the name given by Boeck is certainly distinct from that species. Two specimens which were evidently supposed by Packard to be the species described by him were sent to the Museum of Yale College under a manuscript name as a new species of *Atylus:* one of these specimens, as stated above, is *Pleustes bicuspis*, and is evidently not the species described and figured by Packard; the other specimen is *Halirages fulvocinctus*, and is, I think, the species described and figured by him. Packard describes his species as having "the first three abdominal segments produced into three strongly-hooked projections, the third of which is much the largest;

fourth segment deeply, broadly sinuate"; but, as his figure shows, it is the last thoracic and first two abdominal somites which are produced, and the fourth abdominal which is sinuate. Excepting this and the rounded instead of angular abdominal epimera, the description and figure agree with *Halirages fulvocinctus*.

Calliopeus lævіusculus Boeck (Kröyer).

Calliope lævіuscula Packard, Canadian Nat. and Geol., viii, p. 425 (25), 1863 (*lævinscula*); Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Atlantic coast! (Packard).

Gammarus locusta Fabricius.

Gammarus mutatus Packard, Canadian Nat. and Geol., viii, pp. 402 (2), 419 (19), 425 (25), 1863.

Gammarus locusta Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Gulf coast! (Whiteaves); Atlantic coast! (Stearns exped.); "whole coast" (Packard).

Melita dentata Boeck (Kröyer).

Gammarus purpuratus Packard, Canadian Nat. and Geol., viii, p. 419, 1863.

Gammarus dentatus Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Gulf coast (Packard); Atlantic coast! (Packard, Stearns exped.).

Rhachotropis aculeata Smith (Lepechin).

Amphitonotus Edwardsii Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Atlantic coast! (Packard, Stearns exped.).

Ampelisca Eschrichtii Kröyer.

Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Gulf coast! (Packard). No special locality was given for the specimens sent as this species to the Museum of Yale College by Packard, but they are presumably from Caribou Island, the only locality mentioned in his papers. Specimens of this species were, however, sent by him with *A. macrocephala* and *Byblis Gaimardii* from Chateau Bay.

Ampelisca macrocephala Lilljeborg.

Ampelisca pelagica Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

Haploops tubicola Lilljeborg.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Atlantic coast! (Packard). There were specimens of this species sent to the Museum of Yale College with *Ampelisca Eschrichtii*, which were probably from Caribou Island, as mentioned under that species.

Byblis Gaimardii (Kröyer).

Ampelisca Gaimardi Packard, Mem. Bost. Soc. Nat. Hist., i, p. 299, pl 8, figs. 1, 1*a*, 1867.

Atlantic coast! (Packard, Stearns exped.).

Amphithoe podoceroides Rathke, 1843.

Amphithoe maculata Stimpson, Invert. Grand Manan, p. 53, 1853; Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867 (*Amphithœ*); Smith, Invert. Vineyard Sd., Report U. S. Com. Fish and Fisheries, i, p. 563 (269), pl. 4, fig. 16, 1874.

Atlantic coast (Packard). I have seen no specimens from Labrador, but the species is common from Halifax, Nova Scotia, and the Bay of Fundy to Long Island Sound.

Ericthonius difformis Milne-Edwards.

Ericthonius difformis Milne-Edwards; Smith, Trans. Conn. Acad., iv, p. 278, 1880.

Cerapus rubricornis Stimpson, Invert. Grand Manan, p. 46, pl. 3, fig. 33, 1853; Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867 (*rubiformis*).

Gulf coast (Packard).

Unciola irrorata Say.

Unciola irrorata Say, Jour. Acad. Nat. Sci., Philadelphia, i, p, 389, 1818; Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863; Smith, Trans. Conn. Acad., iv, p. 280, 1880.

Glauconome leucopis Kröyer, Naturh. Tidsskrift, II, i, p. 491, pl. 7, fig. 2, 1845.

Gulf Coast (Packard); Atlantic coast! (Packard coll.). Packard does not mention this species in his final paper, although he had previously mentioned it in his "List of the animals dredged near Caribou Island," as quoted above. He undoubtedly collected it on his last expedition, however, for two specimens were sent to the Museum of Yale College with *Pontogenia inermis* from Henley Harbor.

Dulichia porrecta Bate.

Dulichia porrecta, fide Boeck, Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Packard says only, "This is a rarely found species."

Caprella septentrionalis Kröyer.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Atlantic coast! (Stearns exped.).

ISOPODA.

Phryxus abdominalis Lilljeborg (Kröyer).

Gulf coast! (Stearns exped.).

Dajus misidis Kröyer.

Bopyrus mysidum Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, pl. 8, fig. 5, 1867.

Packard does not state from what part of the coast his specimens came, nor upon what they were parasitic, but they were undoubtedly

from *Mysis oculata*, which he says is "abundant along the whole coast." I have seen no specimens.

Jæra albifrons Leach.

Jæra copiosa Stimpson, Invert. Grand Manan, p. 40, pl. 3, fig. 29, 1863; Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1853 (Caribou Island).

Jæra nivalis Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867 (Sandwich Bay).

"*Asellus Grœnlandicus* Kröyer," Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867 (Square Island! and Hopedale!).

Gulf coast (Packard); Atlantic coast! (Packard and Stearns exped.).

Of "*Asellus Grœnlandicus*," Packard says: "Specimens agreeing in length with those noticed by Fabricius were common at Square Island and Hopedale, in soil under stones, &c., in company with Limax"; but the specimens sent under this name and from these localities to the Museum of Yale College are all *Jæra copiosa*, which, on the New England coast, is often found at some little distance from high-water mark, associated with some species of *Oniscidæ*, &c., and it is probable Packard's specimens were found in a similar locality. Other specimens sent to the Museum of Yale College by Packard are labeled "*Jæra* sp., Indian Tickle" (Atlantic coast).

Synidotea bicuspida Harger.

Idotea bicuspida Owen, Crustacea of the Blossom, p. 92, pl. 27, fig. 6, 1839.

Idotea marmorata Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, pl. 8, fig. 6, 1867.

Synidotea bicuspida Harger, Proc. U. S. National Mus., ii, 1879, p. 160, 1879.

Atlantic coast (Packard).

Ægа psora Kröyer.

Whiteaves mentions the occurrence of this species on the north shore of the Gulf of Saint Lawrence, and it is probably the species referred to by Packard as *Ægа* sp., "taken from the under side of a cod in the Straits of Belle Isle" (Mem. Bost. Soc. Nat. Hist., i, p. 296).

Gnathia cerina Harger.

Praniza cerina Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867.

"Chateau Bay, Long Island" (Packard).

Tanais filum Stimpson.

Gulf coast (Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867).

OSTRACODA.

Cypridina excisa Stimpson.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Inserted without remark by Packard. I have seen no specimens.

COPEPODA.

Lernæa branchialis Linn.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867 (*Leonæa*).

Variety *sigmoidea* (Stearns exped.), without special locality. Packard gives no special locality, and says his specimens were attached to the *skin* of the codfish, which makes it almost certain that he observed some entirely different parasite.

CIRRIPEDIA.

Coronula diadema De Blainville (Linn.).

Packard, Canadian Nat. and Geol., viii, p. 418 (18), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Gulf coast (Packard).

Balanus crenatus Bruguière.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Gulf coast! (Stearns exped.); whole coast (Packard).

Balanus balanoides Stimpson (Linn.).

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Inserted without remark, by Packard.

Balanus porcatus Costa.

Packard, Canadian Nat. and Geol., viii, p. 418 (18), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Whole coast (Packard).

RHIZOCEPHALA.

Peltogaster paguri Rathke.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Atlantic coast! (Stearns exped.). Packard recorded the species from Maine, not Labrador.

NEW HAVEN, CONN., *May* 1, 1883.

NOTES ON THE FISHES OF TODOS SANTOS BAY, LOWER CALIFORNIA.

By ROSA SMITH.

During the past winter (1882–'83) the writer, with a party of naturalists, spent three weeks on Todos Santos Bay and points northward to San Diego.

The bay of Todos Santos has a shore line of about forty miles, a little more than half of it being a smooth sand-beach, the remainder bluffs of dark red or blackish lava, extending into the sea at intervals, forming rocky tide-pools, interspersed with longer or shorter shingle beaches. About 20 miles below the town of Ensenada the land slopes gently to and below the sea-level, allowing the water to cover the shallower por-

tions, forming lagoons and creeks. A small group of picturesque rocks affords the only protection to the bay on its western side at a distance of 10 miles from Ensenada.

Having a low tide during our stay, the rock pools were thoroughly searched with dip-nets, and many heavy stones overturned.

At Punta Banda, on the southern shore of the bay, lives George Tannahill, a Scottish fisherman, who has built a small hut of water-worn bowlders on the shingle beach, where he spends, with his family, a few months of the year "fishing for a pastime," as he told me. He had on hand two species of fishes (*Trochocopus pulcher* and *Serranus clathratus*). He formerly dried the "red-fish" for exportation, but now no regular fishing is done anywhere on the bay. He gave me the common names of thirteen species, which may be referred to the species in this list which are marked with an asterisk, and which are accompanied by the common names used by Mr. Tannahill.

Family SCYLLIIDÆ.

1. Scylliorhinus ventriosus (Garman) J. & G.

Egg cases like those belonging to this species were found along the beach.

Family HETERODONTIDÆ.

2. Heterodontus francisci (Grd.) Gill.

A few egg cases of this species were washed up on the beach.

Family MYLIOBATIDÆ.

***3. Myliobatis californicus** Gill.

Sting-rays three feet in diameter are said to be frequently seen.

Family CYPRINODONTIDÆ.

4. Fundulus parvipinnis Grd.

Abundant in shallow water.

Family MURÆNIDÆ.

***5. Muræna mordax** Ayres.—"Black eel."

Family GASTEROSTEIDÆ.

6. Gasterosteus microcephalus Grd.

At the Tia Juana Hot Springs, about 3 miles below the boundary line, this species is abundant in a stream of somewhat warm mineral water, in company with water-beetles, snails, and other animal forms, and well-shielded by growing water-cress, Azolla, and an alga. This stickleback also occurs in Wild Cat Cañon, a few miles further south. D. I, I, I. 11–13; A. I, 8; lateral plates, 4. In life with the sides silvery forward, golden on abdomen; about eight squarish dark blotches on back and

sides superiorly; some large black punctulations below; chin silvery, salmon-colored in some of the examples; ventrals more or less salmon-colored.

Family MUGILIDÆ.

*7. **Mugil albula** L.—Mullet.

Said to be very abundant in lagoons of Punta Banda.

Family SPHYRÆNIDÆ.

*8. **Sphyræna argentea** Girard.—Barracuda.

Family SCOMBRIDÆ.

*9. **Trachurus picturatus** (Bowditch) J. & G.—Horse mackerel.

Family CARANGIDÆ.

*10. **Seriola dorsalis** (Gill) J. & G.—Yellow-tail.

Family SERRANIDÆ.

*11. **Stereolepis gigas** Ayres.—Jew-fish.

12. **Serranus clathratus** (Grd.) Steindachner.

One seen.

Family SPARIDÆ.

13. **Girella nigricans** (Ayres) Gill.

Numerous young specimens in rock pools.

Family SCIÆNIDÆ.

*14. **Roncador stearnsi** (Steind.) J. & G.—Roncador.

*15. **Cynoscion parvipinne** Ayres.—Corvina.

Family LABRIDÆ.

16. **Trochocopus pulcher** (Ayres) Garman.—Red-fish.

A few seen. Very abundant, and fond of abalone meat, which is used for bait.

Family POMACENTRIDÆ.

*17. **Pomacentrus rubicundus** (Grd.) J. & G.—Gold-fish.

Mr. Tannahill informed me that this species is quite common and troublesome, as its mouth is too small to catch on the large hooks used and it steals the bait put out for larger-mouthed fishes.

Family LATILIDÆ.

*18. **Caulolatilus princeps** (Jenyns) Gill.—White-fish.

Family GOBIIDÆ.

19. **Typhlogobius californiensis** Steind.

A few fine examples of this interesting species were found at low tide burrowing in sand under stones.

Family SCORPÆNIDÆ.

*20. **Sebastodes** species.—Rock-cod.

Family COTTIDÆ.

21. **Leptocottus armatus** Grd.

Two specimens of this extremely common Cottoid were taken with a seine from a shallow stream emptying into the ocean at Rosario, about 15 miles below the boundary line and near the Coronado Islands. The beach at this point is of firm, light brown sand, and the rocky cliff behind the sand strip is red volcanic rock. A few rocks jut into the sea, entirely destitute of life except for the abundant mussels and a very little thread-like sea-weed.

22. **Oligocottus analis** Grd.

Abundant in tide pools on Todos Santos Bay.

Family GOBIESOCIDÆ.

23. **Gobiesox rhessodon** Rosa Smith.

Three young specimens were scraped with a dip-net from living Zostera. They were plain, dark brown, very slender, and from seven-eighths of an inch to one inch in total length. A few adult examples were found adhering to the under surface of stones.

Family BLENNIDÆ.

24. **Isesthes gilberti** Jordan.

Among ten specimens of Isesthes from Todos Santos Bay, the largest measures $5\frac{3}{4}$ inches; head, $4\frac{1}{8}$; depth, $4\frac{1}{8}$; D. XII, 18; A. 21. Five other specimens (smaller) have the same fin formula. A specimen, $2\frac{1}{8}$ inches in length, has D. XII, 16; A. 20; while another somewhat larger has D. XI, 19; A. 21, and an individual less than two inches long has D. XII, 16; A. 19; the orbital tentacles of this last being only trifid instead of multifid, the gill-opening, as in all from this locality, extending downward to lower edge of pectoral. The color of the largest specimen is dull olivaceous, all the markings more obscure than in smaller ones. A specimen $2\frac{1}{4}$ inches long has the following life markings: a black spot, larger than pupil, on second dorsal spine; eight or nine small blue dots on median line of side (below lateral line), from pectoral to caudal; ground color of head bluish gray, finely dotted with reddish; two black stripes downward and forward from eye, the first meeting the one from opposite side close behind symphysis of lower jaw, the second meeting on throat; tentacles multifid.

25. **Clinus evides** J. & G. (= *Gibbonsia elegans* Cooper).

This species was rather abundant in rock pools, most of those taken being "variously variegated, with light and dark shades of red, brown, and white," the predominant color being reddish purple; a few were

plain purplish brown, and others inhabiting deep pools with a heavy growth of Zostera were, in life, of a vivid green, with about four horizontal stripes of lighter green, silvery patches shining through on the inferior stripes. As usual, two brown ocelli margined with a ring of red were placed one at a distance of its own diameter behind the margin of opercular flap, the other as far below the dorsal fin and under its posterior half. In the specimens examined the dorsal fin rays vary from V, XXVIII, 6 to V, XXXI, 9, the anal usually having twenty-four articulate rays, occasionally as few as twenty-three or as many as twenty-six, the anal spines always numbering two.

SAN DIEGO, CAL., *May* 15, 1883.

CATALOGUE OF MOLLUSCA AND ECHINODERMATA DREDGED ON THE COAST OF LABRADOR BY THE EXPEDITION UNDER THE DIRECTION OF MR. W. A. STEARNS, IN 1882.

By KATHARINE J. BUSH.

The collection upon which the following catalogue is based was obtained by the expedition of 1882, under the direction of Mr. W. A. Stearns. Part of the specimens were sent to the Peabody Museum of Yale College by Messrs. B. S. Barrows and J. A. Allen, and the rest to the National Museum by Mr. Stearns.

The dredging was done mostly by Mr. Stearns, Mr. B. S. Barrows, and Mr. Edwin R. Flint; but Messrs. J. A. Allen and Charles L. Flint, jr., assisted in this work.

The dredgings were made during the month of August, in shallow water, at different points along the coast included between Forteau Bay and Dead Island. The principal localities are L'anse au Loup, north latitude 51° 33′, west longitude 56° 48′; Henley Harbor, about north latitude 52° 05′, west longitude 55° 51′; Dead Island, near Square Island, north latitude 52° 48′, west longitude 55° 48′.

The nomenclature adopted is mostly the same as that of the Preliminary Check-list of the Marine Invertebrata of the Atlantic Coast, and the Catalogue of Marine Mollusca by Prof. A. E. Verrill.* The names used in Binney's edition of Gould's Invertebrata of Massachusetts are added in parenthesis when different from those adopted.

For such species as are not included in Gould's report, references have been given to at least one work in which the species is described or figured.

A list of the species found by Prof. A. S. Packard, jr.,† during the summer of 1864, but not obtained by the Stearns expedition, has been appended to the catalogues, both of mollusca and echinodermata, to make the faunal lists more complete.

---

* Preliminary Check-list of the Marine Invertebrata of the Atlantic Coast, New Haven, Conn., 1879. Catalogue of Marine Mollusca, in Trans. Conn. Acad., vol. v, part 2, April, 1882.

† Recent Invertebrate Fauna of Labrador, 1865.

MOLLUSCA.

CEPHALOPODA.

Ommastrephes illecebrosus (Les.).

Several adult specimens were taken at L'anse au Loup, in 15 fathoms, and Fox Harbor, near the shore.

GASTROPODA.

Bela scalaris (Möll.) H. & A. Adams.

Bela scalaris Verrill, Cat. Mar. Mollusca, in Trans. Conn. Acad., vol. v, part ii, p. 471, pl. LVII, figs. 12, 12*a*.

Occurred at Forteau Bay, 20 fathoms; L'anse au Loup, 8 to 15 fathoms; Henley Harbor, 3 to 15 fathoms.

Bela rosea Sars.

Bela harpularia, G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 234, pl. 16, fig. 17, pl. ix, figs. 3 *a-c* (dentition), 1878 (*non* Couthouy).

Bela harpularia, var. *rosea* G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 234, pl. 23, fig. 10.

Bela rosea Verrill, Cat. Mar. Mollusca, p. 485.

Forteau Bay, 20 fathoms; L'anse au Loup, 10 fathoms; Henley Harbor, 10 to 15 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Bela Sarsii Verrill.

Bela cancellata G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 224, pl. 23, fig. 3 (*non* Mighels).

Bela Sarsii Verrill, Cat. Mar. Mollusca, p. 484.

PLATE IX, FIG. 8.

Several specimens dredged at Forteau Bay, 20 fathoms, L'anse au Loup, 10 to 15 fathoms, have been directly compared with shells from Tromso, sent by Dr. Friele from the museum at Bergen. This is a rare species on the American coast, having rarely been found before except at Murray Bay, Canada. (Dawson, coll.)

Bela exarata (Möller) H. & A. Adams.

Bela exarata Verrill, Cat. Mar. Mollusca, p. 467.

Three were dredged at L'anse au Loup, with sand and kelp.

Bela mitrula Lovén.

Bela mitrula G. O. Sars, Moll. Reg. Arcticæ Norvegiæ, p. 233, pl. 23, fig. 9.

Bela concinnula, var. *acuta* Verrill, Cat. Mar. Mollusca, p. 470.

Several specimens, agreeing closely with those of Europe, sent by Dr. Friele, were found at Forteau Bay, 20 fathoms; L'anse au Loup, 10 to 15 fathoms.

Bela pleurotomaria (Couth.) Adams.

Bela pleurotomaria Verrill, Cat. Mar. Mollusca, p. 478.
PLATE IX, FIG. 7.

L'anse au Loup, 10 to 15 fathoms; Henley Harbor, 10 to 15 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 1 to 4 fathoms.

Bela decussata (Couth.) H. & A. Adams.

Bela decussata Verrill, Cat. Mar. Mollusca, p. 479, pl. 43, fig. 13.

Forteau Bay, 20 fathoms; L'anse au Loup, 10 fathoms. One unusually large dead specimen at Henley Harbor, 10 to 15 fathoms.

Bela incisula V.

Bela incisula Verrill, Cat. Mar. Mollusca, p. 461, pl. 43, fig. 12, pl. 57, fig. 14.
PLATE IX, FIG. 10.

Most common at L'anse au Loup, 10 to 15 fathoms; Forteau Bay, 20 fathoms; Henley Harbor, 3 to 15 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Bela bicarinata (Couth.) V.

Bela bicarinata Verrill, Cat. Mar. Mollusca, p. 482, pl. 57, figs. 16, 16*a*.

Not uncommon at Forteau Bay, 20 fathoms; L'anse au Loup, 10 to 15 fathoms. One dead specimen at Henley Harbor, 10 to 15 fathoms.

Bela bicarinata, var. **violacea** (Migh. & Adams).

Bela bicarinata var. *violacea* Verrill, Cat. Mar. Mollusca, p. 483.

Common at all localities in 1 to 20 fathoms.

Admete Couthouyi (Jay) Ad. (=*A. viridula* Gld.).

L'anse au Loup, 10 to 15 fathoms; Henley Harbor, 3 to 15 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 1 to 4 fathoms.

Sipho lividus (Mörch).

Sipho lividus Verrill, Cat. Mar. Mollusca, p. 507.
PLATE IX, FIG. 12.

Two good, though dead, specimens were found at Henley Harbor, in 8 fathoms, and Dead Island, near Square Island, in 1 to 4 fathoms. Hitherto recorded from the Grand Bank of Newfoundland; Orphan Bank, in the Gulf of Saint Lawrence; and off Metis, mouth of the Saint Lawrence River.

Tritonofusus cretaceus (Reeve).

Buccinum cretaceum Packard, Can. Natr., vol. viii, p. 417, pl. 2, fig. 6, 1863; Mem. Boston Soc. Nat. Hist., i, p. 288, pl. 7, fig. 7, 1867.
Tritonofusus Kröyeri Verrill, Cat. Mar. Mollusca, p. 510 (*non* Möller sp.).

A few examples of this interesting species, obtained at Henley Harbor and Temple Bay, in 3 to 10 fathoms, agree exactly with the Canadian form, from off Metis.

Buccinum undatum Linné.

This species occurs abundantly along the coast in 1 to 15 fathoms, but is a much larger and smoother variety than the more typical form found at Eastport, Me. There is also a marked difference in color; most specimens being, in alcohol, of a dark reddish brown.

Buccinum Donovani Gray.

A large and a small specimen of this characteristic species were found at Henley Harbor, at low water and 15 fathoms, comparing well with shells from off Metis.

Buccinum Tottenii Stimp.

Buccinum Tottenii Stimpson, Review Northern Buccinums, Can. Natur., 1865, p. 23 (sep. cop.).

PLATE IX, FIG. 13.

Three shells corresponding to the Canadian form from off Metis, occurred at Henley Harbor and Temple Bay, in 8 to 15 fathoms.

Buccinum ciliatum (Fabr.) Möller.

Buccinum ciliatum Stimpson, Review Northern Buccinums, Can. Natur., 1865, p. 11 (sep. cop.).

PLATE IX, FIG. 14.

This species was found in 3 to 8 fathoms at Henley Harbor. Hitherto recorded from the Grand Bank, Gulf of Saint Lawrence, Greenland, and other Arctic localities.

Trophon clathratus (Linné) Möll.

L'anse au Loup, 10 to 15 fathoms; Henley Harbor, 3 to 15 fathoms; Temple Bay, 10 fathoms.

Astyris rosacea (Gould) H. & A. Adams. (= *Columbella rosacea* Gld.).

PLATE IX, Fig. 6.

A few good specimens were taken at L'anse au Loup, in 8 fathoms; Henley Harbor, in 3 to 8 fathoms. They differ from more typical shells of this species from New England, in having the transverse ribs more distinct on about four of the upper whorls below the nucleus. They are absent from the two last whorls.

Natica clausa Brod. & Sowerby.

Henley Harbor, 8 fathoms; Dead Island, near Square Island, 1 to 4 fathoms. One unusually large specimen measured 30^{mm} in length, 28^{mm} in breadth.

Lunatia Grœnlandica (Möll.) H. & A. Ad.

Henley Harbor, in 3 to 8 fathoms.

Velutina lævigata (L.) Gould (= *V. haliotoidea* Gld.).

A very few small specimens were found at Henley Harbor, 3 to 8 fathoms; Dead Island, near Square Island, 1 to 4 fathoms, mud.

Littorinella minuta (Totten) Stimp. (= *Rissoa minuta* Gld.).

Fox Harbor, Saint Lewis Sound, 1 to 4 fathoms, sand; one dead.

Cingula castanea (Möll.) Verrill.

Cingula castanea G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 174, pl. 10, figs. 1 *a*, 1 *b*, 1878; Verrill, Cat. Mar. Mollusa, pl. 43, fig. 1.

PLATE IX, FIG. 9.

Dead Island, near Square Island, 1 to 4 fathoms, hard bottom.

Littorina littorea (Linné) Menke.

Very rare at so northern a latitude.

Littorina rudis (Maton) Gould.

Much eroded specimens occurred at all the localities.

Lacuna vincta (Mont.) Turton.

Common at Forteau Bay, 20 fathoms; L'anse au Loup, 8 to 15 fathoms; Fox Harbor, Saint Lewis Sound, 1 to 4 fathoms; Dead Island, near Square Island, 1 to 4 fathoms. The larger specimens measure about 13^{mm} in length and 8^{mm} in breadth.

Turritella erosa Couth.

Common at all the localities.

Turritella reticulata Migh.

L'anse au Loup, 10 fathoms; Henley Harbor, 3 to 15 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Turritellopsis acicula Sars.

Turritella acicula Stimp., Proc. Boston Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 35, pl. 1, fig. 5.

Turritellopsis acicula G. O. Sars, Moll. Reg. Arct. Norvegiæ, pl. 10, figs. 14-*a*, *b*.

A few good, though dead, specimens were found at Dead Island, near Square Island, 1 to 4 fathoms, mud.

Trichotropis borealis Brod. & Sow.

L'anse au Loup, 8 to 10 fathoms; Henley Harbor, 3 to 15 fathoms; Temple Bay, 5 to 10 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Aporrhais occidentalis Beck.

Forteau Bay, 20 fathoms; L'anse au Loup, 10 to 20 fathoms; Henley Harbor, 15 fathoms, living. Temple Bay; Fox Harbor, Saint Lewis Sound, 8 fathoms; Dead Island, near Square Island, 2 to 4 fathoms, dead.

Margarita helicina (Fabr.) Möll.

L'anse au Loup, 10 fathoms, one dead. Very common, in 1 to 4 fathoms, at Fox Harbor, Saint Lewis Sound, and Dead Island, near Square Island.

Vol. VI, No. 16. Washington, D. C. Nov. 27, 1883.

Margarita cinerea (Couth.) Gould.

Dredged in abundance on sandy bottoms in 1 to 20 fathoms.

Margarita Grœnlandica (Gm.) Möll. (= *M. undulata* Gld.).

Common at all the localities. At Dead Island, near Square Island, 1 to 4 fathoms, the smooth variety was found.

Margarita argentata Gould.

One dead specimen was taken off Dead Island, near Square Island, in 2 to 4 fathoms, nullipore bottom.

Machæroplax varicosa (Migh.) Friele (= *Margarita varicosa* Gould).

Forteau Bay, 20 fathoms; L'anse au Loup, 10 to 15 fathoms, sand, in abundance; Dead Island, near Square Island, 1 to 4 fathoms.

Machæroplax obscura (Couth.) Friele (= *Margarita obscura* Gld.).

One specimen, living, at L'anse au Loup, 15 fathoms, sand.

Puncturella Noachina (L.) Lowe (= *Cemoria Noachina* Gld.).

Henley Harbor, 3 to 8 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Acmæa testudinalis (Müll.) Han. (= *Tectura testudinalis* Gld.).

L'anse au Loup, 8 to 15 fathoms; Henley Harbor, 3 to 15 fathoms; Temple Bay, 5 to 10 fathoms; Fox Harbor, Saint Lewis Sound, 1 to 5 fathoms; Dead Island, near Square Island, 1 to 4 fathoms.

Acmæa rubella (Fabr.) Dall.

Tectura rubella G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 121, pl. 8, figs. 5 *a*, *b*.
PLATE IX, FIGS. 5, 5*a*.

One living specimen was taken at Temple Bay, rocky bottom.

Lepeta cæca (Müll.) Gray.

Henley Harbor, 3 to 15 fathoms; Temple Bay, 5 to 10 fathoms.

Tonicella marmorea (Fabr.) Carp. (= *Chiton marmoreus* Gld.).

Occurred in abundance at L'anse au Loup, low-water mark to 8 fathoms; Henley Harbor, 3 to 15 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 1 to 4 fathoms.

Trachydermon ruber (Linné) Carp. (= *Chiton ruber* Gld.).

Found with the preceding, but not in such abundance.

Trachydermon albus (Linné) Carp. (= *Chiton albus* Gld.).

A few were found at L'anse au Loup, 8 to 10 fathoms, rocks, sand, and mud.

Menestho albula (Fabr.) Möll. (*non* Gld.).

PLATE IX, FIG. 11.

One young, living, at L'anse au Loup, 10 fathoms, mud and kelp. This specimen does not agree precisely with Greenland examples.

Cylichna alba (Brown) Lovén.

Dead Island, near Square Island, 2 to 4 fathoms, nullipore bottom.

Coryphella diversa (Couth.) Verrill.

Two specimens. L'anse au Loup.

LAMELLIBRANCHIATA.

Saxicava arctica (Linné) Desh.

Common at most of the localities.

Cyrtodaria siliqua (Speng.) Woodw. (=*Glycymeris siliqua* Gld.).

One very young specimen. L'anse au Loup, 10 fathoms, mud and kelp.

Mya arenaria Linné.

Very common in 1 to 5 fathoms.

Mya truncata Linné.

L'anse au Loup, 10 fathoms, with sand and kelp, one young specimen.

Lyonsia arenosa (Möller) Mörch.

One valve was found in Temple Bay, in 10 fathoms, mud.

Periploma papyracea (Say) Conrad; Verrill (=*Anatina papyracea* Gld.).

One valve of a very young specimen was dredged in Henley Harbor, 10 to 15 fathoms.

Macoma fragilis (Fabr.) H. & A. Ad. (=*M. fusca* Gld.).

In abundance in Fox Harbor, Saint Lewis Sound, 1 to 10 fathoms, mud.

Macoma sabulosa (Speng.) Mörch (=*M. proxima* Gld.).

L'anse au Loup, Henley Harbor, Fox Harbor, Dead Island, near Square Island, in 1 to 15 fathoms.

Liocyma fluctuosa Dall (=*Tapes fluctuosa* Gld.).

L'anse au Loup and Henley Harbor, 10 to 15 fathoms.

Cardium ciliatum Fabr. (=*C. Islandicum* Gld.).

Cardium ciliatum Fabr., Fauna Grœnl., p. 410. (1780.)
Cardium Islandicum Gmelin, Syst. Nat., p. 3252. (1792.)

Common in Henley Harbor, 10 to 15 fathoms; Temple Bay, 10 fathoms; Fox Harbor, Saint Lewis Sound, shallow water; Dead Island, near Square Island, 2 to 4 fathoms.

Serripes Grœnlandicus (Gmel.) Beck.

Found in all the localities, in 1 to 15 fathoms.

Cryptodon Gouldii (Phil.) Stimp.

L'anse au Loup, 10 fathoms; Henley Harbor, 3 to 8 fathoms; Dead Island, near Square Island, 1 to 4 fathoms.

Axinopsis orbiculata Sars.

Axinopsis orbiculata G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 63, pl. 19, figs. 11*a–d*.

Plate IX, Fig. 4.

One specimen occurred in Henley Harbor, 10 to 15 fathoms.

Venericardia borealis (Con.) Carp. (=*Cardita borealis* Gld.).

Henley Harbor, 3 to 10 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Astarte elliptica (Brown) McGill.

Common in Henley Harbor and Temple Bay, in 5 to 15 fathoms.

Astarte Banksii (Leach) Gray.

In abundance at Henley Harbor, 3 to 15 fathoms; Temple Bay, 10 fathoms; Fox Harbor, Saint Lewis Sound, shallow water.

Astarte arctica (Gray) Forbes & Han.

Astarte lactea Brod. & Sby., Zool. Jour., IV, p. 365, 1828–'29.

Henley Harbor, 10 to 15 fathoms; Temple Bay, rocky bottom; Fox Harbor, Saint Lewis Sound, 3 to 10 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Nucula tenuis, var. **inflata** (Hancock).

Henley Harbor, in 3 to 8 fathoms.

Yoldia myalis (Couth.) Stimp.

A very badly worn valve was dredged at L'anse au Loup, in 15 fathoms, sand.

Leda Jacksoni Gould.

Henley Harbor and Temple Bay, in 10 to 15 fathoms.

Leda minuta (Müll.) Möller.

Found with the preceding.

Mytilus edulis Linné.

Henley Harbor, Temple Bay, Fox Harbor, Dead Island, in 1 to 10 fathoms.

Modiol ria nigra (Gray) Lovén.

Several young specimens were found at L'anse au Loup, 10 fathoms.

Modiolaria discors (Linné) Lovén.

Dead Island, near Square Island, in 1 to 4 fathoms.

Modiolaria corrugata (Stimp.) Mörch.

Henley Harbor, in 3 to 8 fathoms.

Crenella faba (Müll.) (= *C. pectinula* Gld.?).

Mytilus faba Fabricius, Fauna Grœnlandica, p. 419.

PLATE IX, FIG. 3.

The young of this species were found at L'anse au Loup, 10 to 15 fathoms, sand, mud, kelp; Fox Harbor, Saint Lewis Island, 1 to 4 fathoms, sand, abundant; Dead Island, near Square Island, shallow water.

Crenella glandula (Totten) H. & A. Ad.

L'anse au Loup, in 8 to 10 fathoms.

Crenella decussata (Mont.) Macg.

Crenella decussata Verrill, Cat. Mar. Mollusca, p. 578, Pl. 44, fig. 7.

PLATE IX, FIG. 2.

Several specimens were found at L'anse au Loup, 10 fathoms; Fox Harbor, Saint Lewis Sound, 3 fathoms.

Pecten Islandicus Müller.

Dead Island, near Square Island, in 1 to 4 fathoms.

Anomia aculeata Müll.

L'anse au Loup, 8 to 15 fathoms; Henley Harbor, 10 to 15 fathoms.

BRACHIOPODA.

Rhynchonella psittacea (Gm.) Owen.

Henley Harbor, 3 to 8 fathoms; Temple Bay, 10 fathoms; Dead Island, near Square Island, 1 to 4 fathoms.

List of Labrador shells recorded by Dr. A. S. Packard, Jr., but not obtained by the Stearns expedition.

GASTROPODA.

Bela cancellata (Migh.) Stimp.
Fusus syrtensis, nov. sp. (Not seen.)
Fusus tornatus Gld. (*Neptunea despecta* (L.) Ad.).
Buccinum tenue Gray.
?*Natica heros* Sowb. (*Lunatia heros* (Say) H. & A. Ad.).
Littorina palliata Gld.
Scalaria Grœnlandica Perry.
Margarita campanulata Morse, nov. sp. (*M. helicina*, var.).
Scissurella crispata Flem.
Adcorbis costulata Stimp. (*Molleria costulata* (Möll.) Jeff., Fr.).
?*Lamellaria perspicua* Lovén. (Not seen.)

Bulla pertenuis Migh. (*Diaphana pertenuis* (Migh.) Verrill).
Bulla occulta Migh. (*Cylichna occulta* (Migh.) H. & A. Ad.).
Dendronotus arborescens Ald. & Han.

PTEROPODA.

Clione limacina Phipps (*C. papilionacea* Pallas).
Limacina helicina Phipps.

LAMELLIBRANCHIATA.

Solen ensis Linné (*Ensatella Americana* (Gould) Verrill).
Kennerlia glacialis (Leach) Carp.*[1]
Thracia Conradi Couth.
Thracia myopsis Beck.
Mactra solidissima Chem. (*Spisula solidissima* (Dillw.) Gray).
Mactra polynema Stimp. (*Spisula ovalis* Gld.).
Mesodesma Jauresii Joannis (*Ceronia deaurata* (Turt.) Stimp.).
Gemma Totteni Stimp. (*Tottenia gemma* (Totten) Perkins).
? *Cardium pinnulatum* Conr.*[2]
Cardium Hayesii Stimp. (*C. ciliatum*, var.).
Yoldia sapotilla Stimp.
Mytilus modiolus Linné (*Modiola modiolus* (Linné) Turton).
Pecten tenuicostatus Mighels.
Limatula sulculus Leach. (Not seen.)

Catalogue of Echinodermata obtained by the Stearns expedition.

Lophothuria Fabricii Verrill.

Psolus Fabricii Duncan & Sladen, Echin. Arctic Sea, p. 10, pl. 1, figs. 9–13, 1881.

Young were found at Henley Harbor and Temple Bay in 8 to 10 fathoms.

Pentacta calcigera Stimp.

Cucumaria calcigera Duncan & Sladen, Echin. Arctic Sea, p. 5, pl. 1, figs. 3–8, 1881.

Fox Harbor, Saint Lewis Sound, in 1 to 3 fathoms. A number of good specimens were without a locality label.

Chirodota læve Grube.

Chirodota lævis Duncan & Sladen, Echin. Arctic Sea, p. 12, pl. 1, figs. 14–19, 1881.

Temple Bay in 5 fathoms; Fox Harbor in 1 fathom; Dead Island, near Square Island, in 2 to 4 fathoms.

---

*[1] Three specimens, sent to the Peabody Museum of Yale College, were labeled *Pandora trilineata* Say.

*[2] One specimen labeled *C. pinnulatum* Conr., sent to the Peabody Museum of Yale College =*Cardium ciliatum* Fabr. (young).

Echinarachnius parma Gray.

Common at L'anse au Loup on sandy, muddy, and kelpy bottoms, in 10 to 15 fathoms.

Strongylocentrotus Droebachiensis A. Ag.

Two large specimens were found at L'anse au Loup in 15 fathoms.

Asterias vulgaris Stimp.

Large specimens were found in abundance at low-water mark at Bonne Esperance, Esquimaux Bay.

Asterias polaris (M. & Tr.) Verrill.

Asteracanthion polare Duncan & Sladen, Echin. Arctic Sea, p. 23, pl. 2, figs. 4–8, 1881.

Found in abundance with the preceding. At L'anse au Loup a young specimen was taken in 8 fathoms.

Leptasterias littoralis (Stimp.) Verrill.

Several specimens were found at Dead Island, near Square Island, in 1 to 5 fathoms.

Cribrella sanguinolenta (Müll.) Lütk.

Cribrella sanguinolenta A. Agassiz, North Amer. Star fishes, pl. 18, 1877.

Cribrella oculata Duncan & Sladen, Echin. Arctic Sea, p. 32, pl. 2, figs. 18–21, 1881.

Henley Harbor in 10 to 15 fathoms; Dead Island, near Square Island, in 1 to 5 fathoms.

Crossaster papposus Müll. & Tro.

Crossaster papposus A. Agassiz, North Amer. Star fishes, pl. 12, 1877; Duncan & Sladen, Echin. Arctic Sea, p. 36, pl. 3, figs. 1–4, 1881.

A few specimens were taken in 10 fathoms at Henley Harbor and Temple Bay.

Ophiopholis aculeata Gray.

Ophiopholis bellis Lyman, Cat. Mus. Comp. Zoölogy, No. I, p. 96, pl. 1, figs. 4–6, 1865.

L'anse au Loup in 8 to 15 fathoms; Henley Harbor at low-water mark, and 10 fathoms; Temple Bay in 10 fathoms; Dead Island, near Square Island, in 1 to 5 fathoms. Common.

Amphiura Sundevalli Müll. & Tur.

Amphiura Holbölli Duncan & Sladen, Echin. Arctic Sea, p. 67, pl. 4, figs. 15–17, 1881.

One mutilated specimen was found in 10 to 15 fathoms at Henley Harbor.

Ophioglypha Sarsii (Lütk.) Lym.

Ophioglypha Sarsii Duncan & Sladen, Echin. Arctic Sea, p. 60, pl. 4, figs. 3, 4, 1881.

Two were taken in 10 fathoms at Henley Harbor.

Ophioglypha robusta (Ayres) Lym.

Ophioglypha robusta Duncan & Sladen, Echin. Arctic Sea, p. 62, pl. 4, figs. 5–7, 1881.

L'anse au Loup; Henley Harbor, 10 fathoms; Dead Island, near Square Island, 2 to 4 fathoms.

Ophioglypha nodosa (Lütk.) Lym.

Ophioglypha nodosa Lütken, Addit. ad Hist. Ophiur., pl. 2, figs. 9a, b, 1858.

The most abundant species. L'anse au Loup, Henley Harbor, and Temple Bay, in 10 to 15 fathoms.

List of Labrador Echinoderms recorded by Dr. A. S. Packard, Jr., but not obtained by the Stearns expedition.

Pentacta frondosa Jæger.
Eupyrgus scaber Lütken.
Myriotrochus Rinkii Steenst.
Asterias grœnlandicus Steenst. (*Leptasterias grœnlandicus* V.).
Solaster endeca (Linn.) Forbes.
Ophiacantha spinulosa Müll. & Tr. (*O. bidentata* Ljung).
Astrophyton eucnemis Müll. & Tr.

EXPLANATION OF PLATE IX.

FIG. 1.—*Kennerlia glacialis*, X 2. Specimen from Labrador, collected by Prof. A. S. Packard, jr., 1864.

1*a*. The same. Interior view of another specimen.

2.—*Crenella decussata*, X 6. From Grand Manan, N. B.

3.—*Crenella faba*, X 4. From Labrador.

4.—*Axinopsis orbiculata*, X 8. From Labrador.

5.—*Acmæa rubella*, X 4. From Labrador.

5*a*.—The same specimen. Profile view.

6.—*Astyris rosacea*, X 4. From Labrador.

7.—*Bela pleurotomaria*, X 3. From off Cape Cod.

8.—*Bela Sarsii*, X 4. From Labrador.

9.—*Cingula castanea*, X 8. From Gulf of Saint Lawrence.

10.—*Bela incisula*, X 2. From Eastport, Me.

11.—*Menestho albula*, X 8. From Labrador.

12.—*Sipho lividus*, natural size. From a specimen taken off Metis, Canada, by Principal J. W. Dawson.

13.—*Buccinum Totteni*, natural size. Off Metis, Canada (J. W. Dawson).

14.—*Buccinum ciliatum*, X 2. Rivière du Loup, Canada (J. W. Dawson).

NEW HAVEN, CONN., *May* 1, 1883.

LIST OF FISHES COLLECTED IN THE CLEAR FORK OF THE CUMBERLAND, WHITLEY COUNTY, KENTUCKY, WITH DESCRIPTIONS OF THREE NEW SPECIES.

By DAVID S. JORDAN and JOSEPH SWAIN.

In May, 1883, the writers, aided by a party of students from Indiana University, made a small collection of fishes in the Clear Fork of the Cumberland River, and in its tributaries, Wolf Creek and Brier Creek, near Pleasant View, Whitley County, Kentucky. The following is a list of the species obtained, three of which appear to be new to science. Typical examples of these have been presented to the National Museum.

1. **Amiurus natalis** (Le Sueur) Jordan.

2. **Catostomus teres** (Mitchill) Le Sueur.

The use of the name *commersoni* for this species is probably unfortunate. La Cépède's *Cyprinus commersoni* may have been this species, but that it was so cannot be proven. It is therefore best to use the oldest name of certain application.

3. **Catostomus nigricans** Le Sueur.

4. **Moxostoma velatum** (Cope) Jordan.

One fine large specimen.

5. **Moxostoma macrolepidotum duquesnei** (Le Sueur) Jordan.

Very common in the Clear Fork.

6. **Campostoma anomalum** (Raf.) Agassiz.

7. **Chrosomus erythrogaster** Raf.

Very abundant in the smaller streams. The males were in very high coloration, having the dorsal and the lower fins bright golden yellow, the snout and caudal reddish. In some specimens the black lateral bands were coalescent on the caudal peduncle and partially so on the trunk. These specimens apparently correspond to the description of *Chrosomus eos* Cope. In this case, however, it is evidently a color variation of *C. erythrogaster*.

8. **Hyborhynchus notatus** (Raf.) Ag.

Very common. The males with tuberculate muzzles have the skin at the angle of the mouth swollen a little in the form of a small flap or barbel. This structure is apparently not homologous with the barbel in *Rhinichthys* and related genera, but is rather a thickening of the skin accompanying the nuptial excrescences of the males. On this character the nominal species, *Hyborhynchus superciliosus* Cope was founded.

9. **Ericymba buccata** Cope.

Very abundant in small streams.

10. Minnilus diplæmius (Raf.) Hay.

Abundant.

11. Minnilus cornutus (Mitchill) Jordan & Gilb.

Not rare.

12. Hemitremia vittata Cope.

Several specimens, which we refer with some doubt to this species, were taken in Wolf Creek and the Clear Fork. The scales are larger than in Cope's type and the teeth are in normal number (4–4), not 4–5 or 5–5 as stated by Professor Cope.

The following characters are shown by our specimens:

Olivaceous, the scales above punctate with black; sides with a narrow and very distinct black lateral band, narrower than the eye, extending from snout to base of caudal, where it ends in a distinct oblong black spot; caudal, dull reddish; other fins plain. Head 4, depth 3½, A. 7, Lat. l. about 32, the exact number not easily counted. Tubes of lateral line little developed. Dorsal inserted a little before ventrals, slightly nearer snout than base of caudal; mouth very small, terminal. Snout short and blunt; head thick, broad above; pectorals not reaching ventrals, the latter slightly beyond front of anal; scales before dorsal large. The largest specimens seen were scarcely two inches long. The young have the lateral band faint or wanting.

13. Rhinichthys obtusus Agassiz.

Common in cold clear streams.

14. Ambloplites rupestris (Raf.) Gill.

15. Lepomis megalotis Rafinesque.

16. Lepomis macrochirus Rafinesque.

17. Lepomis cyanellus Rafinesque.

18. Micropterus dolomiei La Cépède.

19. Alvordius aspro Cope and Jordan.

In the Clear Fork.

20. Diplesium blennioides (Raf.) Jor.

In the river channel. The specimen taken was very slender, without red or orange markings in life.

21. Boleosoma susanæ, sp. nov.

Head, 4⅓; depth, 6½. D. VIII, 10 or 11. A. I, 8. Lat. l. 45. Length of largest specimen, 2 inches.

General form and appearance of *Boleosoma nigrum*, but with the body slenderer, the fins smaller, and the head entirely naked.

Body very slender, fusiform, little compressed, the back not much elevated. Head short and small. Mouth small, inferior, formed as in other species of the genus. Snout short, bluntly decurved. Eye rather large, a little longer than snout, the maxillary extending to below front

of pupil. Whole head, nape, breast, and middle line of belly naked. Scales rather large, the tubes of the lateral line wanting on the last three or four. Fins moderate, the dorsals shorter and lower than usual in this genus, highest in the males. Anal spine single, weak. Pectorals rather long, reaching well beyond tips of ventrals, their length about equal to that of head.

Color in life essentially as in *Boleosoma nigrum*, the males (in spring) with the head and fins jet black, the body blackish olive, barred with black.

Females light olive, tessellated with darker, and with dusky spots along the lateral line. A dark spot before eye and one on back before dorsal; lower fins pale; both dorsals and caudal with darker bars.

This little fish is abundant in the tributaries of the Clear Fork of the Cumberland. Most of the numerous types were taken in Wolf Creek. It is named for Mrs. Susan Bowen Jordan.

22. **Pœcilichthys sagitta**, sp. nov.

Head, 3½; depth, 4⅘. D. X—13. A. I, 10. Lat. l. about 68 (48 tubes). Length of typical example, 2¾ inches.

Body rather slender, compressed, the back a little elevated, the caudal peduncle rather long and not very deep. Head very long and slender, eel like, tapering forward to a sharp snout, its depth at the pupil about one-third its length. Interorbital space narrow. Snout about as long as eye; 5 in head. Mouth very large for the genus, oblique, the maxillary reaching to below front of pupil, 3¼ in head. Jaws subequal in front, upper jaw not protractile; teeth rather strong. No scales on cheeks, opercles, or breast; nape covered with small scales. Opercular spine well developed. Gill membranes scarcely connected.

Scales on body small, firm, ctenoid. Humerus with its margin black, scarcely enlarged. Lateral line nearly straight, becoming obsolete under last rays of second dorsal. Belly covered with ordinary scales.

Dorsal spines slender, rather high. Soft dorsal rather higher, its base shorter. Anal nearly equal to soft dorsal, its base somewhat shorter, its rays a little higher. Anal spine slender, single in the typical example, the normal number probably two. Caudal truncate, 1⅓ in head, about as long as the ventrals, which are rather shorter than the pectorals.

Color in life, dusky green, with markings of darker olive, the latter forming about nine obscure cross-bars, which are about as wide as the interspaces, these most distinct posteriorly and below the lateral line. A dusky spot at base of caudal. A roundish orange spot in each of the pale interspaces between the bars along the sides. Some minute orange spots above the lateral line. A narrow black streak along-side of head through eye. A pink spot in front of eye above. Snout tinged with orange. First dorsal translucent, with a narrow edge of orange. Soft dorsal translucent, speckled with dusky and pale orange. Tail

with three or four alternate bars of orange and dusky olive, the marking not very sharp. Pectorals similarly but more faintly marked, orange at base. Anal and ventrals colorless. Breast not blue or orange.

A single specimen was obtained in Wolf Creek.

This species bears little relationship to any of those referred to *Poecilichthys*, in Jordan & Gilbert's Synopsis of the Fishes of North America. It has, however, the technical characters of the genus in which we here place it. Its long, naked, tapering head is its most striking peculiarity.

23. Etheostoma cumberlandicum, sp. nov.

Closely related to *E. flabellare* Raf., but with thicker head and different coloration.

Head, $3\frac{2}{3}$; depth, $5\frac{2}{3}$. D. VIII, 11. A. II, 7. Lat. l. 45, the tubes on 15 to 20 scales. Length, $2\frac{3}{4}$ inches.

Body moderately elongate, somewhat compressed, the back little elevated. Head unusually thick and heavy, little tapering anteriorly, much stouter than in *E. flabellare*. Mouth terminal, very oblique, the lower jaw somewhat projecting. Eye about as long as snout, $4\frac{1}{4}$ in head, the maxillary extending nearly to below its middle. Teeth rather strong. Head, nape, and breast naked. Belly and region along dorsal with the scales small.

Scales of body smoother than in *E. flabellare*, and more loosely imbricated, especially in the adult. Fins essentially as in other species, the dorsal spines low and subequal, lowest in the male, the flesh at their tips being thickened. Caudal large, rounded. Other fins moderate.

Color in life greenish, semi-translucent, the body in the adult without trace of lines, cross-bars, or spots, excepting the large, black humeral spot; back with a few faint, dusty cross-shades. Young with tessellated spots, and numerous faint cross-bars, which are developed chiefly as a series of spots along the lateral line. A dark streak from eye through snout; a round, black spot behind eye. First dorsal translucent, abruptly edged with black, the free tips of the spines golden orange. Second dorsal obliquely barred with alternating bands of black and golden. Caudal pale, with about seven very sharply defined curved cross-bands of black. Pectorals olivaceous, scarcely barred, an orange bar at base. Ventrals and anal plain, slightly dusky.

This little fish is excessively abundant in all the small streams of the Cumberland Mountains. Numerous examples were taken in Wolf Creek, Briar Creek, &c. Others were seen in the Clear Fork, Yellow Creek, Gap Creek, &c. In all these streams this is the most abundant of the Darters.

It should, perhaps, be considered a local variety of *E. flabellare*, but a larger intermediate series is necessary before this view can be taken.

INDIANA UNIVERSITY, *June* 4, 1883.

A DESCRIPTION OF A NEW SPECIES OF HADROPTERUS (HADROPTERUS SCIERUS) FROM SOUTHERN INDIANA.

By JOSEPH SWAIN.

Hadropterus scierus, sp. nov.

Head, 4 (4⅕); depth, 5 (6); length of typical example, 3⅞ inches. D. XIII, 14. A. II, 9. Scales, 7–65–11.

Body robust, rather compressed behind. Head rather short; snout bluntish, 3½ in head. Mouth small, the lower jaw included. Maxillary not reaching the eye by about the width of the pupil. Diameter of eye scarcely equal to length of snout, 4½ in head. Gill membranes broadly connected. Lateral line straight, complete, not prolonged forward to the eye. Opercle covered with rather large scales; cheeks with slightly smaller ones; a triangular area on the breast, in front of the ventral fins, with imbedded scales; the breast otherwise almost naked; throat naked; scales persistent, on middle line of belly little enlarged, one enlarged plate being present between the ventral fins; body otherwise covered with rather small ctenoid scales.

Fins all very large. The spinous dorsal separated from the soft dorsal by the length of the snout. Outline of the spinous dorsal gently curved, the first spine one-third longer than last spine, and two-thirds length of middle spine, which is 1¾ in head. Base of soft dorsal longer than that of anal, its rays of about equal length, 1⅔ in head; anal about as large as soft dorsal; ventrals about equal to pectorals, which are 1¼ in head.

Color in spirits, yellowish olive, everywhere vaguely blotched with black. Top of head, dorsal, anal, and ventral fins entirely black (probably pale in the female). Base of pectoral and caudal fins, branchiostegal membrane, cheeks, and sides posteriorly, blackish. Scales everywhere finely punctulate with brown, the sides with a few larger black specks.

This fish is known at present from only two specimens taken in Bean Blossom Creek, Monroe County, Indiana, about six miles north of Bloomington. The stream is a tributary of White River.

This species differs from the others referred to *Hadropterus* in having the gill-membranes broadly united. In the arrangement given in Jordan & Gilbert's Synopsis of the Fishes of North America it would, therefore, stand as the type of a new genus. It is, however, evidently closely related to *Hadropterus nigrofasciatus*, from which species it cannot properly be generically separated.

INDIANA UNIVERSITY, *June* 4, 1883.

DIAGNOSIS OF NEW GENERA AND SPECIES OF DEEP-SEA FISH-LIKE VERTEBRATES.

By THEODORE GILL.

The explorations of the United States Fish Commission steamer Albatross, under the command of Capt. Z. L. Tanner, were unusually successful during the past summer, in the discovery of hitherto unknown species and higher types of fishes, as well as other animals. At the invitation of the Commissioner, Professor Baird, I have examined the collection made during the several trips of the year, and have found no less than eighteen new species of fish-like vertebrates—one Myzont, one Selachian, and sixteen true Fishes. Diagnoses of most of these are here given, but those of four others—one Eurypharyngoid and three Nemichthyoid fishes—will be immediately published in other articles by the present author in conjunction with Mr. John A. Ryder, whose skill as an anatomist, as well as an artist, has rendered his aid invaluable. Hereafter, more full descriptions and illustrations will be given of the forms now diagnosed.

CLASS OF MYZONTS.

PETROMYZONTIDÆ.

Petromyzon (Bathymyzon) Bairdii.

CLASS OF SELACHIANS.

CHIMÆRIDÆ.

Chimæra abbreviata.

CLASS OF FISHES.

EURYPHARYNGIDÆ.

Gastrostomus Bairdii.

NEMICHTHYIDÆ.

Serrivomer Beanii.
Spinivomer Goodei.
Labichthys carinatus.
Labichthys elongatus.

SYNAPHOBRANCHIDÆ.

Histiobranchus infernalis.

NOTACANTHIDÆ.

Notacanthus analis.

CHAULIODONTIDÆ.

Sigmops stigmaticus.

STOMIATIDÆ.

Hyperchoristus Tanneri.

ALEPOCEPHALIDÆ.

Alepocephalus productus.

HALOSAURIDÆ.

Halosaurus Goodei.

BERYCIDÆ.

Plectromus suborbitalis.

Stephanoberyx Monæ.

Caulolepis longidens.

BROTULIDÆ.

Bassozetus normalis.

GADIDÆ.

Onos rufus.

MACRURIDÆ.

Macrurus Bairdii (Goode & Bean).

DESCRIPTIONS OF SPECIES.

PETROMYZONTIDÆ.

Petromyzon (Bathymyzon) Bairdii.

A lamprey closely related to the common sea lamprey (*Petromyzon marinus*) but with the supproral and infroral plates or laminæ destitute of odontoid tubercles, the armature of the lamprey type being obsolescent.

Inasmuch as the character which thus distinguishes the species contradicts the generic diagnosis attributed to the genus by Günther, Jordan and Gilbert, and other ichthyologists, it may be at least subgenerically distinguished, on account of the obsolescence of the denticles, under the name BATHYMYZON.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33311	2048	40 02 00	68 50 30	547	1

CHIMAERIDÆ.

Chimæra abbreviata.

The snout is moderately produced and the subrostral contour very oblique; the ante-orbital flexure of the suborbital line ascends almost as high as the upper margin of the pupil; the dorsals are scarcely separated by an interspace and the spine of the first is acutely angulated and keeled in front; the pectorals extend nearly to the inner axils of the ventrals; the latter are acutely angulated; the tail is abbreviated and only about as long as the head (from the snout to the transverse nuchal line); the color is dark yellow (in life) or brownish, while the

fins are rather plumbeous, except the second dorsal, which has a longitudinal basal band, nearly uniform with the trunk, about as wide as a third of the fin's height, extending the entire length.

The single specimen of this species is nearly three feet long.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
33435	2084	° ′ ″ 40 16 50	° ′ ″ 66 58 00	1,290	1

EURYPHARYNGIDÆ.

Gastrostomus Bairdii Gill & Ryder.

NEMICHTHYIDÆ.

Serrivomer Beanii Gill & Ryder.

Spinivomer Goodei Gill & Ryder.

Labichthys carinatus Gill & Ryder.

Labichthys elongatus.

SYNAPHOBRANCHIDÆ.

HISTIOBRANCHUS.

Synaphobranchid with the dorsal fin protracted almost as far forward as the base of the pectoral fin, and an isolated small patch of teeth on the vomer behind that on its head.

Histiobranchus infernalis.

The dorsal fin commences little behind the root of the pectoral (15 : 100 of length), while the anal arises not much nearer the snout than the end of the tail; the pectorals are considerably shorter than the snout.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
33279	2037	° ′ ″ 38 30 30	° ′ ″ 69 08 25	1,731	1

NOTACANTHIDÆ.

Notacanthus analis.

A Notacanthus with about eighteen anal spines, eleven dorsal spines, and a posterior ray, the length of the snout and diameter of the orbit subequal and greater than the interorbital area, and the snout projecting about one-third of its own length beyond the mouth.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
33327	2048	° ′ ″ 40 02 00	° ′ ″ 68 50 30	547	1

CHAULIODONTIDÆ.

SIGMOPS.

Chauliodontids without scales or pseudobranchiæ, with an elongated claviform body, a short dorsal and long anal, commencing opposite to each other, and with moderately elongated teeth, alternating with several short ones, in a row along the supramaxillaries as well as intermaxillaries and mandible.

Sigmops stigmaticus.

The only species of the genus; its distinct inferior pearly spots, arranged in two rows on each side of the abdomen, are well marked, and the upper have wax-like guttiform spots connected with them below; there is also a broad longitudinal silvery band or sheen.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33291	2039	38 19 26	68 20 20	2,361	1

STOMIATIDÆ.

HYPERCHORISTUS.

Stomiatids with a robust claviform body, naked skin, teeth on the jaws nearly uniserial, but in several groups of which the successive teeth (about 4) rapidly increase in size backwards, and teeth on the palate enlarged, one on each side of the vomer and several on the palatines; moderate dorsals obliquely opposed, forked caudal, and pectorals each with a separate and specialized uppermost ray.

Hyperchoristus Tanneri.

A black fish with formidable teeth, which was so lively when brought to the surface that it twisted itself round in its attempt to bite the commander of the vessel, Captain Tanner.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33444	2083	40 26 40	66 58 00	956	1

ALEPOCEPHALIDÆ.

Alepocephalus productus.

This species agrees closely with *A. Agassizii*, but the eye is considerably smaller, its diameter equaling less than a quarter of the head's

Vol. VI, No. 17. Washington, D. C. Nov. 27, 1883.

length, while the snout is half as long again as in *A. Agassizii*, and forms little less than a third of the length of the head.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33341	2035	39 26 16	70 02 37	1,362	1

Halosaurus Goodei.

B. 12. D. I. 10–11. V. I. 8.

The snout is moderately produced, its preoral portion forming two-sevenths (H. m. $\frac{2}{7}$) of its length; the eye is small, equal to one-fifth (H. m. $\frac{1}{4}$) of the postocular portion of the head, and less than one-half (1 : $2\frac{1}{2}$ c. H. m. 1 : 2) of the width of the interorbital space. The head is longer than the distance between it and the root of the ventral; the supramaxillary reaches the vertical of the front margin of the eye; the dorsal is entirely behind the ventrals; the anal commences as far behind the root of the ventrals as the latter is behind the preoperculum; the pectorals nearly reach backward to the ventrals; the squamation is similar to that of the *H. macrochir*.

This species has been confounded with the *H. macrochir* by previous writers, and it is certainly very nearly related to it, but it appears to be specifically separable by the number of rays in the dorsal and ventral fins and the proportions of those parts contrasted above. I take pleasure in dedicating it to my friend, Prof. G. Brown Goode, who first, in union with Dr. Bean, determined its existence, as well as its near relationship to *H. macrochir*.

N. M. Nos.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33281	2037	38 53 00	69 23 30	1,731	1
33312	2051	39 41 00	69 21 20	1,106	1
33330	2051	39 41 00	69 21 20	1,106	10
33336	2035	39 26 16	70 02 37	1,362	3
33338	2052	39 40 05	69 21 25	1,098	10

BERYCIDÆ.

PLECTROMUS.

Berycids with an elongated form, moderate cycloid scales, an oblong head with a much decurved or truncate snout, rather small eyes, and teeth small, acute, and in two rows in each jaw, of which those of the inner row (at least in the lower jaw) are largest, and palate toothless.

Plectromus suborbitalis.

The color is black. The dorsal fin has three spines and sixteen rays, and the anal one spine and eight rays. Two spines—one on each side of the nape—springing forward from the shoulder bones, give a strange appearance to the fish, and have gained for it the generic name *Plectromus* (*plectron*, spur, and *omos*, shoulder).

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33271	2036	38 52 40	69 24 40	1,735	1

STEPHANOBERYX.

Berycids with an elongated claviform contour, body covered with cycloid scales scarcely imbricated and armed about the center with one or two erect spines; an oblong head with a moderate convex snout, and with thin osseous ridges, especially an inner U-shaped one on the crown whose limbs diverge on each side of the nape, and an outer sigmoid one on each side above the eyes and continuous with one projecting from the nasal; the inner and outer ridges connected by a cross-bar on a line with the anterior margin of the orbit; rather small eyes in the anterior half of the head, and the teeth small, acute, and in a band on the intermaxillaries and dentaries (palate toothless); and with ventrals having one spine and five rays.—Closely allied to *Melamphaes*.

Stephanoberyx Monæ.

A small fish of a brownish color, which exhibits a beautiful system of crests, ridges, and spines on the head. D. 14. A. 13. P. 10. V. I. 5.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33445	2077	41 09 40	65 55 00	1,253	1

CAULOLEPIS.

Berycids with a laterally oval or broad pyriform contour a compressed body covered with small pedunculated leaf-like scales, an abruptly declivous forehead, small eyes, a pair of very long pointed teeth in front of upper jaw closing in front of lower, a similar pair of still longer pointed teeth in the lower received in foveæ of the palate; on the sides of each jaw two long teeth terminating in bulbous tips, a row of minute teeth on the posterior half of the supramaxillaries, and a toothless palate.—Closely related to *Anoplogaster*.

Caulolepis longidens.

The color is a uniform black; there are two spines and seventeen rays in the dorsal fin, and two spines and eight rays in the anal; the front

teeth of the lower jaw are of enormous length (nearly twice as long as those of the upper), but the scales exhibit the most remarkable peculiarity.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33270	2034	39 27 10	69 56 20	1,346	1

BROTULIDÆ.

BASSOZETUS.*

Dinematichthyine brotulids with a slender body, a narrow differentiated caudal fin, anus about a third of the total length from the snout, small eyes, and unarmed head and shoulders.

Bassozetus normalis Gill.

The greatest height little exceeds an eighth of the total length, and the head enters nearly five and a half (18.5 100) times in the latter; the caudal has 9 rays, and its length equals the width of the head.

N. M. No.	Station.	Lat.	Long.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33306	2042	39 33 00	68 26 45	1,555	1

GADIDÆ.

Onos rufus.

There are three barbels (and no accessory ones); the enlarged dorsal ray is as long as, or longer than, the head; some enlarged brown-colored teeth are developed in the exterior row, and the color in life is an almost uniform salmon or brick-red hue. It is closely related to the *Onos ensis* of Greenland and may possibly prove to be identical with it, but nothing has been stated with regard to the color of that species, a feature too striking to be overlooked.

N. M. No.	Station.	Latitude.	Longitude.	Fathoms.	Specimen.
		° ′ ″	° ′ ″		
33297	2051	39 41 00	69 20 20	1,106	1

MACRURIDÆ.

Macrurus Bairdii *Goode & Bean.*

The tail is very long and slender, the height diminishing to an equality with the diameter of the orbit considerably within the anterior half of the total length, and thence regularly attenuated to the end: the head forms little more than a sixth of the length; the eye is very large,

* *βάσσων* (Doric Greek) deep, and *ξήτων*, seeker.

the diameter exceeding a third of the head's length; the interorbital space is little more than a quarter of the same length, and the snout is considerably less than a third; the latter, viewed from above, is subquadrate, but with an anterior median projection and its bounding ridges emarginated; the rostro-suborbital is well defined and continues backward toward the interior limb of the preopercle, while the lower surface of the snout and below the suborbital ridge are well developed; the mouth is rather small; the opercle is also comparatively small and triangular, the posterior margin being nearly rectilinear; the dorsal spine is about as long as the head from the front of mouth to the tip of opercle, and is armed with strong spines appressed upwards; the pectorals reach backward to the vertical of the fourth or fifth anal ray, and the filamentary ventrals to about the third ray.

D. (1) II. 10, (2) 138. A. 119. P. 15. V. 7.

The scales are quite small, there being about 27 longitudinal rows in front (6 + 1 + 20), and are characteristic in their armature, there being generally 15 or 16 (13–20) rows of alternating subequal spines on the surface and no approach to union of any into keels.

The color, in alcohol, is yellowish-brown, merging into bluish on the abdomen.

N. M. Nos.	Station.	Latitude.	Longitude.	Fathoms.	Specimens.
		° ′ ″	° ′ ″		
33418	2062	42 17 00	66 32 00	150	15
33406	2064				3

DIAGNOSES OF NEW GENERA OF NEMICHTHYOID EELS.

By THEODORE GILL and JOHN A. RYDER.

Hitherto only three species have been recognized among the Nemichthyoid eels—three species of Nemichthys (*N. scolopaceus*, *N. avocetta*, and *N. infans*) and one representing an isolated type that possibly represents another family—the genus *Cyema* of Dr. Günther. But the trawling operations of the United States Fish Commission steamer Albatross were rewarded in 1883 by the finding of not less than four species representing three hitherto unknown modifications of structure necessitating generic distinction. One of these forms was in most respects closely allied to the ordinary long known type, but the other two were very different. Diagnoses of the new types are here offered in advance of the publication of more detailed descriptions and illustrations at some other time.

SERRIVOMER.

Nemichthyids with the head behind eyes of an elongated parallelogramic form, with moderately attenuated jaws, branchiostegal membrane confluent at posterior margin, but with the branchial apertures limited by an isthmus except at the margin, and with lancet-shaped vomerine teeth in a crowded (sometimes doubled) row.

Serrivomer Beanii.

D. 157. A. 138.

The stoutest of the family and with much shorter jaws than any other, and with a very formidable vomerine armature. The total length of the single specimen obtained was .594 of a meter; its height at the vertical of the mandibular articulation is .016 m., and the greatest height of the body (just behind the branchial apertures) is .02 m.

N. M. No.	Station.	Latitude.	Longitude.	Fathoms.	Specimen.
		° ′ ″	° ′ ″		
33383	2075	41 40 30	65 28 30	855	1

SPINIVOMER.

Nemichthyids with a rectilinear occipito-rostral outline, with very attenuated jaws, high mandibular rami, the branchial apertures nearly confluent, enlarged acute conic teeth an a median row on the vomer, and with a silvery epidermis, and a filiform tail.

Spinivomer Goodei.

D. ——. A. ——.

The smallest of the family, but a beautiful silvery form. The total length of the only specimen found is .13 of a meter, and its greatest height (at the branchial region) is .0025 m.

The rays are ensheathed in a tough membrane which renders it impossible at present to enumerate them with exactitude. They are, however, it is to be noted, more distant from each other, and consequently fewer than in *Serrivomer*.

The fish has a silvery sheen by which, as well by the smaller eyes and deeper mandibles, it may be at once recognized from its relations.

N. M. No.	Station.	Latitude.	Longitude.	Fathoms.	Specimen.
		° ′ ″	° ′ ″		
33293	2039	38 19 26	68 20 20	2,361	1

LABICHTHYS.

Nemichthyids with the head behind the eyes contracted, with very attenuated jaws, the branchiostegal membrane connected to the throat and the branchial apertures limited to the sides, with small conical teeth in a band along the vomer and otherwise dentition of *Nemichthys*, a black epidermis, and the tail abruptly truncated.

Labichthys carinatus.

D. 268. A. 287. P. 13.

The ridges that bound the median rostral sulcus converge and form a carina along the median line in vertical from the anterior border of the

orbit. The greatest height of the body (at posterior third) of the type specimen (.447 m. long) is .013 m., and the height behind pectorals is .0055 m. The color is black.

N. M. No.	Station.	Latitude.	Longitude.	Fathoms.	Specimen.
		° ′ ″	° ′ ″		
33369	2076	41 13 00	65 33 30	906	1

Labichthys elongatus.

D. 346. A. 309 + *x*. (The anal is destroyed towards its end.) P. 19.

The ridges that bound the rostral groove are not confluent backwards in a cariniform extension, but end in a vertical from the orbit. The greatest height of the body (at posterior third) in the type specimen (.542 m. long) is .015 of a meter. The color is black.

N. M. No.	Station.	Latitude.	Longitude.	Fathoms.	Specimen.
		° ′ ″	° ′ ″		
33577	2100	39 22 00	68 34 30	1628	1

ON THE ANATOMY AND RELATIONS OF THE EURYPHARYNGIDÆ.

By THEODORE GILL and JOHN A. RYDER.

The remarkable fish called *Eurypharynx* was one of the fruits of the explorations of the French vessel Travailleur in 1882. A single specimen about a foot and a half long was obtained off the coast of Morocco at a depth of 2,300 meters (about 1,100 fathoms), and has been partially described by M. L. Vaillant under the name *Eurypharynx pelecanoides*.

Three specimens of the same general type of fishes were found by the United States Fish Commission steamer Albatross in August and September, 1883, and might be considered to be generically and even specifically identical with *Eurypharynx pelecanoides* were it not for several positive statements made by the describer of that species.

The problem of the relations of *Eurypharynx* to other fishes has been discussed by M. Vaillant with what appears to us to be negative results and one set of conclusions necessarily contravenes another. But it is only just to M. Vaillant to let the opinions as to the affinity of the fish enunciated by him be presented in his own language:

"We may say that the fish presents relations with the Anacanthini, with certain Physostomi, such as the Scopelidæ and Stomiatidæ, and also with the Apodes. While it resembles these last in the want of ventral fins and the imperfection of the opercular apparatus, it differs from them too much in its well-developed and absolutely free intermaxillaries to allow it to be placed in the same group. As regards the Scopelidæ and Stomiatidæ, all the known genera in those families have a very widely open branchial orifice: in the former the intermaxillary alone forms

the free border of the upper jaw; in the latter the maxillary forms part of it; and thus it would be the Scopelidæ that *Eurypharynx* would approach, especially as it does not present the hyoidean barbel which has hitherto been indicated as characteristic of the Stomiatidæ.

"However, of all fishes it is to *Malacosteus niger*, Ayres, placed in the latter family by zoologists, that we are tempted to approximate the animal here under consideration; they alone present the simple arrangements of the suspensorium indicated above.

"But, finally, it is perhaps with the Anacanthini that its relations seem to be most real, whether we consider the form of the body, which greatly resembles that of *Macrurus*, or the absence of ventral fins, which is usual in certain animals of the group; thus several Ophidiidæ and all the Lycodidæ (the latter even having their branchial orifice reduced, although not to the degree that occurs in our animal) increase the probability attaching to this view. However, the characters of *Eurypharynx* are so strongly marked that in any case it is necessary to regard it as the type of a new family; and of this it would be the sole representative, unless subsequent investigations show that we must unite with it the genus *Malacosteus*."—(Vaillant, *op. cit.*)

We are unable to appreciate any affinity of *Gastrostomus* to any Anacanthines, Physostomes, or typical Apods, nor does it seem to be at all related to *Malacosteus*, which has been universally considered to be a little modified Stomiatid. Our own conclusions are expressed in the following arrangement.

The characters observed in the specimens collected by the Albatross may be segregated into several categories—(1) those disagreeing with structural characters exhibited by all normal Teleosts and which are paramount even to the characters usually considered to be of ordinal value; (2) those presumably common to the western and eastern Atlantic forms and which may be regarded as of family value; and (3) the characters alleged to be peculiar to *Eurypharynx* on one hand and on the other confirmed as to their discrepancy in the American form. In this order we here expose the cardinal characteristics of the Eurypharyngoid fishes in advance of a monograph in which we propose to describe and illustrate in detail their morphology, and discuss their relationship to other fishes, and especially to the Saccopharyngids and eel like types generally.

ORDER LYOMERI.

Fishes with five branchial arches* (none modified as branchiostegal or pharyngeal) far behind the skull; an imperfectly ossified cranium, articulating with the first vertebra by a basi-occipital condyle alone; only two cephalic arches, both freely movable, (1) an anterior dentigerous one—the palatine, and (2) the suspensorial, consisting of the

* "We find six pairs of interior branchial clefts, and consequently five branchiæ" in *Eurypharynx*.—VAILLANT.

hyomandibular and quadrate bones;* without maxillary bones or distinct posterior bony elements to the mandible; with an imperfect scapular arch remote from the skull; and with separately ossified but imperfect vertebræ.†

FAMILY EURYPHARYNGIDÆ.

Nouvelle famille *Vaillant*, Comptes Rendus. Acad. Sc. Paris, t. —, p. 1226, Dec. 11, 1882 (not named).

Eurypharyngidæ *Gill*, Science, v. 1, p. 231, March 30, 1883.

Lyomeres with the head flat above and with a transverse rostral margin, at the outer angles of which the eyes are exposed, with the jaws excessively elongated backwards and the upper parallel and closing against each other as far as the articulation of the two suspensorial bones, with minute teeth on both jaws, with a short abdomen and long attenuated tail, branchial apertures narrow and very far behind, dorsal and anal fins continued nearly to the end of the tail, and minute pectoral fins.

The mandibular rami are exceedingly narrow and slender, but the jaws are extremely expansible and the skin is correspondingly dilatable; consequently an enormous pouch may be developed. Inasmuch as the slenderness and fragility of the jaws and the absence of raptorial teeth (at least in *Gastrostomus*) preclude the idea of the species being true fish of prey, it is probable that they may derive their food from the water which is received into the pouch, by a process of selection of the small or minute organisms therein contained.

The peculiar closure of the anterior half of the upper jaws upon each other, and the co-ordinate joint between the hyomandibular and quadrate elements of the suspensorium are doubtless correlated with the mode of ingestion or selection of food. The skin constituting the pouch, it may be added, has a peculiar velvety appearance, and also reminds one of the patagium or wing membrane of a bat. But a more detailed summary of the salient characteristics of the type may be justly demanded at once.

OSTEOLOGY.

The skeleton is noteworthy for its simplicity or rather fewness of its parts, but the homologies of these parts are, for that very reason, not evident at first sight. We necessarily confine our attention to *Gastrostomus*, as the parts of *Eurypharynx* have not yet been described or figured.

The *cranium* above is really pentagonal, but apparently, in the main, transversely quadrate, expanding backwards around the foramen magnum (which is conspicuous from above) and forwards into the ethmoid expansion, which is separated from the main portion by a strangula-

* "We find neither hyoidean apparatus nor opercular pieces."—VAILLANT.

† "It is important to indicate the complete absence of the swimming bladder."—VAILLANT.

tion; below it appears to have more of a pentagonal outline on account of the less irregularity of the surface near the contour.

The *notochord* is persistent in the skull for half the length of the basi-occipital.

The *occipital condyle* is transverse and there are no lateral ones.

The *basioccipital* occupies nearly a third of the length of the base of the cranium.

There is a very small *supraoccipital* developed as a transverse bone above the foramen magnum and protruded forward as a triangular wedge between the parietals.

External to the exoccipital there is an *opisthotic* element, in front of which succeeds a discoidal element (which is probably the proötic) with which alone the hyomandibular articulates, not coming in contact with any other otic bones.

There are well-marked *exoccipitals* and *alisphenoids* which have more or less distinct sutural relations with adjoining bones, but their limits have not been clearly determined.

External to the parietals there is a *pterotic* with lateral and ventral fossæ for the insertion of the strong muscles which move the jaws.

The *parasphenoid* is present and extends as a narrow splint from the hinder portion of the basioccipital to very near the end of the rostrum, where it widens and assumes a slightly spatulate form, resting free on the ethmoid expansion, there being no vomer developed.

The *presphenoid* has not been worked as to its limits anteriorly, but the fifth nerve passes out of the skull behind the alisphenoid in its usual relative position to other parts and immediately within and in front of the discoidal element lodged in a fossa behind the alisphenoid and below the pterotic, and with which the styliform hyomandibular has an articulation admitting of a swinging movement, inasmuch as the pterotic itself is slightly mobile in relation to the adjacent bones.

The *parietals* are the best developed bones, and cover most of the hinder half of the cranium, those of the two sides being in contact from near the foramen to near the center of the roof.

In front of the parietals there are *postfrontals* which form laterally the posterior border of the orbit.

The *ethmoid* or rostral part of the cranium is cartilaginous or like the chondrocranium of the typical teleost in its histological characters.

The *orbital fossæ* open obliquely forwards and directly downwards, and there are no infraorbital bones.

The *nasal fossæ* are depressed excavations in the lateral region of the cranial rostrum, partly roofed over above and from behind by horizontally projecting cartilaginous ridges; they open obliquely forwards and outwards within a very short distance of the upper side of the end of the snout.

The foramen for the passage of the *ninth and tenth nerves* opens alongside the basioccipital and perforates the exoccipital.

There is *no vomer* developed, but a triangular cartilaginous element pendent from the cranial rostrum affords attachment for the palatine element anteriorly; this element is inclined obliquely downwards and backwards and is joined to the rostrum by its anterior border.

The *articular condyle* for the suspensorium, as already indicated, is a discoidal cartilaginous element (resting in a fossa under the lateral expansion of the cranium); it has a papilliform eminence in the center, which fits into a conical depression in the head of the slender hyomandibular bone: the hyomandibular, and especially the quadrate, are excessively elongated and articulate by an intermediary cylindroidal cartilaginous bond, which reminds one of the intervertebral disks seen in the spinal column of mammals; this cartilage is ensheathed behind by a splint-like prolongation of the quadrate, which is prolonged and attenuated on the surface of the hyomandibular; the distal end of the quadrate is grooved longitudinally, forming, with the articular end of the mandible, a complete ginglymus joint.

The *vertebræ* are very numerous, and at the same time very simple and little differentiated from each other.

The vertebral *centra* are annular, and constricted in the middle like a dice-box, and the cavity of each vertebra is filled with vacuolated tissue, the remains of the chorda; the centra are connected together by cartilaginous annular ligaments.

The *neurapophyses* are slender, diverging (instead of convergent), cartilaginous distally, and embracing the neural sheaths on the sides, while by the neurapophyses is supported a membranous sheath which roofs over the nervous chord, and around which there is a wide serous space which extends into the cranium, expanding so that the serous space around the brain is as capacious relatively as, or more so than, in Elasmobranchs.

Hæmapophyses are represented by parallel plates on the ventral face of the centra, and these plates are broadest at the ends of the vertebræ.

The first vertebra is shorter than those which follow, and the caudal vertebræ are simpler than those of the body and prebranchial region; at the extreme tip of the tail there are possibly no vertebræ differentiated, the skeletal axis of the body being represented by the notochord and its sheath.

The interspinous basalia of the median fin rays are composed of two pieces, one proximal, the other distal, with the articular extremities represented by cartilage.

The median fin rays at their base have cartilaginous articular portions mesially divided, the halves continued distally into the lateral halves of the unsegmented rays. The medulla or axial portion of the rays is not cartilaginous.

There is an eradiate ventral fold of ectoblast, as in embryo fishes. No dorsal or anal rays exist for some distance from the end of the tail. (These last are features which would indicate a defective development of the extreme caudal end of the bony skeletal axis of the body.)

BRANCHIAL SYSTEM.

The branchial apparatus has five very short arches and six clefts, the arches being fringed with a double row of lamellæ, with cartilaginous axial supporting filaments. The very short branchial arches seem to have been backwardly displaced, and the clefts open downward instead of laterally. The clefts lie in a pair of anteriorly divergent furrows in the floor of the pharynx. The skeletal elements of the branchial apparatus are probably in large part cartilaginous and imperfectly developed. The branchiæ are covered by a soft integumentary fold, in which there are no apparent traces of branchiosteges.

MYOLOGY.

The muscular apparatus which actuates the jaws and hyomandibular suspensor in *Gastrostomus* presents one very remarkable feature in that its cross-section apparently exceeds that of the dorso-ventral lateral muscular masses of the nape. These muscles operate (1) the mandible and (2) the hyomandibular and quadrate.

The mandible is extended by a powerful extensor muscle, lying behind and external to the hyomandibular. (Its belly, in our largest specimen, is about as long as that of the hyomandibular—about .035^{m}, and its filiform tendon is partially ossified, and measures .065^{m} in length, thus together constituting a total length of .10^{m}.) Its origin is in the lateral cranial fossæ in the pterotic, and its insertion into the angular portion of the mandible, which is turned upward and backward over the distal end of the quadrate, like the olecranon of man. This muscle may be called the extensor of the mandible, and is practically placed posteriorly to the suspensor.

The other principal muscle originates anteriorly, externally and internally to the articulation of the mandibular suspensor, which depends obliquely backwards from the skull, and its belly is about .05^{m} long and eight times the bulk of the mandibular extensor. Part of it passes down between the palatine and the suspensor internally, and its internal belly is prominent within the mouth, while its external belly is strongly marked from without, behind and below the eyes, immediately behind which its anterior origin from the skull begins. The dentigerous palatine is really anterior to it, but closely apposed, while a furrow in the posterior side of its belly receives the upper half of the suspensorium. Its origin largely covers the postorbital portion of the ventral face of the cranium nearly as far back as the basisphenoid and from the external ventral margin of the skull behind the eye to near the middle line. Its insertion seems to be partly into the angular portion of the mandible in front of its articulation with the quadrate and partly into the quadrate itself. Its function is to close the mandible and to divaricate and approximate the greatly elongated suspensor, which itself has a cartilaginous joint near its upper third, and enjoys a special mobility in virtue of its peculiar articulation with the cranium.

SPLANCHNOLOGY.

The viscera are arranged in the abdominal cavity in a somewhat peculiar manner in that the black pigmented layer of the mouth and throat is continued back over a blind, saccular prolongation of the walls of the pharynx and œsophagus, the latter being so greatly widened as to scarcely be evident, except as defined by its relative position with respect to the branchiæ. This peculiar arrangement has given an unexpected significance to the generic name which we have proposed. While there is no very evident œsophageal constriction, both it and the pharyngeal part of the alimentary tract are very short, owing to the great reduction of the branchial apparatus.

The thin membranous parietes of the mouth and throat are thrown into numerous longitudinal, approximated, parallel folds, in harmony with the fact that the throat and mouth are very distensible. This wrinkling of the parietes of the pharyngeal region is apparent above the gills, which evidently open internally in the ventral part of the pharynx.

A darkly pigmented cæcal prolongation of the throat begins just above and behind the gills, and is lined with a thick deeply plicated secretory epithelium, the whole sack extending as far back as the first half of the body cavity; at the anterior lateral portion of this pigmented sack the widest, thick-walled part of the intestine arises on the right side and extends backward under the dark-walled cæcal pouch along the middle line between the thick and symmetrically disposed liver, which lies against either side of both the dark pouch and the first portion of the intestine, and extends for about half the length of the abdominal cavity. Behind the liver the intestine becomes suddenly narrower, and has two flexures, but is not very sharply bent upon itself.

The pigmented cæcal part of the alimentary tract seems to be the stomach, from which it is probable that the food is passed after partial digestion to the thick-walled anterior portion of the intestine proper, lying just below it and opening into it at its anterior part.

The mode in which the food is collected is probably as suggested before, namely, by filling the mouth with water containing small organisms which are retained and left in the pharynx above the gills as the water is strained through the latter. The wrinkles in the oral and pharyngeal integument would indicate that the latter probably contains scattered muscular fibers and is itself contractile.

The abdominal cavity is separated from the cardiac by a septum, in front of which there is a well-developed heart of the usual type with an atrial sinus, ventricle, and bulbus aortæ. The heart lies in a very thick-walled pericardial sac.

No air-bladder or rudiment of such a structure has been discovered in our specimens.

The renal organs lie in the hinder part of the abdominal cavity, ex-

tending for half its length as a thick agglomerated mass of nephric tubules external to the peritoneum.

Behind the liver, in the female, the ovary is developed on either side of the mesentery for half the length of the body cavity. It is composed of series of free slightly plicated lobes which depend into the abdominal cavity on either side of the intestine. No peritoneal tunic embraces the ovarian organ, and there is no oviduct, the ova escaping from the body by way of a conspicuous pore immediately behind the vent.

The following facts in regard to the genesis of the ova have been made out: The ova probably drop from the naked ovigerous lamellæ, as they rupture their follicles, into the abdominal cavity. In our specimen the ova were found to be immature, but were probably within a couple of weeks of the mature state, judging from their large size (.0007 meter, in diameter), so that the animal probably spawns in the autumn. No very immature or very young ova were noticed in the ovarian stroma, which would indicate that the spawning season was near at hand. (The specimen was obtained September 3d.)

There is probably present in the eggs when they are full grown oil, which appears to be superficially embedded in the vitellus in the ovarian eggs which were examined. The proof that the ova studied by us were immature consists in the fact that there still seemed to be present a nuclear body in the center of the vitellus when the eggs were stained with safranin and the superfluous color abstracted with alcohol.

What now are the deductions to be derived as to the systematic relations of the Eurypharyngids? We cannot agree with M. Vaillant that they have any relations with the Anacanthini, with certain Physostomi, such as the Scopelidæ and Stomiatidæ, and also with the Apodes, nor that they are at all approximated to the genus *Malacosteus*. On the contrary, in our opinion, there are few fishes more removed from them than the Anacanthines, and the Scopelids and Stomiatids (including *Malacosteus*) are also extremely divergent. It is true that the latter exhibit an analogous extension of the oral fissure, but the little value of that character is evident from the gradation of the wide-mouthed forms of their series into those having normally cleft ones. Furthermore, the extension of the peristomal elements has been attained by entirely different methods in the two types. In the Scopelids and Stomiatids, the upper jaw is constituted by the hypertrophied intermaxillaries or supramaxillaries, and the palatines are conversely reduced, while in the Eurypharyngids the upper arcade of the mouth is constituted solely by the liberated and excessively elongated palatine bones, and the maxillaries are entirely wanting.

It is then with the true Apodal fishes that the Eurypharyngids may be most aptly compared. In that series we find a gradation from those forms exhibiting nearly the typical Teleostean type of structure to those in which the palatine bones alone form the superior arch of the mouth

and other elements are atrophied or entirely absent. The Muræenids* are those forms exhibiting the greatest degree of degradation of the cephalic arches. But it is by no means certain yet that the Eurypharyngids are derived from the same primitive stock as the Muræenids. On the contrary, the evidence thus far furnished by our anatomical investigations lead us to believe that they are the offshoots of a primitive phylum cognate with the specialized Apodes, but far back in the phyletic history of those diversiform (or rather diversistructural) fishes. The common characters are rather the results of teleological modification resulting from analogous conditions, or rather conditions entailing analogous structures, than of common origin. For the present, therefore, we propose to isolate the Eurypharyngids as the representatives of a distinct order and to place that order next to the Apodes. As an ordinal name we propose Lyomeri,† by which we intend to point at the loose connection of the palatine and suspensorial elements and the isolation of the branchial and scapular arches from the cranium.

Whether any of the other known types of fishes belong to this order is very doubtful, and, in fact, we have sufficient data respecting them to be tolerably certain that none do, unless it may be the *Saccopharynx flagellum*. *Saccopharynx* is a very peculiar type, the representative of quite an isolated family, but its structure is almost unknown. The last systematic writer who has referred to its characters (Dr. Günther) has described the genus as consisting of "deep-sea congers, with the muscular system very feebly developed, with the bones very thin, soft, and wanting in organic matter; *head* and gape *enormous*"; "*maxillary* and mandibulary bones very thin, slender, arched, armed with one or two series of *long*, slender, widely set *teeth*, their points being directed inwards," &c.‡ Dr. Günther's "maxillary" bones are doubtless palatines, and his description is very deficient in precision, but supplemented as it is by the descriptions of Mitchill and Harwood, it is evident that the genus *Saccopharynx*, or family Saccopharyngidæ, is quite remote from the Eurypharyngidæ. More than this can only be surmised at most till its structural characteristics are determined.

The question must hereafter arise whether the fishes examined by M. Vaillant and ourselves are the same or really distinct generic types. Little value is to be attached to the relative extension (within the limits observed) of the jaws, but the proportions of the cranium (if confirmed) would indicate that the two forms exhibit marked differences, and our respect for the eminent French naturalist will not permit us to

* We understand by the term "Muræenids" the natural family represented by *Muræna* and closely related genera only, and not the heterogenous medley called the "family Muræenidæ" by Dr. Günther. See Cope's memoir in Trans. Am. Phil. Soc., v. 14, p. 456; Gill's "Arrangement of the families of Fishes," p. 20, and Jordan & Gilbert's "Synopsis of the Fishes of North America," p. 355.

† *Λυος*, loose, and *μερος*, part or segment.

‡ Günther (Albert C. L. G.): An Introduction to the Study of Fishes, 1880, p. 670.

assume error on his part in reference thereto, and, consequently, we propose (provisionally at least) to differentiate the two forms as follows:

EURYPHARYNX.

Eurypharynx Vaillant. Comptes Rendus Acad. Sc. Paris, t. —, p. 1232, Dec. 11, 1882 (tr. Ann. & Mag. Nat. Hist. (5), v. 11, p. 67).

Eurypharyngids with the cranium prolonged backwards, the dentigerous bones little more than three times as long as the cranium;* "faint dentary granulations" on both jaws, and at the extremity of the mandible "two hooked teeth";† and the tail terminating in a point.

EURYPHARYNX PELECANOIDES.

Eurypharynx pelecanoides Vaillant.

GASTROSTOMUS.

Gastrostomus Gill & Ryder.

Eurypharyngids with the cranium abbreviated and little or no longer than broad, the dentigerous bones almost seven times as long as the cranium; minute acute conic teeth depressed inwards in a very narrow band on the jaws (no enlarged teeth at the extremity of the mandible), and the tail with an eradiate membrane under its terminal portion.

GASTROSTOMUS BAIRDII.

Gastrostomus bairdii Gill & Ryder.

The cranium forms about one-thirtieth or less of the extreme length, and is as broad as long; the jaws are excessively elongated, being nearly (in large) or more (in young) than seven times longer than the cranium; there are about 160 rays in the dorsal fin and about 107 in the anal; the pectorals are very small, being only about as long as the diameter of the eye, and little more than twice as long as wide at the base, and have about nine simple rays. The rays of the unpaired fins are quite flexible in the small individuals, but quite rigid and more perfectly ossified in the larger; they become obsolete toward the end of the tail. The rays, which are rigid and well ossified anteriorly, become shorter,

* "This animal, about 0.47 metre long and 0.02 metre high at the most elevated part, is of an intense deep black color. The body, the form of which is masked in front by the abnormal mouth, which will be mentioned further on, resembles that of *Macrurus;* it becomes regularly attenuated from about the anterior fourth, the point at which the external branchial orifice is seen, and terminates in *a point* at the caudal extremity; the anus is situated at the junction of the anterior third with the posterior two-thirds of the body.

"What gives this fish a very peculiar physiognomy is the arrangement of the jaws and the structure of the mouth, which are even an exaggeration of what Mr. Ayres has described in *Malacosteus niger.* Although the head is short, scarcely 0.03 metre, *the jaws and the suspensorium* are excessively elongated; the latter did not *measure* less than 0.095 metre; and from this it results that the articular angle is carried very far back, to a distance from the end of the muzzle equal to *about three and a half times the length of the cephalic portion.*"

† "On both jaws one can feel faint dentary granulations; at the extremity of the mandible there are two hooked teeth 0.002 metre long."

very slender, and flexible—in fact almost as limp as threads near the end of the tail. The vertebral bodies become longer and more attenuated toward the end of the tail.

	Metre.
Extreme length	.47
Body:	
Height at branchial region	.035
Height at anus	.025
Height at commencement of anal fin	.02
Length of abdominal cavity	.05
Cranium:	
Length	.015
Width	.015
Interorbital area	.011
Orbit, diameter	.003
Jaw:	
Upper, length	.103
Lower, length	.103
Suspensorium, length	.102
Branchial aperture:	
From snout	.11
From dorsal	.028
Interbranchial isthmus, width	.0035
Dorsal:	
From snout	.07
Longest ray	.0075
Anal:	
From snout	.175
Longest ray	.015
Pectoral:	
Distance from branchial aperture	.002
Distance from anus	.04
Distance from snout	.115
Length	.0035
Width (at base)	.0015

The vertebræ of *Gastrostomus Bairdii*, as observed in the mutilated medium-sized specimen, are as follows:

Total number?	97
(The last two or three caudal are not distinguishable by dissection.)	
Number intervening between cranium and branchiæ	16
Number between branchiæ and vent	6
Number in tail	75
Vertebral formula (approximately) 22 + 75	97

The three specimens of this species secured were found at different times and in quite different depths of water, as will be seen from the following exhibit:

N. M. Nos.	Station.	Latitude.			Longitude.			Fathoms.
		°	′	″	°	′	″	
33294	2047	40	02	30	68	49	40	389
33295	2043	39	49	00	68	28	30	1,467
33386	2074	41	43	00	65	15	20	1,309

Vol. VI, No. 18. Washington, D. C. Dec. 13, 1883.

The proportions of the three specimens of *Gastrostomus* essentially agree as to those points for which measurements have been given by M. Vaillant, and their ratios and the descrepancy therefrom of the type of *Eurypharynx* may be judged from the following table:

	E.	G. 1.	G. 2.	G. 3.
Extreme length	.47	.47	.235	.149
Cranium:				
Length	.03	.015	.0075	.0045
Width		.015	.0075	.0045
Suspensorium, length	.095	.102	.053	.0335

There is no *à priori* improbability of the existence of two or even many generic modifications of the Lyomerous type, and differences like those represented by the preceding diagnoses are such as might naturally be expected.

ORNITHOLOGICAL NOTES ON COLLECTIONS MADE IN JAPAN FROM JUNE TO DECEMBER, 1882.

By PIERRE LOUIS JOUY.

INTRODUCTION.

Accompanied by Mr. A. J. M. Smith, I left Yokohama on the morning of the 23d of June, 1882, for an ornithological trip to Fuji-yama. This, the highest mountain in Japan, is a favorite breeding-ground for many species of birds, both migratory and resident; centrally situated and having an altitude of over 12,000 feet above the sea level, it affords every favorable condition of environment.

Traveling by the ordinary hand-carriage, or kuruma, we accomplished about 35 miles of our journey, which was as far as the condition of the roads would allow. We then walked on to Tonozawa, a small place where we had a bath heated by a natural spring, and also secured very good accommodations for the night.

From Tonozawa to Ashinoyu, by mountain paths, through several small villages, occupied the next day. Sulphur springs of varying temperature, from 85° Fah. to boiling point, abound in these hills, and are utilized largely for bathing purposes. The water is conducted by means of bamboo pipes to the houses and public bathing places, and in many of the towns hot and cold water flow side by side through the principal street.

Here, as in Switzerland, the people are mainly engaged in cabinet work, turning and carving; many grotesque objects are made out of the roots of trees. Although mills run by water-power abound, yet they

do not use water for driving the lathes, which have only a half-rotary motion and are worked entirely by foot-power.

The weather was very unpropitious, and the roads were in a very bad condition. It still continuing to rain heavily, we stopped at Ashinoyu for two days. Few birds were seen, except *Passer montanus*, *Emberiza ciopsis*, and the sprightly Japanese nightingale, *Cettia*, which, despite the rain, sang merrily on every roadside.

From Ashinoyu, over the grass hills skirting Hakone Lake, we walked on to Higashitanaka, a small town about 6 miles from our destination, where, procuring a kuruma, we arrived at Subashiri on the same day. Subashiri, situated on the east slope of Fuji, 2,500 feet above the level of the sea, is almost due west from Yokohama about 45 miles. It is one of the principal towns from which the pilgrims make the ascent of the Sacred Mountain. Though small it consists mainly of "tea-houses," or native hotels, and can probably accommodate 600 or 800 guests. Arriving three or four weeks ahead of the pilgrim season, we found the place quite deserted, and were fortunate in securing two very good rooms at the best tea-house in the place. Here we worked from the 28th of June until the end of July, and, although we had ten days of bad weather, we succeeded in getting 326 specimens and about 60 species of birds, besides a few nests and eggs. A number of interesting first plumages of birds were obtained which have hitherto been undescribed. The approach of the pilgrim season filled the town with guests, whose curiosity in regard to our doings became a positive annoyance. From the middle of July until the end of August an average of over 1,000 persons ascended the mountain daily from the various towns around its base. A large proportion of these people passed through Subashiri.

Having accomplished all that it was possible for us to do unless we had waited for the fall migration, we determined to seek a new field. Returning to Yokohama for fresh supplies, we resolved to continue our work in the central part of Japan. We accordingly left on the 22d of August, taking a tent and outfit for an extended trip in the mountains. We first camped out on the shores of Chiusenji Lake, among the Nikko Mountains, about 90 miles nearly due north from Yokohama.

At this elevated region (4,375 feet above the level of the sea), although early in September, the nights were quite cold, and very few birds were to be obtained. A fine specimen of the honey buzzard (*Pernis apivorus*) was brought to us by an old native hunter, who shot it with his matchlock gun; the young of the rare robin (*Larvivora cyanea*), also the young of the Eastern bullfinch (*Pyrrhula orientalis*), were the most interesting birds we collected at Chiusenji.

An occasional kite was seen flying over the lake, refuting the testimony of the guide-book, which states that "*no fish live in it.*" Swifts, which are so numerous in summer, had all departed when we arrived, and a sojourn of ten days at the lake convinced us that we had arrived

at that unsatisfactory season when the migratory birds had all departed, and yet it was not cold enough to drive the winter birds down from the mountains.

Finding it necessary to reduce our luggage to the smallest amount possible with the work in hand, we sent our tent and collections on hand back to Yokohama. The balance of our supplies and outfit we sent by native express company to Omachi, in the province of Shinshiu, which we decided to make our headquarters. We now had a walk before us of about 100 miles over some of the most picturesque and mountainous country in Japan, extending nearly across the main island. The roads were exceedingly rough, being mainly bridle-paths for pack-horses. In this stretch of country we did not observe a single valley 10 miles in width. Five miles from Chiusenji we passed through the town of Umoto, on the shores of Umoto Lake, a beautiful sheet of water, smaller in size than Chiusenji, but much more irregular in shape. This lake is on a higher level than Chiusenji, and empties into it by a steep cascade. Some of the strongest sulphur springs in Japan are found at Umoto, and are much resorted to by travelers. The water, which is 124° Fahr., pours out of the hillside and finally empties into the lake, turning the water a dirty, milky color. In this part of the lake we noticed that carp were particularly abundant, seeming to enjoy the warmer water.

At Numata, a town of about 4,000 inhabitants, we secured specimens of the "*Ai*," a celebrated Japanese fish belonging to the Salmonidæ (the *Salmo altivelis* of authors). These fish are caught in a peculiar manner. After whipping the stream with flies, as for trout, and securing a fish, a fine gut line is passed through the nostrils and fastened to a line held in the hand; trailing behind the fish thus fastened, which is simply a decoy, are several bright hooks which flash in the sunlight and attract other fish. The decoy is now gently led up stream, and the fish, in darting after it, get snagged on the hooks. Horse-hoof parings, used as lures, are said to be successful with "*Ai*"; they are also caught with weirs.

At Kusats, one of the most important watering-places in Japan, celebrated for its many fine baths, we stopped for a day and a half. Here bathing is done under systematic instruction, and many people suffering from skin-diseases resort to the springs during the summer months.

The red-cheeked starlet (*Sturnia pyrrhogenys*), which we had observed only once before at Subashiri, was very common about Kusats; several flocks of 30 or 40 were seen.

The only town of any importance in our line of travel was Zenkoji, the capital of the province of Shinshiu, where we arrived on the evening of the 16th of September. This is quite a large, compactly-built place, containing about 7,000 people. On the high road to Nügata, the west coast sea-port, it commands most of the trade of this section of the country.

We spent a day here visiting the famous temples and sightseeing.

We left Zenkoji on the morning of the 18th, and, having secured a kuruma for a short distance, we walked the remainder, 25 miles, into Omachi, where we arrived at 5 p. m.

Omachi, situated at the base of the Tate-Yama Mountains, is 2,150 feet above the sea-level and about 130 miles northwest from Yokohama. These mountains, the most considerable in Japan, present an almost impassable barrier between the province of Shinshiu and the west coast, a pass 7,700 feet high, affording a doubtful means of communication during a few months in the year. We were attracted to this isolated region by the accounts of the game which was said to abound in the mountains. We were also anxious to secure ptarmigan, said to be exceedingly tame and abundant.

As our luggage had not yet arrived, we were detained at Omachi several days awaiting it; meanwhile we occupied ourselves in prospecting about the country in search of a permanent place to work in. At Oide, a small hunting village 3 miles from Omachi, containing a single tea-house, we secured a room, and our gear having arrived we took possession of our quarters and commenced work on the 25th of September. Here we remained for three months, adding many valuable specimens to our previous collections, and returning to Yokohama late in December.

At Tate-Yama we secured specimens of the rare goat-antelope *Nemorhedus crispar*, the Japanese bear, *Ursus japonicus*, the monkey, *Macacus speciosus*, raccoon-faced dog, badger, and many smaller animals of equal rarity. Our collection of birds was enhanced by about 300 skins, including many species not collected by us before. We also made a small collection of fishes and reptiles.

Before closing this brief account I desire to acknowledge my indebtedness to Mr. Alan Owston, of Yokohama, whose co-operation in my work and many acts of kindness made collecting possible; to Capt. Thomas Blakiston, for invaluable assistance in the work of identification; to Mr. Smith, a genial companion and excellent collector, who performed the office of interpreter and smoothed over the roughness of traveling in a strange country; to Mr. H. Pryer, who gave me free access to a valuable collection of Japanese birds; and to many other gentlemen for courtesies extended.

YOKOHAMA, JAPAN, *April* 30, 1883.

Turdus cardis T. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxix et xxx, p. 65; Blakiston, Ibis, 1862, p. 319; Whitely, Ibis, 1867, p. 199; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 165; Brit. Mus. Cat., Vol. V, p. 261.

This is a lowland thrush, and is found breeding at Fuji, all around the base of the mountain. It was quite common there, although we did

not meet with it at any other place. The nest is generally placed in the fork of a small tree overhanging a stream, and is composed of moss and roots woven into a compact mass, with the addition of dried leaves and mud to give it solidity. It is lined with grass, fine rootlets, and horse-hair. It is about 120mm to 130mm in diameter, and its inside depth is from 40mm to 45mm. The eggs vary much in size and color, ranging from 27mm to 29½mm in length, and from 20mm to 21½mm in diameter.

The ground color is a rich creamy tint with faint lilaceous blotches; the eggs are mottled all over with streaks and blotches of madder-brown.

Nests were taken in the latter part of June and early in July.

Young in first plumage.—Above, uniform dusky; the feathers of the back margined with blackish; some specimens show pale ochraceous shaft lines. Throat and belly pure white; the cheeks, breast, and flanks have a slight tinge of ochraceous. The entire under parts are thickly covered all over with round, dusky spots; these are confluent on the cheeks and sides of the head, inclosing the white of the throat. Wing plain, dusky, slightly olivaceous on the outer webs; a few of the wing coverts edged with rusty brownish.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
360	.....	♂ ad.	Fuji-Yama	June 30, 1882	
380	.....	♂ ad.	....do	July 2, 1882	
381	88607	♂ juv.	....do	July 2, 1882	
382	.....	♂ juv.	....do	July 2, 1882	
399	.....	♂ ad.	....do	July 2, 1882	
454	88611	♀ ad.	....do	July 8, 1882	
474	.....	♂ juv.	....do	July 11, 1882	
495	88606	♂ ad.	....do	July 13, 1882	
496	.....	♂ ad.	....do	July 13, 1882	
526	88612	♂ juv.	....do	July 16, 1882	
595	88608	♀ juv.	....do	July 24, 1882	
599	.....	♂ ad.	....do	July 25, 1882	

Turdus obscurus Gmel. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxvii, p. 63; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 165; Brit. Mus. Cat., Vol. V, p. 273.

This species seems to be rather a rare one. We collected it only in Shinshiu in autumn.

It is generally found in thickets and about streams, but a few were taken on the hills by the bird-catchers.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
715	41320	♂ ad.	Tate-Yama, Shinshiu	Oct. 23, 1882	
716	.....	♀ ad.	....do	Oct. 23, 1882	
723	.....	♂ ad.	....do	Oct. 27, 1882	Iris dark brown.
795	91317	♀ ad.	....do	Nov. 17, 1882	
385	88605	♂ ad.	Fuji-Yama	July 2, 1882	
508	88604	♀ ad.	.....	July 13, 1882	

Turdus pallidus Gmel. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxvi, p. 62; Whitely, Ibis, 1867, p. 199; Blakiston and Pryer, Ibis, 1878, p. 240; Seebohm, Ibis, 1879, p. 37; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 164; Brit. Mus. Cat., Vol. V, p. 274.

A single specimen of this bird was obtained in the province of Shinshiu. We did not meet with it at Fuji or elsewhere.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
751	91319	♂ ad.	Tate-Yama, Shinshiu	Nov. 2, 1882	

Turdus sibericus Pall. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxxi, p. 66; Seebohm, Ibis, 1879, p. 37; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 164; Brit. Mus. Cat., Vol. V, p. 180.

This fine thrush frequents the deeper woods, and is rarely seen below a considerable altitude. I once shot one as he flitted across the path, but most of the specimens were collected at a small spring which flowed from the side of Fuji, at an elevation of about 5,000 feet. They were very shy, and only seen about sunset. This spring, the only water for a considerable distance around, was a favorite resort for all kinds of small birds, which, towards sunset, began to appear in twos and threes from all directions.

Robins and flycatchers, *narcissina*, and others, were frequently seen; among flocks of tits noisily fighting for first place at the bath, the little *Acredula* seemed the most aggressive. The Siberian thrush was so silent in its movements and suspicious of the slightest noise that it required the closest attention to detect it. This spot became one of our favorite collecting grounds.

A full-plumaged male which had begun to assume the autumnal plumage was taken at Chiusenji Lake in the latter part of August. The primary coverts are edged with brownish; the superciliary line is not so distinct, and is slightly suffused with brownish. All the feathers of the crown have rusty edgings, and there are traces of the same color on the throat. The belly is considerably lighter than the breast, and there are a number of black terminal spots to the feathers.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
395	88602	♀ ad.	Fuji-Yama	July 2, 1882	
398		♀ ad.	do	July 2, 1882	
486	88610	♂ ad.	do	July 11, 1882	Iris dark brown.
509	88609	♂ ad.	do	July 14, 1882	Iris very dark brown.
510		♂ ad.	do	July 14, 1882	
511	88603	♀ ad.	do	July 14, 1882	
512		♂ ad.	do	July 14, 1882	
532		♀ ad.	do	July 18, 1882	
533		♂ ad.	do	July 18, 1882	
534		♂ ad.	do	July 18, 1882	
647		♂ ad.	Chiusenji Lake	Aug. 31, 1882	

Turdus chrysolaus T. Temm. et Schl., Faun. Japon, 1847, Aves, pl. xxviii, p. 64; Whitely, Ibis, 1867, p. 199; Blakiston and Pryer, Ibis, 1878, p. 241; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 166; Brit. Mus. Cat., Vol. V, p. 275.

This thrush is quite common at Fuji in the breeding season, and was also found at Chiusenji Lake and at Tate-Yama. Some specimens in breeding plumage show a distinct white line over the eye entirely wanting in fall birds, which are also very dark on the throat and ear coverts.

The nest is similar in size and general appearance to that of *cardis*, but is composed of much coarser material, and instead of being covered with moss it is bound together with long fibers of grass. One nest has a piece of straw rope and a bit of old blue cotton cloth in it, such as used by the natives in making sandals or "*warajies*."

The eggs are pale bluish in color, blotched and speckled all over with brown and lilaceous. They average slightly smaller in size than *cardis*, being about 27^{mm} by 20^{mm}.

Young birds in first plumage resemble young of *cardis*, but are much lighter in color. The back is light olive brown; all the feathers have broad ochraceous webs, giving the back a streaked appearance; the feathers are also margined with blackish; the head is slightly darker than the back.

The cheeks and under parts are suffused with ochraceous, which deepens into reddish brown on the flanks. The sides of the head, breast, and flanks are thickly covered with small dusky spots.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
330	.....	♂ juv.	Fuji-Yama	June 29, 1882	
346	.....	♂ ad.	....do	June 29, 1882	
361	.....	♀ ad.	....do	June 30, 1882	
362	.....	♀ ad.	....do	June 30, 1882	
424	.....	♀ ad.	.... do	July 4, 1882	
522	.....	♂ ad.	....do	July 14, 1882	
629	91318	♂ juv.	Chiusenji Lake	Aug. 27, 1882	
722	.....	♂ ad.	Tate-Yama, Shinshiu	Oct. 27, 1882	

Turdus fuscatus Pall. Blakiston, Ibis, 1862, p. 319; Swinhoe, Ibis, 1874, p. 157; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 167; Brit. Mus. Cat., Vol. V, p. 262.

This bird was collected only at Tate-Yama, where it made its appearance in the latter part of October and soon became very numerous.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
721	91311	♀ ad.	Tate-Yama, Shinshiu	Oct. 27, 1882	Iris very dark brown.
749	.....	♀ ad.	....do	Oct. 31, 1882	
750	91312	♀ ad.	....do	Nov. 1, 1882	
773	.....	♀ ad.	....do	Nov. 7, 1882	
776	.....	♂ ad.	....do	Nov. 8, 1882	
794	.....	♂ ad.	....do	Nov. 17, 1882	
809	91313	♀ ad.	....do	Nov. 25, 1882	
810	.....	♀ ad.	....do	Nov. 25, 1882	
824	91314	♂ ad.	.... do	Nov. 30, 1882	"Abundant; only thrush seen at this time."
825	91315	♂ ad.	....do	Nov. 30, 1882	
826	.....	♀ ad.	....do	Nov. 30, 1882	
829	.....	♀ ad.	....do	Nov. 30, 1882	
830	91316	♂ ad.	....do	Nov. 30, 1882	

Hypsipites amaurotis T. & S. Temm. et Schl., Faun. Japon, 1847, Aves, pl. xxxi B., p. 68; Blakiston, Ibis, 1862, p. 320; Whitely, Ibis, 1867, p. 199; Swinhoe, Ibis, 1874, p. 158; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 163; Brit. Mus. Cat., Vol. VI, p. 42.

"Screechers" are exceedingly abundant in every locality in which I have collected.

They are very gifted vocalists, and have a wide range of mimicking notes, reminding one at times of our own mocking thrushes. They have no notes so sweet as our thrushes, and their vocabulary is varied with the voice of the purple grackle and the discordant notes of the jay.

They are caught in large numbers in Shinshiu in a very peculiar manner. Decoys, of their own species, are placed in cages in a grove of trees, generally on top of a hill, and about 15 or 20 feet apart; close by is a horizontal twig, birdlimed, on the end of which is a bunch of attractive berries. A few inches below the twig a net is spread, about 10 inches wide at the top, and 18 inches deep. The birds, attracted by the calls of their mates in the cages, and the seductive berries, alight on the twigs, and, feeling the lime, attempt to throw themselves off by dropping down backwards, and generally fall in the net. If they fall on the ground, they have so much birdlime on them that they are easily caught.

In the autumn these birds fly in large flocks, and as many as thirty or forty are caught in a morning by one man.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
502	88664	♂ ad.	Fuji-Yama	July 13, 1882	Iris reddish brown.
729	91325	♀ ad.	Tate-Yama, Shinshiu	Oct. 28, 1882	

Pratincola maura Pall. Blakiston, Ibis, 1862, p. 318; Whitely, Ibis 1867, p 197; Swinhoe, Ibis, 1874, p. 155; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 162; Brit. Mus. Cat., Vol. IV, p. 188.

Common in the long grass of the hillsides around Fuji. Breeding in June; fully fledged young taken early in July. These birds are often seen on the tops of the grass stems or small bushes, and utter a sharp clicking note when approached. Although not shy, they are very wary, and rapidly make their way through the thick grass, appearing and disappearing on all sides.

Young in first plumage are much streaked and spotted above with dusky and pale buff. All the feathers of the crown and nape with narrow buffy webbings. Back with arrow-shaped buff centers to the tips of the feathers; upper tail coverts brownish. Wings and tail dusky, the latter tipped and edged with brownish. Secondaries and wing coverts broadly edged with brownish; innermost wing coverts white. Chin, breast, and belly pale buff; throat dirty white. The feathers of the breast much edged and mottled with dusky.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
303	.....	♀ ad.	Ashinoyu	June 26, 1882	Iris dark brown.
312	88636	♂ ad.	Fuji-Yama	June 27, 1882	
429	.....	♂ ad.	....do	July 5, 1882	
430	88637	♀ ad.	....do	July 5, 1882	
448	.....	♂ juv.	....do	July 6, 1882	
619	.....	♂ ad.	....do	July 29, 1882	

Erithacus cyaneus (Pall.) Blakiston and Pryer, Ibis, 1878, p. 239, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 161; Brit. Mus. Cat., Vol. V, p. 303.

Specimens of this rare robin were collected both at Fuji and Chiusenji. At the latter locality we obtained two specimens of the young of the year. They are dull olive on the crown and back; rump and tail blue; wings dusky bluish or brownish. Eyelids and line from the bill to the eye ochraceous. Breast and sides of the face ochraceous. All the feathers with faint olivaceous edgings. The throat is lighter than the breast, and separated from it by these olivaceous edgings to the feathers. Belly white.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
513	91457	♂ ad.	Fuji-Yama	July 14, 1882	
660	91377	♂ juv.	Chiusenji Lake	Sept. 3, 1882	
662	.....	♂ juv.	....do	Sept. 3, 1882	

Tarsiger cyanurus (Pall.) Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxi, p. 54; Blakiston, Ibis, 1862, p. 318; Whitely, Ibis, 1867, p. 197; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 161; Brit. Mus. Cat., Vol. IV, p. 255.

This is one of the commonest birds in the mountains during summer. It is very familiar in its ways and easily approached. Seated on a low branch of a tree or shrub, with its head on one side, it eyes you curiously, all the while uttering a low, guttural, chuckling note.

This bird is often the only one seen on some of the higher passes.

Young of the year resemble the female.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
342	.....	♂ juv.	Fuji-Yama	June 29, 1882	
350	.....	♂ ad.	....do	June 29, 1882	
404	.....	♀ ad.	....do	July 2, 1882	
405	88619	♀ ad.	....do	July 2, 1882	Iris very dark umber brown.
421	.....	♂ ad.	....do	July 4, 1882	
422	88618	♂ ad.	....do	July 4, 1882	Iris very dark umber brown.
781	91370	♂ juv.	Tate-Yama, Shinshiu	Nov. 13, 1882	
869	.....	♂ ad.	....do	Dec. 15, 1882	
870	.....	♀ ad.	....do	Dec. 15, 1882	

Ruticilla aurorea Pall. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxi, D, p. 56; Blakiston, Ibis, 1862, p. 318; Swinhoe, Ibis, 1875, p. 449; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 162; Brit. Mus. Cat., Vol. V, p. 345.

Observed in Shinshiu from the latter part of October until late in December. Generally found in low bushes or tangled thickets; has a loud, piping note.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
717	.....	♂ ad.	Tate-Yama, Shinshiu.....	Oct. 24, 1882	Iris black.
739	91371	♀ ad.	Matsumoto, Shinshiu.....	Oct. 29, 1882	
876	91372	♂ ad.	Tate-Yama, Shinshiu.....	Dec. 18, 1882	

Cinclus pallasi T. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxxi, C, p. 68; Swinhoe, Ibis, 1875, p. 449; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 160; Brit. Mus. Cat., Vol. VI, p. 316.

We found the dipper common in all the mountain streams, but it was more abundant in Shinshiu than at Fuji.

Young birds are curiously mottled all over, the under parts with white, dusky, and brownish markings. The throat is lighter in color than the breast, and is the last to assume the adult plumage.

The back is a light chocolate brown, all the feathers being margined with dusky.

The white spot over the eye is particularly noticeable in the young.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
491	88613	♂ ad.	Fuji-Yama.....	July 12, 1882	
492	.....	♀ ad.	.....do.....	July 12, 1882	
616	.....	♂	..... do	July 29, 1882	
640	.....	♂ juv.	Chiusenji Lake.....	Aug. 30, 1882	Iris sienna brown, legs pale bluish.
653	91321	♂ juv.	.....do.....	Sept. 1, 1882	
654	.....	♀ juv.	.....do.....	Sept. 2, 1882	
659	91322	♀ juv.	..... do.....	Sept. 3, 1882	
686	91323	♂ ad.	Tate-Yama, Shinshiu.....	Oct. 7, 1882	
842	.....	♂ ad.	.....do.....	Dec. 5, 1882	Iris umber brown.
851	91354	♀ ad.	.....do.....	Dec. 8, 1882	
863	.....	♂ ad.	.....do.....	Dec. 12, 1882	

Phylloscopus coronatus T & S. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xviii, p. 48; Blakiston, Ibis, 1862, p. 317; Whitely, Ibis, 1867, p. 197; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 159; Brit. Mus. Cat., Vol. V, p. 49.

Exceedingly abundant on Fuji in June and July, breeding. Not met with elsewhere.

Young of the year resemble the adult, but have the crown dusky, and lack the central stripe. The figure in the Fauna Japonica is lacking in the median line on the crown.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
316	.....	♂ ad.	Fuji-Yama	June 28, 1882	
324	88628	♀ juv.	....do	June 28, 1882	
475	.....	♂ ad.	....do	July 11, 1882	Iris dark brown.
514	.....	♂ juv.	....do	July 14, 1882	
540	.....	♂ ad.	....do	July 18, 1882	
606	.....	♂ ad.	.... do	July 27, 1882	
607	.....	♂ juv.	....do	July 27, 1882	
608	88627	♂ ad.	....do	July 27, 1882	
620	.....	♂ ad.	....do	July 29, 1882	
621	.....	♂ ad.	....do	July 29, 1882	

Phylloscopus xanthodryas Swinhoe. Seebohm, Ibis, 1879, p. 36; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 159; Brit. Mus. Cat., Vol. V, p. 42.

Found on Fuji in July, but not nearly so common as *coronatus*. Obtained also at Chiusenji Lake in October.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
418	.....	♂ ad.	Fuji-Yama	July 4, 1882	Iris, umber brown.
573	88624	♂ ad.	....do	July 20, 1882	
574	.....	♀ ad.	.... do	July 20, 1882	
682	91374	♂ ad.	Chiusenji Lake	Oct. 3, 1882	

Cettia cantans (T. & S). Temm. et Schl., Faun. Japon., 1847, pl. xix, p. 51; Whitely, Ibis, 1867, p. 197; Seebohm, Ibis, 1879, p. 35; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 156; Brit. Mus. Cat., Vol. V, p. 139.

Abundant everywhere, breeding at Fuji. In summer their cheerful and pleasing song enlivens every roadside.

Young birds, and adults also in autumn and winter, are very wren-like in their habits, being found along the banks of streams and in brush-heaps. They utter a harsh scolding note when disturbed, and have the same habit of cocking the tail over the back. Young in first plumage, above dull olive, head slightly grayish; wings and tail brownish; line over the eye yellow. Entire under parts pale yellowish. Sides and flanks slightly olivaceous; tarsi and toes dusky.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
305	.....	♂ ad.	Ashinoyu	June 26, 1882	Iris dark brown.
367	88630	♂ ad.	Fuji-Yama	June 30, 1882	
460	.....	♂ juv.	....do	July 9, 1882	
580	.....	♂ ad.	....do	July 23, 1882	
589	.....	♂ ad.	....do	July 24, 1882	
611	.....	♂ juv.	....do	July 28, 1882	
623	.....	♂ juv.	....do	July 29, 1882	
720	.....	♂ ad.	Tate-Yama	Oct. 26, 1882	
774	91375	♀ ad.	....do	Nov. 7, 1882	

Cettia cantillans (T. & S.). Temm. et Schl., Faun. Japon., 1847, Aves, pl. xx, p. 52; Blakiston, Ibis, 1862, p. 318; Whitely, Ibis, 1867, p. 197.

A large series of specimens collected at Fuji and elsewhere, together with two forms of young birds, induce me to reinstate the name of *cantillans*, ignored of late by ornithologists, for the smaller species. I do not distinguish any difference of color, but there is a very great difference in size, especially in the comparative length of the wing and tarsus. *C. cantans* measures: tarsus, 24.5 mm to 25.5 mm, and wing 63 mm to 65 mm, while cantillans is 22 mm to 22.5 mm in the tarsus, and wing 55 mm.

This difference in size cannot be attributable to sex or season. I have a female of *cantans* measuring 9.5 mm more in the wing than adult male of *cantillans*. There is a marked difference in the young of the two species, *cantans*, young, being 25 mm, *cantillans* 22 mm, in the tarsus; and 56 mm against 50 mm in the wing.

Young in first plumage are the same as described under *cantans*, but have the tarsi and toes yellowish instead of dusky.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
468	.....	♂ juv.	Fuji-Yama	July 10, 1882	Iris dark brown.
498	.....	♂ juv.	....do	July 13, 1882	
499	.....	♂ juv.	....do	July 13, 1882	
630	.....	♂ juv.	Chiusenji Lake	Aug. 27, 1882	
775	91376	♂ ad.	Tate-Yama, Shinshiu	Nov. 7, 1882	

Cettia squamiceps Swinhoe. Swinhoe, Ibis, 1874, p. 155, et 1877, p. 205, pl. iv; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 157; Brit. Mus. Cat., Vol. V, p. 142.

A single specimen of this bird was obtained at Fuji. It seems to be rather rare.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
490	91456	♂ ad.	Fuji-Yama	July 12, 1882	

Regulus japonicus Bp. Temm. et Schl., Faun. Japon., 1847, Aves, p. 70; Blakiston, Ibis, 1862, p. 320, Whitely, Ibis, 1867, p. 196; Seebohm, Ibis, 1879, p. 37; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 160.

This bird was taken on Fuji-Yama at an altitude of about 7,000 feet. It undoubtedly breeds there. It was first seen about Tate-Yama early in October, having been forced down from the mountains by the snow-storms.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
570	.....	♂ ad.	Fuji-Yama	July 20, 1882	
680	91359	♂ ad.	Tate-Yama, Shinshiu	Oct. 3, 1882	
685	.....	♂ ad.	do	Oct. 3, 1882	
695	91360	♂ ad.	do	Oct. 15, 1882	
819	.....	♂ ad.	do	Nov. 28, 1882	
833	.....	♀ ad.	do	Dec. 3, 1882	
843	.....	♂ ad.	do	Dec. 5, 1882	
844	91361	♀ ad.	do	Dec. 5, 1882	
862	91362	♂ ad.	do	Dec. 9, 1882	
874	.....	♂ ad.	do	Dec. 17, 1882	Iris very dark umber brown.

Acredula trivirgata (Temm.) Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxxiv, p. 71; Blakiston and Pryer, Ibis, 1878, p. 235; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 151.

Abundant everywhere in the mountains in flocks. Breeding at Fuji. Young birds are uniform dusky brownish above, with the crown and wing-coverts pure white; throat, belly, and breast white. The eyelids are a brilliant orange color in young birds.

List of specimens.

Original No.	Museum No.	Sex.	Locality.	Date.	Remarks.
315	.....	♂ juv.	Fuji-Yama	June 28, 1882	Iris black.
322	.....	♂ juv.	do	June 28, 1882	
464	.....	♂ juv.	do	July 11, 1882	
465	88649	♂ juv.	do	July 11, 1882	
466	88647	♂ juv.	do	July 11, 1882	
476	.....	♂ juv.	do	July 10, 1882	
477	88646	♂ juv.	do	July 10, 1882	
478	.....	♂ ad.	do	July 10, 1882	
485	.....	♂ juv.	do	July 11, 1882	
487	.....	♂ juv.	do	July 11, 1882	
488	88648	♂ juv.	do	July 11, 1882	
529	.....	♂ juv.	do	July 16, 1882	
541	.....	♂ ad.	do	July 18, 1882	
542	.....	♂ juv.	do	July 18, 1882	
543	.....	juv.	do	July 18, 1882	
603	.....	♀ ad.	do	July 27, 1882	
604	.....	♂ ad.	do	July 27, 1882	
605	.....	♂ juv.	do	July 27, 1882	
687	.....	♂ ad.	Tate-Yama, Shinshiu	Oct. 8, 1882	
786	.....	♀ ad.	do	Nov. 17, 1882	Iris dark brown.
790	91351	♀ ad.	do	Nov. 17, 1882	
837	91352	♂ ad.	do	Dec. 4, 1882	
838	91353	♀ ad.	do	Dec. 4, 1882	

Parus ater L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 70; Blakiston, Ibis, 1862, p. 321; Whitely, Ibis, 1867, p. 198; Swinhoe, Ibis, 1874, p. 155; Seebohm, Ibis, 1879, p. 31; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 149.

Common in small flocks among the pines. Rather rare at Fuji, but exceedingly abundant in Shinshiu in winter.

List of specimens.

Original No.	Museum No.	Sex.	Locality.	Date.	Remarks.
340	.....	♂ ad.	Fuji-Yama	June 29, 1882	
373	88645	♀ ad.	do	June 30, 1882	
675	.....	♂ ad.	Tate-Yama, Shinshiu	Sept. 27, 1882	
683	91347	♂ ad.	do	Oct. 3, 1882	
688	91348	♂ ad.	do	Oct. 8, 1882	
696	.....	♀ ad.	do	Oct. 15, 1882	Iris dark brown.

Parus minor T. & S. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxxiii, p. 70; Whitely, Ibis, 1867, p. 198; Swinhoe, Ibis, 1874, p. 156; Seebohm, Ibis, 1879, p. 33; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 150.

The commonest tit, abundant everywhere in the mountains, associating with the coal and marsh tits.

Found breeding at Fuji in June. A nest which contained seven young birds was taken from an old bamboo pipe which stood in the yard of our inn at Subashiri.

Young birds in the first plumage differ from the adults in having the entire upper parts, with the exception of the white spot in the nape of the neck, dull olive green; crown slightly darker. Sides of the face, breast, and flanks pale yellowish. Throat and middle of the belly like the back. The cheek patches are not separated from the color of the breast, as in the adult.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
325	88641	♂ ad.	Fuji-Yama	June 28, 1882	
383	88642	♂ juv.	do	July 2, 1882	
544	.....	♂ juv.	do	July 18, 1882	
684	.....	♂ ad.	Tate-Yama, Shinshiu	Oct. 3, 1882	
689	.....	♂ ad.	do	Oct. 8, 1882	
692	.....	♀ ad.	do	Oct. 9, 1882	
804	91345	♀ ad.	do	Nov. 23, 1882	
873	91346	♂ ad.	do	Dec. 15, 1882	
29	85799	♂ ad.	Nagasaki	May 30, 1882	

Parus palustris japonicus (L.) Seebohm. Blakiston, Ibis, 1862, p. 321; Whitely, Ibis, 1867, p. 198; Swinhoe, Ibis, 1874, p. 156; Seebohm, Ibis, 1879, p. 32; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 150.

Abundant in the mountains. Found breeding at Fuji.

List of specimens.

Original number	Museum number.	Sex.	Locality.	Date.	Remarks.
467	.....	♂ ad.	Fuji-Yama	July 10, 1882	Iris dark brown.
489	.....	♂ ad.	do	July 11, 1882	
519	.....	juv.	do	July 14, 1882	
545	88644	♂ ad.	do	July 18, 1882	
609	88643	♂ ad.	do	July 27, 1882	
681	.....	♀ ad.	Tate-Yama, Shinshiu	Oct. 3, 1882	
690	91349	♂ ad.	do	Oct. 9, 1882	
691	91350	♀ ad.	do	Oct. 9, 1882	
791	.....	♀ ad.	do	Oct. 17, 1882	
861	.....	♂ ad.	do	Dec. 9, 1882	

Parus varius T. & S. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxxv, p. 71; Blakiston, Ibis, 1862, p. 321; Swinhoe, Ibis, 1874, p. 155; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 151.

This bird, commonly seen in cages all over the country, was rather rare at Fuji, and was only seen late in the season at Tate-Yama.

It is found in the pines with other species of tits, but is generally solitary or in pairs. Its note resembles that of the little woodpecker.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
377	.....	♀ ad.	Fuji-Yama.....	July 1, 1882	Iris brown.
827	91343	♀ ad.	Tate-Yama, Shinshiu	Dec. 1, 1882	
831	91344	♂ ad.	.....do.....	Dec. 3, 1882	
845	.....	♂ ad.	.....do.....	Dec. 6, 1882	
849	.....	♂ ad.	.....do.....	Dec. 7, 1882	
855	.....	♂ ad.	.....do.....	Dec. 9, 1882	

Sitta europæa L. Blakiston, Ibis, 1862, p. 322; Swinhoe, Ibis, 1863, p. 99; Whitely, Ibis, 1867, p. 196; Swinhoe, Ibis, 1874, p. 152; Seebohm, Ibis, 1879, p. 34; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 152.

Not met with at Fuji, but very common at Chiusenji Lake and Tate-Yama.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
627	.....	♂ ad.	Chiusenji Lake.....	Aug. 27, 1882	
633	91355	♂ ad.	.....do.....	Aug. 29, 1882	
636	.....	♂ ad.	.....do.....	Aug. 29, 1882	
661	.....	♂ ad.	.....do.....	Sept. 3, 1882	
663	91356	♂ ad.	.....do.....	Sept. 4, 1882	
671	91357	♂ ad.	.....do.....	Sept. 6, 1882	
673	.....	♂ ad.	.....do.....	Sept. 7, 1882	
745	91358	♂ ad.	Tate-Yama, Shinshiu.....	Oct. 31, 1882	
856	.....	♂ ad.	.....do.....	Dec. 9, 1882	
996	91547	♂ ad.	Sapporo, Yezo.....	Oct. 17, 1882	

Certhia familiaris L. Whitely, Ibis, 1867, p. 196; Swinhoe, Ibis, 1874, p. 152; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 138.

One specimen, a young bird, was taken in Shinshiu, after a violent snow-storm.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
821	91354	♀ juv.	Tate-Yama, Shinshiu	Nov. 30, 1882	
997	91548	♀ ad.	Sapporo, Yezo.....	Oct. 14, 1882	

Troglodytes fumigatus Temm. Temm. et Schl., Faun. Japon., 1847, Aves, p. 69; Swinhoe, Ibis, 1874, p. 152; Seebohm, Ibis, 1879, p. 37; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 160; Brit. Mus. Cat., Vol. VI, p. 276.

Common in the summer near the peaks of the high mountains; breeding at Fuji.

Found about brush-heaps and near streams in the lowlands from about the middle of November.

I could not distinguish any difference between the habits of this bird and our own familiar winter wren. It has the same low, delicious, warbling song common to both species.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
571	88640	♂ ad.	Fuji-Yama	July 20, 1882	
787	91363	♂ ad.	Tate-Yama, Shinshiu	Nov. 17, 1882	
820	.....	♀ ad.	....do	Nov. 30, 1882	
828	91364	♂ ad.	....do	Dec. 2, 1882	
834	91365	♀ ad.	....do	Dec. 4, 1882	
835	91366	♂ ad.	....do	Dec. 4, 1882	
836	.....	♂ ad.	....do	Dec. 4, 1882	
839	91367	♀ ad.	....do	Dec. 4, 1882	
848	.....	♂ ad.	....do	Dec. 7, 1882	
850	.....	♂ ad.	....do	Dec. 8, 1882	

Acrocephalus bistrigiceps Swinhoe. Swinhoe, Ibis, 1874, p. 154, as *C. Maacki;* Seebohm, Ibis, 1879, p. 35; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 156; Brit. Mus. Cat., Vol. V, p. 94.

Very common in the meadows around Fuji. They are rather shy in their habits, the males mounting the tops of the long grass and disappearing on the other side. I did not succeed in getting any females, and judge that they were all in the nests at that time.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
309	.....	♂ ad.	Fuji-Yama	June 27, 1882	
310	88629	♂ ad.	....do	June 27, 1882	
311	.....	♂ ad.	....do	June 27, 1882	

Acrocephalus orientalis (T. & S.). Temm. et Schl., Faun. Japon., 1847, Aves, pl. xx, B, p. 50; Blakiston, Ibis, 1862, p. 317; Swinhoe, Ibis, 1874, p. 153; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 156; Brit. Mus. Cat., Vol. V, p. 97.

We obtained this species only about Fuji-Yama, where it did not seem to be very common.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
384	88631	♀ ad.	Fuji-Yama	July 2, 1882	
417	88632	♂ ad.	....do	July 3, 1882	Iris light umber.
437	.....	♂ ad.	....do	July 5, 1882	
438	.....	♂ ad.	....do	July 5, 1882	

Zosterops japonica T. & S. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxii, p. 57; Seebohm, Ibis, 1879, p. 29; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 138.

Very common at Fuji-Yama, where it was breeding in July. We had a nest of this bird brought to us which contained three eggs. They are plain bluish white in color, without speckling, and measure about 13.5^{mm} by 17^{mm}. The nest is a beautiful structure, composed entirely of moss

Vol. VI, No. 19. Washington, D. C. Dec. 18, 1883.

patched outside with large pieces of lichen and lined inside with horsehair. It is rather flat in shape and is evidently a ground nest. It measures about 90mm outside diameter and is 40mm in depth; inside diameter, 55mm. This bird was common in Shinshiu in the autumn and was often taken by the bird-catchers.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
320	.....	♂ ad.	Fuji-Yama	June 28, 1882	Iris light sienna.
323	88639	♀ ad.	....do	June 28, 1882	
610	.....	♂ ad.	....do	July 28, 1882	

Anthus maculatus Hodg. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xxiii, p. 58; Swinhoe, Ibis, 1877, p. 144; Seebohm, Ibis, 1879, p. 34; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 153.

Exceedingly abundant at Fuji; found as high up as the snow line.

Breeding in the latter part of June and early in July. Nest on the ground, composed of moss and dried grass, very slightly lined with finer grasses and rootlets. The eggs vary much in size and shape, ranging from 19mm to 21mm in length, and average 10mm in breadth. The ground color is lilaceous; the entire surface is speckled all over with sepia, the spots becoming confluent on the larger end.

Young of the year resemble the adult, but are duller on the upper parts and all the markings are finer. Wing coverts with buffy edgings; flanks and under tail coverts washed with ochraceous.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
329	.....	♀ ad.	Fuji-Yama	June 29, 1882	
336	.....	♂ ad.	....do	June 29, 1882	
366	88661	♂ ad.	....do	June 30, 1882	
403	88659	♀ ad.	....do	July 2, 1882	
423	88660	♂ ad.	....do	July 4, 1882	Shot on the snow.
537	.....	♂ ad.	....do	July 18, 1882	
538	.....	♂ ad.	....do	July 18, 1882	
539	.....	♂ juv.	....do	July 18, 1882	
583	.....	♂ ad.	....do	July 23, 1882	
584	.....	♂ ad.	....do	July 23, 1882	
585	.....	♂ ad.	....do	July 23, 1882	
586	.....	♂ ad.	....do	July 23, 1882	
587	88658	♂ ad.	....do	July 23, 1882	
588	.....	♂ ad.	....do	July 23, 1882	
592	.....	♂ ad.	....do	July 24, 1882	
593	88662	♀ juv.	....do	July 24, 1882	
594	.....	♂ juv.	....do	July 24, 1882	
626	.....	♂ juv.	....do	July 30, 1882	
1003	91554	♂ juv.	Sapporo, Yezo	Sept. 28, 1882	
1004	91555	♂ ad.	....do	Sept. 28, 1882	

Motacilla boarula L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 59; Blakiston, Ibis, 1862, p. 318; Swinhoe, Ibis, 1874, p. 157; Seebohm, Ibis, 1879, p. 35; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 155.

Seen at Fuji only, where it was tolerably common.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
597	.....	♂ ad.	Fuji-Yama	July 25, 1882	
618	88663	♀ ad.	.....do	July 29, 1882	

Motacilla lugens T. & S. Temm. et Schl., Faun. Japon., 1847, Aves., pl. xxv, p. 60; Blakiston, Ibis, 1862, p. 319; Whitely, Ibis, 1867, p. 198; Swinhoe, Ibis, 1874, p. 156, as *japonica;* Seebohm, Ibis, 1879, p. 34; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, p. 155.

Very common along the banks of streams; also in the paddy fields after the rice has been cut.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
440	.....	♂ ad.	Fuji-Yama	July 6, 1882	
665	.....	♂ ad.	Chiusenji Lake	Sept. 3, 1882	
674	91368	♀ ad.	Tate-Yama, Shinshiu	Sept. 26, 1882	
677	91369	♂ ad.	.....do	Sept. 26, 1882	

Hirundo gutturalis Scop. Swinhoe, Ibis, 1874, p. 151; Seebohm, Ibis, 1879, p. 29; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 139.

These birds are familiar objects flying through the streets and darting into the native houses through open doors. Almost every house in a Japanese town has one or more little wooden shelves, placed just inside the door on one of the rafters of the ceiling, on which the swallows build their nests and rear their young. Nor is their confidence misplaced; they are as sacred on their shelf as any of the household gods, an offer of money for which is considered an insult. I believe these swallows rarely build elsewhere than in the situations I have described.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
472	.....	♀ juv.	Fuji-Yama	July 10, 1882	

Chelidon blakistoni Swinh. Swinhoe, Proceed. Zool. Soc. Lond. 1863, p. 320; Swinhoe, Ibis, 1863, p. 90; Swinhoe, Ibis, 1874, p. 151; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 140.

We found these birds breeding in considerable numbers on the sides of an inaccessible cliff or chasm on Fuji-Yama above the limit of forest growth. Their nests must have been composed largely of saliva, as there is no mud in that volcanic region. Many of the birds, when shot, had their mouths full of fine scoriæ dust, of which they were evidently making their nests.

We saw these birds on some of the higher passes in Shinshiu in September.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
558	.....	♀ ad.	Fuji-Yama	July 20, 1882	
559	.....	♂ ad.	do	July 20, 1882	
560	.....	♂ ad.	do	July 20, 1882	
561	.....	♂ ad.	do	July 20, 1882	
562	.....	♀ ad.	do	July 20, 1882	
563	.....	♂ ad.	do	July 20, 1882	
564	.....	♂ ad.	do	July 20, 1882	
565	88668	♂ ad.	do	July 20, 1882	
566	88669	♂ ad.	do	July 20, 1882	
567	88670	♀ ad.	do	July 20, 1882	
568	88671	♂ ad.	do	July 20, 1882	
569	.....	♀ ad.	do	July 20, 1882	
591	.....	♀ ad.	do	July 24, 1882	

Ampelis phœnicoptera T. Temm. et Schl., Faun. Japon, 1847, Aves, pl. xliv, p. 84; Whitely, Ibis, 1867, p. 200; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 149.

I did not observe this bird at Fuji. In the latter part of November a small flock made its appearance at Tate-Yama. They were feeding, at that time, on mistletoe berries.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
823	91385	♀ ad.	Tate-Yama, Shinshiu	Nov. 30, 1882	Iris venetian red.

Lanius bucephalus T. & S. Temm. et Schl., Faun. Japon, 1847, Aves, pl. xiv, p. 39; Whitely, Ibis, 1867, p. 200; Swinhoe, Ibis, 1875, p. 450; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 146.

Very common everywhere; collected at Fuji, Chiusenji, and in Shinshiu.

Young in first plumage.—Upper parts, crown, ear-coverts, and back rufous-brown, darker on the head; secondaries and wing-coverts broadly edged with rufous; superciliary line cream color; lower parts buff, deepening into brownish on sides and flanks; throat, sides of face, and belly cream color; breast, sides of face, and flanks closely covered with dusky crescentic markings; tail dusky, edged with rufous, most of the feathers tipped with white.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
327	.....	♀ ad.	Fuji-Yama	June 29, 1882	
428	88677	♂ ad.	do	July 5, 1832	Iris dark brown.
436	.....	♂ ad.	do	July 5, 1882	
531	88676	♂ ad.	do	July 17, 1882	
652	91383	♂ juv.	Chiusenji Lake	Aug. 31, 1882	
756	.....	♂ ad.	Tate-Yama, Shinshiu	Nov. 2, 1882	
757	91384	♀ juv.	do	Nov. 2, 1882	

Lanius superciliosus L. Swinhoe, Ibis, 1875, p. 450; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 147.

Very abundant at the base of Fuji, breeding. Not observed elsewhere.

Nest in the fork of a small tree or bush. It is very large for the size of the bird, measuring 100mm in diameter, with an inside depth of 50mm. It is composed of roots, the stems of plants, and grass, and is lined with finer grasses and rootlets. The eggs are cream color, much speckled all over, but especially the larger end, with umber brown; there are a few lilac blotches beneath the spots. The eggs are perfectly oval in shape, and measure 22mm by 16.5mm.

Young, first plumage.—Above, grayish brown, tinged with rusty, and narrowly barred with dusky; these bars narrower and more indistinct on nape; rump dull buff, narrowly and rather distantly barred; upper tail-coverts light rusty, narrowly barred with dusky; wings dusky, the coverts and secondaries broadly margined with pale rusty; lores and auriculars blackish, bordered above by light mottled grayish; lower parts white, the breast and sides tinged with pale buffy grayish, and rather indistinctly undulated with dark grayish; bill pale-colored, darker on culmen; feet very pale.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
374	.....	♀ ad.	Fuji-Yama	July 1, 1882	Bill dark horn color, fleshy toward the base; feet slate.
375	.....	♂ ad.	....do.....	July 1, 1882	
376	.....	♂ ad.	....do.....	July 1, 1882	
400	88673	♀ ad.	....do.....	July 2, 1882	
401	.....	♂ ad.	....do.....	July 2, 1882	
444	.....	♂ ad.	....do.....	July 6, 1882	
445	.....	♂ ad.	....do.....	July 6, 1882	
446	88675	♂ juv.	....do.....	July 6, 1882	
463	.....	♀ ad.	....do.....	July 10, 1882	
500	.....	♀ ad.	....do.....	July 13, 1882	
501	88674	♀ ad.	....do.....	July 13, 1882	
523	88672	♂ ad.	....do.....	July 14, 1882	

? **Lanius magnirostris** Less. Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 147.

A specimen which is identical with the one mentioned in Blakiston and Pryer's list was shot at Fuji. It has the form of *superciliosus*, but is a very distinct species.

The head is pure ashy gray, extending down to the shoulders; the wing-coverts, back, and rump are a rich chestnut, closely barred with dusky wavy lines. Ear coverts black. A narrow black line extends from the eye to the base of the bill. Nasal feathers white. A superciliary and post-ocular white line. Entire under parts pure white; flanks barred with dusky. Tail chestnut, narrowly tipped with white. Bill heavy, strongly hooked and toothed, 15mm in length. Wing 92mm. Tail 85mm. Tarsus 24mm.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
402	91455	♀ ad.	Fuji-Yama	July 2, 1882	

Pyrrhula orientalis T. & S. Temm. et Schl., Faun. Japon., 1847, Aves, pl. liii, p. 91; Blakiston, Ibis, 1862, p. 328; Whitely, Ibis, 1867, p. 203; Swinhoe, Ibis, 1874, p. 160; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 176; Seebohm, Ibis, 1882, p. 371, as *rosacea*.

I first saw these birds high up Fuji, at an elevation of between 3,000 and 4,000 feet. Young birds were very common in the treetops at Chiusenji Lake in latter part of August, seeming to keep entirely in the birch trees.

A large series of specimens in various stages of plumage, collected in Shinshiu, induce me to believe that Seebohm's species *rosacea* is simply a highly-developed stage of plumage of *orientalis*.

Looking over the collection I find I have five adult males. The first is typical *orientalis;* cheek-patches and throat rose color, breast clear ashy gray, back slightly darker. In the second the color of the throat is not clearly defined against the gray breast, the rose color runs down to a point in front, and there are rosy feathers scattered over the breast; in the third the rose has become a decided tint all over the breast, and in the fourth this color is still deeper on the breast, and has made its appearance on the back; but in the fifth specimen the *rosaceous* phase is very well developed. There is no line of demarkation between the cheeks and the breast. The rose color, or "vermillion," as Seebohm calls it, extends all over the breast, down to the flanks. The back is also strongly suffused with the same color. I judge that this specimen is even brighter or more rosaceous than the ones Mr. Seebohm describes, but with such a series before me as I have just described, I must draw the conclusion that *rosacea* is simply a phase of plumage of *orientalis*. Captain Blakiston agrees with me in the conclusions arrived at in regard to this species.

This phase of plumage is by no means rare in Shinshiu. A fair proportion of all the males I saw had the flush of breast and back of *rosacea*. Both plumages are figured in the "Fauna Japonica."

Young birds of the year: upper parts dirty olive-brown, darker on the head, rump white; below brownish, lighter in tint than the back. Wings and tail as in the adult. Bill smoky brown; feet brownish. The chin is black in some specimens.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
641	91335	♂ juv.	Chiusenji Lake	Aug. 30, 1882	
642	.....	♂ juv.	..... do	Aug. 30, 1882	Iris very dark brown.
643	.....	♂ juv.	..... do	Aug. 30, 1882	
644	.....	♂ juv.	..... do	Aug. 30, 1882	
645	91336	♂ juv.	..... do	Aug. 30, 1882	
646	.....	♂ juv.	..... do	Aug. 30, 1882	
655	.....	♂ juv.	..... do	Sept. 2, 1882	
656	91337	♂ juv.	..... do	Sept. 2, 1882	
658	91338	♂ juv.	..... do	Sept. 2, 1882	
812	91339	♂ ad.	Tate-Yama, Shinshiu	Nov. 28, 1882	
813	.....	♂ ad.	..... do	Nov. 28, 1882	
814	.....	♀ ad.	..... do	Nov. 28, 1882	
815	91340	♂ ad.	..... do	Nov. 28, 1882	
816	91341	♀ ad.	..... do	Nov. 28, 1882	
867	.....	♂ ad.	..... do	Dec. 14, 1882	
875	91342	♂ ad.	..... do	Dec. 17, 1882	

Carpodacus roseus Pall. Swinhoe, Ibis, 1877, p. 145; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 175.

One specimen of this bird was obtained in Shinshiu having been caught with bird-lime.

This species appears to have been only recorded in a wild state before from Yezo. I am informed, however, that the bird-dealers of Tokio frequently have specimens of this bird for sale. Locality of specimens unknown.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
797	91346	♂ ad.	Tate-Yama, Shinshiu	Nov. 21, 1883	

Chlorospiza sinica L. Temm. et Schl., Faun. Japon., 1847, Aves, pl. xlix, p. 89, as *Kawarahiba minor;* Whitely, Ibis, 1867, p. 202; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 173.

Very common at Fuji in summer. Not collected in Shinshiu.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
506	88680	♀ ad.	Fuji-Yama	July 13, 1883	
249	88681	♂ juv.	.....	.....	

Cocothraustes vulgaris japonicus Bp. Temm. et Schl., Faun. Japon., 1847, Aves, pl. li, p. 90; Whitely, Ibis, 1867, p. 201; Swinhoe, Ibis, 1874, p. 160; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 175.

This bird is frequently found in the bird-shops in winter, but is rarely seen in a state of nature on account of the shyness of its habits. We did not meet with it at Fuji-Yama.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
769	91437	♂ ad.	Matsumoto, Shinshiu	Nov. 5, 1882	Iris reddish brown; bill lavender, washed with brownish, tip dusky; tarsi and toes lilaceous.
857	91438	♀ ad.	Tate-Yama, Shinshiu	Dec. 9, 1882	

Eophona personata (T. & S.). Temm. et Schl., Faun. Japon., 1847, Aves, pl. lii, p. 91; Whitely, Ibis, 1867, p. 201; Swinhoe, Ibis, 1877, p. 145; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 175.

This species probably breeds on Fuji-Yama, as specimens were taken in June and July, but it is apparently not very common. It was also found in Shinshiu in winter.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
352	88678	♂ ad.	Fuji-Yama	June 30, 1882	Bill chrome yellow, base slightly greenish; feet pale flesh color.
358		♂ ad.	do	June 30, 1882	
359	88679	♀ ad.	do	June 3[illegible], 1882	
378		♂ ad.	do	July 1, 1882	
864		♀ ad.	Tate-Yama, Shinshiu	Dec. 12, 1882	Iris dark reddish brown; bill pale yellow, base slightly greenish; tarsi and toes pale flesh color.

Loxia albiventris Swinh. Temm. et Schl., Faun. Japon., 1847, Aves, p. 93; Swinhoe, Ibis, 1875, p. 450; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 176.

Crossbills were exceedingly plentiful in Shinshiu from about the middle of October. We were informed by the natives that they made their appearance in considerable numbers about every third year. At such times many people are employed catching them, and a considerable number are destroyed. The site for a bird-catcher of this description is on the summit of a hill, where there are a few trees, generally firs or pines. Selecting a suitable tree in which to hang his cages of decoy birds, he proceeds to make a broom-like arrangement of fir branches by wrapping them on the end of a long pole; into this he thrusts a few slender twigs, which have been coated with bird-lime. Resting the pole against the tree, and allowing the limed twigs to project through the top, he lies in wait at a suitable distance off, quietly smoking his pipe, until some passing flocks of siskins or crossbills are attracted by the singing of the birds in the cages and alight on the twigs. Taking the old twigs out, with the birds fluttering and struggling on them, he puts new ones in their places and is ready for the next flock.

Some specimens, males, are curiously mottled with red, green, and orange, and some females have a decided reddish tinge to the feathers.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
724	91569	♀ ad.	Tate-Yama, Shinshiu	Oct. 27, 1882	
725	.....	♀ ad.	....do	Oct. 27, 1882	Iris dark brown.
726	.....	♂ ad.	....do	Oct. 27, 1882	
727	91432	♂ ad	....do	Oct. 27, 1882	
742	.....	♀ ad.	....do	Oct. 30, 1882	
743	.....	♂ ad.	....do	Oct. 31, 1882	
805	91433	♂ ad.	....do	Nov. 24, 1882	
806	91434	♀ ad.	....do	Nov. 24, 1882	
807	.....	♀ ad.	....do	Nov. 24, 1882	
817	.....	♂ ad.	....do	Nov. 28, 1882	
852	.....	♀ ad.	....do	Dec. 9, 1882	
853	.....	♀ ad.	....do	Dec. 9, 1882	
854	91435	♀ ad.	....do	Dec. 9, 1882	
871	.....	♂ ad.	....do	Dec. 15, 1882	

Leucosticte brunneinucha Brandt. Whitely, Ibis, 1867, p. 202; Swinhoe, Ibis, 1875, p. 450; Blakiston and Pryer Trans. As. Soc. Japan, Vol. X, P+. I., 1882, p. 174.

I did not see these birds alive, either in the mountains or elsewhere, in Japan, but on returning from Tate-Yama, late in December, there were immense strings of them in the bird-shops near Matsumoto. In two small shops there were at least three hundred specimens, all more or less decomposed. I managed to secure a few for identification. We were informed that they had all been netted, and most of them had been taken at one time.

These birds compare very well with Yezo specimens taken in February. Kurile Island birds (summer) are much darker, and have black bills.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
881	91445	♂ ad.	Matsumoto, Shinshiu	Dec. 21, 1882	Iris dark brown; bill golden yellow, tip dusky; tarsi and toes black.
882	.....	♂ ad.	....do	Dec. 21, 1882	
883	.....	♂ ad.	....do	Dec. 21, 1882	
884	.....	♂ ad.	....do	Dec. 21, 1882	
885	.....	♂ ad.	....do	Dec. 21, 1882	
886	.....	♀ ad.	....do	Dec. 21, 1882	
887	.....	♂ ad.	....do	Dec. 21, 1882	
888	.....	♀ ad.	....do	Dec. 21, 1882	
889	.....	♀ ad.	....do	Dec. 21, 1882	
890	.....	♂ ad.	....do	Dec. 21, 1882	
891	.....	♂ ad.	....do	Dec. 21, 1882	
892	.....	♂ ad.	....do	Dec. 21, 1882	
893	91447	♂ ad.	....do	Dec. 21, 1882	
894	91448	♀ ad.	....do	Dec. 21, 1882	
895	.....	♀ ad.	....do	Dec. 21, 1882	
896	.....	♀ ad.	....do	Dec. 21, 1882	
897	.....	♂ ad.	....do	Dec. 21, 1882	
898	91450	♀ ad.	....do	Dec. 21, 1882	
899	91451	♀ ad.	....do	Dec. 21, 1882	
900	.....	♀ ad.	....do	Dec. 21, 1882	
*901	91452	♀ ad.	....do	Dec. 21, 1882	
902	.....	♀ ad.	....do	Dec. 21, 1882	
903	.....	♀ ad.	....do	Dec. 21, 1882	
904	.....	♀ ad.	....do	Dec. 21, 1882	

Ægiothus linaria L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 89; Swinhoe, Ibis, 1874, p. 160; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 174.

Two specimens of this bird, apparently not taken before south of Yezo, were obtained from a bird-catcher at Tate-Yama. They had been caught with bird-lime and were in company with siskins.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
798	91439	♂ ad.	Tate-Yama, Shinshiu	Nov. 21, 1882	Iris brown; bill bright yel low, tip dusky.
799	.....	♀ ad.	....do	Nov. 21, 1882	

Chrysomitris spinus L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 89; Blakiston, Ibis, 1862, p. 327; Whitely, Ibis, 1867, p. 201; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 173.

In fall and winter these birds are in large flocks in Shinshiu, and great numbers are caught with bird-lime. Not met with at Fuji.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
728	91440	♀ ad.	Tate-Yama, Shinshiu	Oct. 27, 1882	Iris brown.
746	.....	♂ ad.	....do	Oct. 31, 1882	
747	.....	♀ ad.	....do	Oct. 31, 1882	
748	.....	♀ ad.	....do	Oct. 31, 1882	
859	91441	♂ ad.	....do	Dec. 9, 1882	
860	91442	♂ ad.	....do	Dec. 9, 1882	

Passer montanus L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 89; Blakiston, Ibis, 1862, p. 327; Whitely, Ibis, 1867, p. 202; Swinhoe, Ibis, 1877, p. 145; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 172.

Abundant everywhere near houses or towns, finding suitable breeding-localities in the thatched roofs of the native houses. This bird is much prized by the Japanese as a subject for screen-pictures and other ornamental purposes, and is one of the few birds that they draw pre-eminently well.

It seems to have rather a gentler disposition than its much despised relative, *domesticus*.

NOTE.—I did not meet with *P. rutilans* either at Fuji or in Shinshiu.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
442	88682	♂ ad.	Fuji-Yama	July 6, 1882	

Fringilla montifringilla L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 87; Whitely, Ibis, 1867, p. 201; Swinhoe, Ibis, 1874, p. 160; Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 172.

Shinshiu in autumn; not common.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
679	.....	♂ ad.	Tate-Yama, Shinshiu	Oct. 3, 1882	
741	.....	♀ ad.	.....do.....	Oct. 30, 1882	

Emberiza personata Pall. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lix B, p. 99; Swinhoe, 'Ibis,' 1874, p. 161: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 170.

Common, breeding at Fuji early in July. Very common in Shinshiu late in autumn in reedy ditches and among rice. Nest on the ground or in a tussock of grass, made of dried grass and lined with fine roots and horse-hair. The eggs are nearly round in shape and measure 20^{mm} by 16^{mm}. Ground color whitish, suffused with pale lilac blotches; a few dark brown spots around the larger end and sometimes on the sides.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
505	88688	♂ ad.	Fuji-Yama	July 13, 1882	Iris dark brown.
520	88687	♂ ad.	.....do.....	July 14, 1882	
740	.....	♂ ad.	.....	Oct. 29, 1882	

Emberiza ciopsis Bp. Temm. et Schl. Faun. Japon., 1847, pl. lix, p. 98, as *cioides:* Blakiston, 'Ibis,' 1862, p. 328: Whitely, 'Ibis,' 1867, p. 202: Swinhoe, 'Ibis,' 1874, p. 161: Seebohm, 'Ibis,' 1879, p. 38: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 168.

Abundant everywhere, found breeding at Fuji. Nest of dried grass and leaves lined with fine rootlets. Eggs are rounded or bluntly oval in shape and measure 21^{mm} by 17^{mm}.5. The ground color is white, with a fine sub-speckling of bluish. The larger end is covered with hair lines and blotches of black.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
304	.....	♂ ad.	Hakone	June 26, 1882	Iris umber brown.
458	.....	♂ ad.	Fuji-Yama	July 9, 1882	
470	.....	ad.	.....do.....	July 10, 1882	
494	88685	♂ ad.	.....do.....	July 12, 1882	
528	88686	♀ ad.	.....do.....	July 16, 1882	
577	.....	♂ ad.	.....do.....	July 22, 1882	
582	.....	♀ ad.	.....do.....	July 23, 1882	
808	.....	♀ ad.	Tate-Yama, Shinshiu	Nov. 25, 1882	Bill dusky, under mandible bluish.
872	.....	♂ ad.	.....do.....	Dec. 15, 1882	

Emberiza variabilis T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lvi, p. 94: Swinhoe, 'Ibis,' 1875, p. 450: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 171.

This bird does not seem to be common. One specimen was obtained in Shinshiu in October, and I saw them again on the borders of that province at Usui Pass.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
694	91570	♀ ad.	Tate-Yama, Shinshiu.....	Oct. 15, 1882	Iris dark brown; feet and under mandible, dusky purplish.

Emberiza rustica Pall. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lviii, p. 97: Blakiston, 'Ibis,' 1862, p. 328: Whitely, 'Ibis,' 1867, p. 202: Swinhoe, 'Ibis,' 1874, p. 161: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 169.

First seen at Tate-Yama about the middle of November. Found at that time, in small flocks in the tree tops.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
788	.....	♂ ad.	Tate-Yama, Shinshiu.....	Nov. 17, 1882	Iris black.
789	91572	♀ ad.	.....do.....	Nov. 17, 1882	

Emberiza fucata Pall. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lvii, p. 96: Blakiston, 'Ibis,' 1862, p. 328: Whitely, 'Ibis,' 1867, p. 202: Siwnhoe, 'Ibis,' 1874, p. 161: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I. p. 169.

Common around Fuji in summer, but not collected elsewhere.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
301	.....	♀ ad.	Ashinoyu	June 25, 1882	Iris dark brown.
302	88684	♀ ad.	.....do.....	June 25, 1882	
306	88683	♂ ad.	.....do.....	June 26, 1882	
308	.....	♂ ad.	.....do.....	June 26, 1882	
368	.....	♂ ad.	Fuji-Yama	June 30, 1882	
469	.....	♂ ad.	.....do.....	July 10, 1882	
598	.....	♀ ad.	.....do.....	July 25, 1882	

Emberiza sulphurata T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lx, p. 100: Whitely, 'Ibis,' 1867, p. 203: Blakiston & Pryer, 'Ibis,' 1878, p. 243: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 171.

The commonest bunting at Fuji where it was breeding in June and early in July. Not found in Shinshiu.

Nest placed in fork of small bush, composed of grass, lined with horse-hair or the seed-stalks of moss. The eggs are nearly oval in shape and average about 15 by 19^{mm}. They vary considerably in

ground color, some being pale brownish, others lilaceous, and have numerous blotches and spots of dark brown unevenly distributed over the entire surface.

Young ♂, first plumage.—Above dull grayish olive, the back more decidedly olive, and broadly streaked with black; wings dusky, the middle and greater coverts tipped with light buff, and tertials broadly edged with dull rusty. Lower parts dull yellowish buff, paler and clearer on the abdomen, tinged with fulvous across jugulum, and with olive-grayish along sides; a very indistinct dusky bridle beneath the buffy malar stripe; lores grayish, eyelids pale buff.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
318	.....	♀ ad.	Fuji-Yama	June 28, 1882	Iris brown, bill bluish.
328	88690	♀ ad.	..... do	June 29, 1882	
363	.....	♂ ad.	.....do	June 30, 1882	
455	.....	♂ ad.	..... do	July 8, 1882	
456	88691	♂ juv.	.....do	July 8, 1882	
457	.....	♂ ad.	.....do	July 9, 1882	
471	88689	♂ ad.	.....do	July 10, 1882	
503	.....	♂ ad.	.....do	July 13, 1882	
504	.....	♂ ad.	.....do	July 13, 1882	
527	.....	♀ ad.	..... do	July 16, 1882	
576	.....	♂ ad.	.....do	July 22, 1882	

Accentor rubidus T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xxxii, p. 69: Whitely, 'Ibis,' 1867, p. 198: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 152.

This bird was obtained on Fuji-Yama in July at an elevation of about 8,000 feet. It was generally found in the scrub willows and has a sparrow-like chirping note. Later in the season we obtained it at a much lower elevation in Shinshiu.

It does not seem to be a common bird; not more than one or two specimens are ever seen at a time.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
386	88638	♂ ad.	Fuji-Yama	July 2, 1882	Iris reddish brown.
575	.....	♂ ad.	.....do	July 20, 1882	
778	.....	♂ ad.	Tate-Yama	Nov. 10, 1882	
779	91444	♂ ad.	.....do	Nov. 10, 1882	

Accentor erythropygius Swinh. Seebohm, 'Ibis,' 1879, p. 34: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. 1 1882, p. 153.

Two specimens of this bird were obtained from Fuji. They had been prepared by natives, and were so moth-eaten that they had to be destroyed. I identified them as belonging to this species. One specimen was subsequently obtained in Shinshiu. It was shot on the summit of

Mt. Gorokudake in the Tate-Yama Range. The Japanese happily call this bird the "*iwa hibari*," "rock lark," a name which is very suggestive of the habits of the bird.

Returning from Tate-Yama late in December by way of Usui Pass, I had the pleasure of seeing three of these birds at the same time, certainly an unusual thing for birds of their solitary nature. I was descending the pass considerably in advance of my companions, when a turn in the road brought me by a partially boggy place, surrounded by rocks with water trickling over and between them. Here I saw the accentors. They were flitting around on the rocks, and seemed to be rather silent birds, simply uttering a low, soft chuckling note. They were very familiar, and allowed me to approach within about 20 feet without taking alarm.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
348	.....	♂ ad.	Fuji-Yama	Aug. —, 1881	Destroyed.
349	.....	♀ ad.	.....do	Aug. —, 1881	Do.
678	91443	♂ ad.	Gorokudake, Shinshiu	Sept. 28, 1882	Iris light brown.

Alauda japonica T. & S. Temm. et Schl. Faun. Japon., 1847, pl. xlvii, p. 87: Blakiston, 'Ibis,' 1862, p. 327: Whitely, 'Ibis,' 1867, p. 293: Swinhoe, 'Ibis,' 1874, 161, et 1877, p. 145: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I. 1882: p. 167.

Abundant on the low grass hills around Hakone Lake and about Fuji. Breeding on Fuji in July.

Young ♀, *first plumage*—Pileum brownish black, relieved by a few narrow white crescents, the feathers being narrowly tipped with white; a very distinct superciliary stripe of white, extending continuously from bill to and around occiput; nape dull brownish buff, clouded with dusky; back and scapulars black, the feathers narrowly margined terminally with white and edged with dull buff or fulvous; wings black, the feathers broadly edged with light fulvous or clay-color, the tips of the uppermost feathers whitish. Stripe on side of head, blackish; lower parts pure white posteriorly, buffy white or pale buff anteriorly, the jugulum broadly but rather indistinctly streaked with dusky.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
307	.....	ad.	Hakone	June 26, 1882	Iris dark brown.
579	88657	♀ juv.	Fuji-Yama	July 22, 1882	
999	91550	♂ ad.	Yubuts, Yezo	Sept. 15, 1882	
1000	91551	♂ ad.	Sapporo, Yezo	June 23, 1882	

Corvus japonensis Bp. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xxxix B, p. 79: as *macrorhynchus:* Blakiston, 'Ibis,' 1862, p. 325: Whitely, 'Ibis,' 1867, p. 200, Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 141: Brit. Mus. Cat., Vol. III, p. 41.

Common about the shores of Chiusenji Lake. This bird has much harsher and more varied notes than *C. corone* and is more of a maritime species.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
664	91390	♀ ad.	Chiusenji Lake	Sept. 3, 1882	Iris blue-black.

Corvus corone L. Temm. et Schl., Faun. Japon., 1847, Aves, p. 79: Swinhoe, 'Ibis,' 1874, p. 159: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 141: Brit. Mus. Cat., Vol. iii, p. 36.

Abundant everywhere inland; the only species we observed in Shinshiu.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
735	.....	♂ ad.	Tate-Yama, Shinshiu	Oct. 29, 1882	Iris blue-black.
811	91391	♂ ad.	....do....	Nov. 25, 1882	

Nucifraga caryocatactes L. Blakiston, 'Ibis,' 1862, p. 326: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 143: Brit. Mus. Cat., Vol. III, p. 53.

We found the nut crackers on Fuji at an elevation of about 5,000 feet. They were in small flocks of eight or ten and were quite easily approached, having none of the sagacity of crows or jays. The natives give them the name "*baka-karasu*," or 'fool-crows,' on that account.

They are occasionally seen on the foot-hills at Tate-Yama in December, and are sometimes trapped.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
332	.....	♂ ad.	Fuji-Yama	June 29, 1882	
333	.....	♂ ad.	....do....	June 29, 1882	
334	.....	♂ ad.	....do....	June 29, 1882	
335	.....	♀ ad.	....do....	June 29, 1882	
388	.....	♂ ad.	....do....	July 2 1882	Iris burnt umber.
389	88701	♀ ad.	....do....	July 2, 1882	
390	.....	♀ ad.	....do....	July 2, 1882	
391	88699	♂ ad.	....do....	July 2, 1882	
392	88700	♂ ad.	....do....	July 2, 1882	
426	.....	♂ ad.	....do....	July 4, 1882	
427	.....	♂ ad.	....do....	July 4, 1882	
879	91392	♂ ad.	Tate-Yama, Shinshiu	Dec. 17, 1882	

Garrulus japonicus Bp. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xliii, p. 83: Swinhoe, 'Ibis,' 1877, p. 144: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 144: Brit. Mus. Cat., Vol. III, p. 95.

Abundant everywhere in small flocks. Collected at Fuji, Chiusenji Lake, and in Shinshiu. Young of the year differ from adults in having the upper parts, crown, back, and wing-coverts dull rufous. The ear coverts are of the same color, thus showing a near affinity to *glandarius*. It is also worthy of notice that the iris of young birds is light blue, as in *glandarius*.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
393	88696	♂ juv.	Fuji-Yama	July 2, 1882	Iris bluish-white.
407	.....	♂ juv.	do	July 3, 1882	
530	88695	♀ ad.	do	July 17, 1882	Iris white, bill bluish, tipped with dusky; feet lilaceous.
546	88694	♂ ad.	do	July 19, 1882	
601	.....	♀ juv.	do	July 25, 1882	
651	.....	♀ juv.	Chiusenji Lake	Aug. 31, 1882	
758	91389	♀ ad.	Tate-Yama, Shinshiu	Nov. 2, 1882	Crop contained 12 acorns.

Cyanopolius cyanus Pall. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xlii, p. 81: Swinhoe, 'Ibis,' 1877, p. 145: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 143: Brit. Mus. Cat., Vol. III, p. 68.

Common around the base of Fuji in summer; also met with in Shinshiu as late as December.

Young of the year.—Differing from the adult in having the feathers of the pileum margined terminally with white, causing a hoary appearance, especially on forehead; middle and greater wing-coverts tipped with pale buff, and breast and sides clouded with dull gray.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
394	88697	♀ ad.	Fuji-Yama	July 2, 1882	
547	88698	♂ juv.	do	July 19, 1882	

Sturnia pyrrhogenys T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xlvi, p. 86: Blakiston, 'Ibis,' 1862, p. 327: Whitely, 'Ibis,' 1867, p. 201: Swinhoe, 'Ibis,' 1874, p. 159: Blackiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 146.

Taken at Fuji in summer; not very common. We saw immense flocks of this bird in the neighborhood of Kusats in September.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
443	.....	♂ ad.	Fuji-Yama	July 6, 1882	Iris light brown.
590	88693	♂ ad.	do	July 6, 1882	

Tchitrea princeps T. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xvii E, p. 47: Blakiston and Pryer, 'Ibis,' 1878, p. 234: idem, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 148: Brit. Mus. Cat., Vol. IV, p. 361.

Very abundant around Fuji in summer, breeding from the latter part of June until the middle of July.

The flight of this bird is heavy and only sustained for short distances. It has none of the quick, nervous movements of the fly-catchers, but when flitting silently from tree to tree, or throwing itself headlong from some tall branch and catching an insect in its flight and alighting again with one long curve, it resembles a heavy-headed dart. The long tail, three times the length of the body, quite overbalances the bird and gives it this peculiar appearance when flying.

The nest is placed in the deep fork of a small tree, sometimes supported by the swaying branches of a Wisteria, and about 8 or 10 feet from the ground; generally near running water. It is composed of dried grass, strips of bark, and live moss, which is bound around the forks of the tree and trails down in some examples for a considerable distance below the nest.

Some nests are garnished with pieces of lichen and the whole outside surface is bound together and smoothed off with spider webs.

The nest is lined inside with fine moss roots. The eggs are rounded oval in shape and measure 20^{mm} by 16^{mm}. The ground tint is a delicate pinkish or cream color, and they are much speckled on the side and around the butt with lilac blotches and spots of burnt sienna.

The males do not attain the adult plumage until the third year; young males of the second year resemble the female, but are much darker and have longer tails. The colors of the soft parts of this bird are much more brilliant in life than they are represented in the 'Fauna Japonica' plate, and the fleshy ring around the eye is larger. They are as follows: Iris blue-black; eyelids and bill bright cobalt blue; tarsi and toes bluish lead color.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
313	88654	♂ juv.	Fuji-Yama	June 27, 1882	Iris blue-black.
319		♂ juv.	do	June 28, 1882	
339		♂ ad.	do	June 29, 1882	
353		♂ ad.	do	June 30, 1882	
354		♂ ad.	do	June 30, 1882	
355		♂ ad.	do	June 30, 1882	
356		♀ ad.	do	June 30, 1882	
357	88653	♀ ad.	do	June 30, 1882	
439	88651	♂ ad.	do	July 5, 1882	
451		♂ ad.	do	July 8, 1882	
452		♀ ad.	do	July 8, 1882	
497		♂ ad.	do	July 13, 1882	Nest contained 3 eggs at this time.
524	88652	♀ ad.	do	July 15, 1882	Accompanying nest and 4 eggs.
525	88655	juv.	do	July 15, 1882	
553		♂ ad.	do	July 19, 1882	
554		♂ ad.	do	July 19, 1882	
555		♀ ad.	do	July 19, 1882	
556		♂ ad.	do	July 19, 1882	
581		♀ ad.	do	July 23, 1882	
622		♂ ad.	do	July 29, 1882	
631	91378	♂ juv.	Chiusenji Lake	Aug. 28, 1882	

Vol. VI, No. 20. Washington, D. C. Dec. 27, 1883.

Pericrocotus cinereus Lafr. Seebohm, 'Ibis,' 1879, p. 31: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 149: Brit. Mus. Cat., Vol. IV, p. 83.

This bird is occasionally seen at Fuji, in small flocks, in the tree-tops. I observed it also, under similar conditions, at Chiusenji Lake. It has a loud, whistling note.

A young male, collected in the latter part of August, is in the plumage of the female, but differs in having the three innermost secondaries broadly edged with white.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
387	88656	♀ ad.	Fuji-Yama	July 2, 1882	
431		♂ ad.	do	July 5, 1882	
432		♀ ad.	do	July 5, 1882	
617		♀ ad.	do	July 29, 1882	
628	91382	♂ juv.	Chiusenji Lake	Aug. 27, 1882	

Poliomyias luteola Pall. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xvii B, p. 46, as *Muscicapa mugimaki:* Brit. Mus. Cat., Vol. iv, p. 201: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 148.

A single individual of this rare species was obtained in Shinshiu. This is the third specimen that has been recorded from Japan since the time of the 'Fauna Japonica.'

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
731	91373	♂ ad.	Matsumoto, Shinshiu	Oct. 29, 1882	Caught with bird-lime.

Butalis latirostris Raffles. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xv, p. 42, as *M. cinereo-alba:* Blakiston, 'Ibis,' 1862, p. 317: Whitely, 'Ibis,' 1867, p. 199: Swinhoe, 'Ibis,' 1874, p. 159: Seebohm, 'Ibis,' 1879, p. 31: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 147: Brit. Mus. Cat., Vol. iv, p. 127.

Very abundant at Fuji in June and July, collected also at Chiusenji and in Shinshiu in September.

Young, in first plumage; above pure white, all the feathers with dusky edgings. Wing and tail dusky. Secondaries and wing coverts broadly edged with whitish. Rump slightly tinged with brownish. Entire under parts pure glossy white.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
341	.....	♂ ad.	Fuji-Yama	June 29, 1882	
351	.....	♀ ad.	.....do.....	June 29, 1882	
370	88634	♀ ad.	.....do.....	June 30, 1882	
371	88635	♂ juv.	.....do.....	June 30, 1882	
372	.....	♂ juv.	.....do.....	June 30, 1882	
419	88633	♂ ad.	.....do	July 4, 1882	Iris dark brown.
420	.....	♀ ad.	.....do.....	July 4, 1882	
479	.....	♂ ad.	.....do.....	July 11, 1882	
480	.....	♀ ad.	.....do.....	July 11, 1882	
481	.....	♀ ad.	.....do.....	July 11, 1882	
482	.....	♂ ad.	.....do.....	July 11, 1882	
657	91381	♀ ad.	Chiusenji Lake	Sept. 2, 1882	
676	.....	♂ ad.	Tate-Yama, Shinshiu	Sept. 27, 1882	Only one specimen seen.

Xanthopygia cyanomelæna T. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xvii D, p. 47 ♂ as *M. melanoleuca;* pl. xvi, p. 43, ♀ as *M. gularis:* Whitely, 'Ibis,' 1867, p. 199: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 147: Brit. Mus. Cat., Vol. IV, p. 251.

Common in the deep woods at Fuji, breeding early in June. Occasionally seen at Chiusenji in September.

This bird is easily attracted by imitating its mellow whistling note.

Young in first plumage; entire upper parts dull olive brownish; all the feathers edged with dusky, and with large ochraceous centers, thus giving the bird a very streaked and spotted appearance. Wing dusky brownish or bluish (in males); shoulder and greater wing-coverts broadly edged with ochraceous.

Under parts strongly suffused with ochraceous; all the feathers edged with dusky.

Bill brownish; mouth and base of under mandible yellow; tarsi and toes dusky yellowish; claws dusky.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
321	.....	♂ ad.	Fuji-Yama	June 28, 1882	
343	.....	♂ ad.	.... do.....	June 29, 1882	Iris dark brown.
364	88615	♀ ad.	.....do.....	June 30, 1882	
379	.....	♂ juv.	.....do.....	July 1, 1882	
406	88617	♀ juv.	.....do.....	July 2, 1882	
416	.....	♂ ad.	.....do	July 3, 1882	
453	88614	♂ ad.	.....do	July 8, 1882	Iris brown.
461	.....	♀ ad.	.....do.....	July 10, 1882	
612	.....	♂ ad.	.... do.....	July 28, 1882	
613	.....	♀ ad.	.... do	July 28, 1882	
614	88616	♀ juv.	.....do.....	July 28, 1882	
615	.....	♂ juv.	.....do.....	July 28, 1882	
638	91379	♂ juv.	Chiusenji Lake	Aug. 30, 1882	
639	.....	♂ juv.	.....do.....	Aug. 30, 1882	

Xanthopygia narcissina T. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xvii C, p. 46: Blakiston, 'Ibis,' 1862, p. 318: Swinhoe, 'Ibis,' 1874, p. 159: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 148: Brit. Mus. Cat., Vol. IV, p. 249.

We found this bird abundant at Fuji in June and July. It is very shy in its habits, and frequents the deep woods.

Young in first plumage are hardly distinguishable from young *cya-*

nomelæna. The coloration of the back is precisely the same; the wings are dusky. Primaries and secondaries edged with olive-brown; shoulder and wing-coverts broadly tipped with ochraceous. The under parts are much lighter than *cyanomelæna*, the throat and belly being pure white or pale yellowish, while the breast alone is suffused with ochraceous and has dusky margins to the feathers.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
326	.....	♂ ad.	Fuji-Yama	June 28, 1882	
337	.....	♂ ad.	....do	June 29, 1882	
338	88621	♂ ad.	....do	June 29, 1882	
344	.....	♂ ad.	....do	June 29, 1882	
345	.....	♂ ad.	....do	June 29, 1882	
365	.....	♂ ad.	....do	June 30, 1882	
415	.....	♂ ad.	....do	July 3, 1882	
441	.....	juv.	....do	July 6, 1882	
447	.....	♀ ad.	....do	July 6, 1882	
449	88620	♂ ad.	....do	July 6, 1882	
450	.....	♂ ad.	....do	July 6, 1882	Iris brown.
459	.....	♂ ad.	....do	July 10, 1882	
473	.....	juv.	....do	July 11, 1882	
483	.....	♂ ad.	....do	July 11, 1882	
484	.....	♀ ad.	....do	July 11, 1882	
515	.....	♂ ad.	....do	July 14, 1882	
516	.....	♂ ad.	....do	July 14, 1882	
517	.....	♂ ad.	....do	July 14, 1882	
518	88622	♀ ad.	....do	July 14, 1882	
521	.....	♂ ad.	....do	July 14, 1882	
535	.....	♂ ad.	....do	July 18, 1882	
536	.....	♂ ad.	....do	July 18, 1882	
572	.....	♀ ad.	....do	July 20, 1882	
624	.....	♂ ad.	....do	July 30, 1882	
625	88623	♀ ad.	....do	July 30, 1882	
719	91380	♂ juv.	Tate-Yama, Shinshiu	Oct. 26, 1882	

Picus leuconotus Bechst. Blakiston, 'Ibis,' 1862, p. 325: Whitely, 'Ibis,' 1867, p. 195: Swinhoe, 'Ibis,' 1875, p. 451: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 133.

Only met with at Chiusenji Lake, where it did not seem to be common.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
649	91326	♀	Chiusenji Lake	Aug. 31, 1882	
650	.....	♀	....do	Aug. 31, 1882	

Picus major japonicus (L.) Seebohm. Blakiston, 'Ibis,' 1862, p. 325: Whitely, 'Ibis,' 1867, p. 195: Swinhoe, 'Ibis,' 1875, p. 451: Seebohm, 'Ibis,' 1879, p. 29: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 132.

This is the commonest woodpecker in the mountains.

Specimens vary considerably in the amount of white in the wings and in the markings of the tail feathers. In one example the barring of the tail is almost obsolete, and in most of our specimens only the two central tail feathers are entirely black. This peculiarity has been remarked on before, but in a large series of specimens from Shinshiu

this is the rule, only two specimens in the lot having the four central feathers black.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
347	.....	♂ ad.	Fuji-Yama	June 29, 1882	Iris venetian red.
396	88704	♀	....do.....	July 2, 1882	
397	.....	♀ ad.	....do.....	July 2, 1882	
425	88703	♂	....do.....	July 4, 1882	
462	.....	♀	....do.....	July 10, 1882	
493	.....	♂	....do.....	July 12, 1882	
596	.....	juv.	....do.....	July 24, 1882	
648	.....	♂ ad.	Chiusenji Lake	Aug. 31, 1882	
672	91327	♂ ad.	....do	Sept. 6, 1882	
700	.....	♂ ad.	Tate-Yama, Shinshiu.....	Oct. 17, 1882	Iris bright reddish brown; bill and feet dusky.
718	.....	♀ ad.	..... do.....	Oct. 25, 1882	Iris dark brown.
755	.....	♂ ad.	....do.....	Nov. 2, 1882	
772	.....	♂ ad.	....do	Nov. 7, 1882	
792	91328	♂ ad.	....do	Nov. 17, 1882	
793	.....	♀ ad.	.....do.....	Nov. 17, 1882	
803	91329	♂ ad.	....do.....	Nov. 20, 1882	
840	91330	♀ ad.	....do.....	Dec. 4, 1882	
865	91331	♀ ad.	..... do.	Dec. 12, 1882	
866	91332	♀ ad.	.... do	Dec. 12, 1882	
878	.....	♀ ad.	..... do	Dec. 17, 1882	

Picus kisuki T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xxxvii, p. 74: Blakiston, 'Ibis,' 1862, p. 325: Swinhoe, 'Ibis,' 1875, p. 451: Seebohm, 'Ibis,' 1879, p. 29: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 134.

This bird was not common at Fuji, but became tolerably so in Shinshiu in autumn and winter.

It almost invariably accompanies flocks of tits, associating with them in perfect harmony.

On moving from tree to tree they utter the warning cry "*gee'd*," "*gee'd*," but whether the tits follow the woodpecker, or *vice versa*, I was unable to ascertain with certainty.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
314	88705	♂ ad.	Fuji-Yama	June 28, 1882	Iris reddish brown.
317	.....	♂ ad.	.....do.....	June 28, 1882	
369	.....	♀ ad.	.....do.....	June 30, 1882	
698	91333	♂ ad.	Tate-Yama, Shinshiu	Oct. 17, 1882	
780	91334	♀ ad.	.....do.....	Nov. 13, 1882	
800	..	♀ ad.	.....do	Nov. 20, 1882	
801	91426	♀ ad.	.....do.....	Nov. 20, 1882	
822	.....	♀ ad.	.....do	Nov. 30, 1882	
822½	91427	♂ ad.	..... do	Nov. 30, 1882	
832	.....	♀ ad.	.....do.....	Dec. 3, 1882	
868	.....	♂ ad.	.....do.....	Dec. 14, 1882	Iris reddish brown.

Gecinus awokera T & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xxxvi, p. 72: Blakiston and Pryer, 'Ibis,' 1878, p. 229: Blakiston & Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. p. 136.

Not obtained at Fuji. Early in autumn these birds are commonly found on magnolia trees, but later in the season they seem to frequent the *Cryptomeria* groves.

Fresh colors of this bird are as follows: Iris venetian red; bill dark greenish, base lemon yellow; tarsi and toes dull olive green.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
699	91428	♀ ad.	Tate-Yama, Shinshiu	Oct. 17, 1882	Stomach contained berries.
703	91429	♀	do	Oct. 19, 1882	
744		♀ ad.	do	Oct. 31, 1882	Iris venetian red.
752	91430	♂ ad.	do	Nov. 2, 1882	
753		♀ ad.	do	Nov. 2, 1882	
802		♀ ad.	do	Nov. 21, 1882	

Cuculus hyperythrus Gould=**pastoralis** Cab.=**spaveroides** Vigors apud Schrenck, =**fugax** Horsfield. Seebohm, 'Ibis,' 1879, p. 28: Seebohm, 'Ibis,' 1878, p. 227: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 131.

We observed this species at Fuji. One specimen was obtained at Chiusenji in September. They have no note at this season except a faint, wheezy sort of whistle.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
669	91387	♂ ad.	Chiusenji Lake	Sept. 6, 1882	Iris dark brown; bill dusky, under mandible greenish yellow; naked space around eye lemon yellow; tarsi, toes, and claws bright lemon yellow.

Cuculus himalayanus Vigors. Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 131.

We did not succeed in getting any Cuckoos at Fuji, although we frequently heard the notes of several species. They are so constantly hunted by the natives for medicinal purposes that it is impossible to approach them in the breeding season. At Chiusenji we occasionally saw them flitting silently through the trees along the lake shore.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
637	91386	♂ ad.	Chiusenji Lake	Aug. 29, 1882	Iris orange; upper mandible black, lower mandible greenish-yellow; mouth orange-red; tarsi and toes bright chrome; claws dusky.

Alcedo bengalensis Gm. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xxxviii, p. 76: Blakiston, 'Ibis,' 1862, p. 325: Whitely, 'Ibis,' 1867, p. 196: Swinhoe, 'Ibis,' 1874, p. 152: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 136.

Common in all suitable localities both at Fuji and Shinshiu. Also seen at Chiusenji Lake.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
423	.. ....	♂ ad.	Fuji-Yama	July 5, 1882	
434	88706	♀ juv.	do	July 5, 1882	
693	91394	♂ ad.	Tate-Yama, Shinshiu	Oct. 13, 1882	
697	.....	♂ ad.	.... do	Oct. 17, 1882	

Halcyon coromanda Bodd. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xxxix, p. 75: Seebohm, 'Ibis,' 1879, p. 20: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 137.

We only met with this bird at Chiusenji Lake, where we shot a single specimen. We were told by the natives that they were common at the lake during the summer months.

NOTE.—We saw the large black and white kingfisher, *Ceryle guttata*, at Tate-Yama up to the time we left, the latter part of December, and were told that they remained all winter. It is found in the wildest mountain streams and gorges, and is exceedingly wary. We did not succeed in getting specimens.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
670	91393	♂ ad.	Chiusenji Lake	Sept. 6, 1882	Bill, tarsi, and toes coral red.

Caprimulgus jotaka T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. xii et xiii, p. 37: Whitely, 'Ibis,' 1867, p. 195: Swinhoe, 'Ibis,' 1876, p. 331: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 140.

Abundant at Fuji, where their cry, "*chuck, chuck, chuck*," was constantly heard in the still evening air, and sometimes before daybreak in the morning. We frequently saw them flying around the lake shore at Chiusenji, and observed them occasionally in Shinshiu up to the end of October. At this time they are silent, and are only obtained by disturbing them in their resting places in the daytime.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
414	.....	♂ ad.	Fuji-Yama	July 3, 1882	Iris, deep blue-black.
435	....	♂ ad.	.....do	July 5, 1882	
548	.....	♀ ad.	.....do	July 19, 1882	
602	88702	♂ ad.	do	July 26, 1882	
635	.....	♀ ad.	Chiusenji Lake	Aug. 28, 1882	
730	91388	♀ ad.	Tate-Yama, Shinshiu	Oct. 28, 1882	

Scops semitorques Schleg. Temm. et Schl. Faun. Japon., 1847, Aves, pl. viii, p. 24; Swinhoe, Ibis, 1875, p. 448: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 179: Brit. Mus. Cat., Vol. II, p. 83.

Two specimens of this bird were obtained in Shinshiu. They had been caught in nets.

This is the only species of owl that we succeeded in collecting. Considering the nature of the country we were in, the variety of owls was indeed remarkable.

In the deep woods above Chiusenji Lake I saw a very light colored specimen of *Syrnium rufescens*. I was attracted by the noisy chattering of a flock of jays, and on approaching saw a large owl sitting on a burnt stump. In the gloom of the forest I at first took it to be a snowy owl. The jays were flying around him, screeching and jawing in noisy excitement, and every now and then one would fly at him. I was unable to approach near enough to get a shot on account of the denseness of the underbrush. While I stood watching this bloodless battle he quietly flew off with his tormentors following him.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
733	91406	♀ ad.	Matsumoto Shinshiu	Oct. 29, 1882	Iris bright chrome.
734		♀ ad.	do	Oct 29, 1882	

Pernis ptilonorhynchus (Temm.).

Pernis apivorus, Temm. et Schl. Faun. Japon., 1847, Aves, p. 24: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 183: Brit. Mus. Cat. Vol. I. pp. 344 to 347.

One specimen, an adult male, was shot at Chiusenji.

We saw this bird circling around mountain peaks, on two occasions during our stay at the lake, and were informed by the natives that they were common every year in the mountains about Nikko and Chiusenji. I am not sure that this information is reliable, however, because they confound this species with *Spizaëtus nipalensis* and call them both "*Kuma taka*."

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
666	91403	♂ ad.	Chiusenji Lake	Sept. 4, 1882	Iris bright yellow, inclining to orange on the outer edge.

Milvus melanotis T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. v. et v. B, p. 14: Blakiston, 'Ibis,' 1862, p. 314: Whitely, 'Ibis,' 1867, p. 194: Swinhoe, 'Ibis,' 1874, p. 150: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 181: Brit. Mus. Cat., Vol. I, p. 324.

Kites are rarely seen in the interior. A few resort to Chiusenji Lake in summer.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
668	91421	♂ ad.	Chiusenji Lake	Sept. 4, 1882	Iris umber brown.

Accipiter gularis T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. ii, p. 5: Swinhoe, 'Ibis,' 1863, p. 443: Seebohm, 'Ibis,' 1879, p. 42: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 184: Brit. Mus. Cat., Vol. I, 150.

This is the commonest species of hawk in Shinshiu. A fine series, comprising male, female, and young, were obtained in October and November. At this season, when they are migrating, large numbers are taken by the natives in nets and also with bird-lime.

They are very plucky in the pursuit of game, often attacking birds almost as large and strong as themselves. On such occasions they pay little heed to an observer. I have seen one of these birds in hot pursuit of a large woodpecker (*P. japonicus*), which only escaped through the friendly shelter of a large pine. The average measurement of the wing in nine adult males is 168^{mm} (162^{mm} to 173^{mm}), and the tarsus 48^{mm} (46^{mm} to 49^{mm}).

Young males average in the wing 166^{mm} (161^{mm} to 171^{mm}), and tarsus 48^{mm} (46^{mm} to 49^{mm}).

The adult female measures 193^{mm} in the wing, and 52^{mm} in the tarsus.

Young females average in the wing 189^{mm} (184^{mm} to 194^{mm}), and tarsus 50^{mm} (50^{mm} to 52^{mm}).

None of this series of male adults are as bright on the flanks as the example figured in the "Fauna Japonica."

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
704	91409	♀ juv.	Matsumoto, Shinshiu	Oct. 23, 1882	
705	91410	♂ ad.	do	Oct. 23, 1882	
707		♂ ad.	do	Oct. 23, 1882	Iris orange, bill dusky, tarsi and toes chrome.
708	91411	♂ ad.	do	Oct. 23, 1882	
709		♂ juv.	do	Oct. 23, 1882	Iris lemon yellow.
710		♂ ad.	do	Oct. 23, 1882	
711	91412	♂ juv.	do	Oct. 23, 1882	Iris chrome.
712		♂ ad.	do	Oct. 23, 1882	
713	91413	♂ ad.	do	Oct. 23, 1882	
714	91414	♂ ad.	do	Oct. 23, 1882	
737		♂ juv.	do	Oct. 30, 1882	
738	91415	♂ juv.	do	Oct. 29, 1882	
759	91416	♀ ad.	do	Nov. 4, 1882	
760		♂ ad.	do	Nov. 4, 1882	
761	91417	♂ ad.	do	Nov. 4, 1882	
762	91418	♂ juv.	do	Nov. 4, 1882	
763		♂ juv.	do	Nov. 4, 1882	
764		♂ juv.	do	Nov. 4, 1882	
766	91419	♀ juv.	do	Nov. 4, 1882	
767		♀ juv.	do	Nov. 4, 1882	
768		♀ juv.	do	Nov. 4, 1882	
770		♀ juv.	do	Nov. 5, 1882	
771	91420	♀ juv.	do	Nov. 5, 1882	

Accipiter nisus L. Temm. et Schl. Faun. Japon., 1847, p. 5: Blakiston, 'Ibis,' 1862, p. 314: Whitely, 'Ibis,' 1867, p. 194: Seebohm, 'Ibis,' 1879, p. 42: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 183: Brit. Mus. Cat., Vol. I, p. 132.

Two specimens, an adult female and young male, were obtained in Shinshiu. They were both taken in nets by the natives. The young male resembles the young female of *gularis*, but is much lighter in color, more rufous on the crown and back, and lacks the streaking of the breast of *gularis*.

Measurements are, wing, 211mm; tarsus, 53mm.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
736	91408	♂ juv.	Matsumoto, Shinshiu.....	Oct. 29, 1882	Iris chrome yellow.
785	91407	♀ ad.	.....do.....	Nov. 15, 1882	

Astur palumbarius L. Seebohm, 'Ibis,' 1879, p. 42: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 183: Brit. Mus. Cat., Vol. I, p. 95.

Obtained in Shinshiu in October. Not common. This specimen was caught in a net.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
706	91404	♂ ad.	Matsumoto, Shinshiu	Oct. 23, 1882	Iris brilliant cadmium yellow; bill horn color, base bluish; cere dark greenish; tarsi and toes chrome.

Butastur indicus Gm. Seebohm, 'Ibis,' 1879, p. 42: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 183: Brit. Mus. Cat., Vol. I, p. 297.

Observed at Fuji; breeding very late. Young in the down taken about the middle of July.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
557	88707	♀ ad.	Fuji-Yama	July 19, 1882	Iris chrome; cere, tarsi, and toes ocher; tip of bill black.
578	88708	♂ pullus.	.....do.....	July 22, 1882	Young of No. 557. Iris dark umber. bill a. d feet same as adult.

Buteo japonicus T. & S. Temm. et Schl. Faun. Japon., 1847, Aves, pl. vii B. p. 20: Blakiston and Pryer, 'Ibis,' 1878, p. 248: Seebohm, 'Ibis,' 1879, p. 41: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 182: Brit. Mus. Cat., Vol. I, 180.

Two specimens, both in the light phase of plumage, were collected in Shinshiu. One of them was caught with bird-lime.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
784	91405	♂ ad.	Matsumoto, Shinshiu	Nov. 15, 1882	
858	91596	♀ ad.	Tate-Yama, Shinshiu	Dec. 9, 1882	

Treron sieboldii Temm. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lx, D, p. 102: Whitely, 'Ibis,' 1867, p. 204: Swinhoe, 'Ibis,' 1875, p. 452: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 129.

We found this beautiful pigeon tolerably abundant at Fuji, but exceedingly shy. They were feeding almost entirely at that time on wild cherries. We observed them in Shinshiu as late as October 26. They are sometimes caught in that province in the nets described under the heading of *Hypsipites amaurotis*.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
331	88711	♀ ad.	Fuji-Yama	June 29, 1882	Iris golden yellow.
549	88710	♂ ad.	do	July 19, 1882	Bill blue, tip dull horny-bluish, naked space around eye blue; tarsi and toes lilac.
550	.....	♂ ad.	do	July 19, 1882	
551	.....	♂ ad.	do	July 19, 1882	
552	.....	♂ ad.	do	July 19, 1882	

Turtur gelastes Temm. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lx, B, p 100: Whitely, 'Ibis,' 1867, p. 204, as *rupicola*: Swinhoe, 'Ibis,' 1874, p. 162: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 129.

Common everywhere; breeding at Fuji. Also taken in the neighborhood of Tate-Yama.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
600	88709	♂ juv.	Fuji-Yama	July 25, 1882	Iris yellow ocher; eyelids and feet purplish; bill dusky.

Phasianus versicolor Vieill. Temm. et Schl. Faun. Japon., 1847, Aves, p. 104: Swinhoe, 'Ibis,' 1875, p. 452: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882 p. 126.

We obtained green pheasants at all the localities in which we collected, but did not find them abundant anywhere. A nest and eight eggs were taken at Fuji in July; young chicks were also obtained

about the same time. These are very prettily mottled on the back with dark-brown, chocolate, and salmon color; head yellow, with a central stripe of dark brown. A triangular patch of chocolate covers the orifice of the ear. Under parts pale yellow, breast with a tinge of brownish.

List of specimens.

Original number.	Museum number.	Sex.	Localities.	Date.	Remarks.
408	88713	Pullus.	Fuji-Yama	July 3, 1882	
409	....	♂ pullus.	....do	July 3, 1882	
410	....	Pullus.	....do	July 3, 1882	
411	88714	Pullus.	....do	July 3, 1882	
412	88715	♀ pullus.	....do	July 3, 1882	
777	....	♀ ad.	Tate-Yama, Shinshiu	Nov. 10, 1882	Iris sienna brown.
796	....	♂ ad.	....do	Nov. 21, 1882	Iris bright chrome; bare space around eye deep crimson.
841	....	♀ ad.	....do	Dec. 4, 1882	
847	....	♂ ad.	....do	Dec. 6, 1882	

Phasianus scœmmeringii T. Temm. et Schl. Faun. Japon., 1847, Aves, p. 104: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 126.

Found in the same localities as the preceding, but appears to range higher up the mountains than that species. Collected at Fuji, Chiusenji, and in Shinshiu.

List of specimens.

Original number.	Museum number.	Sex.	Localities.	Date.	Remarks.
413	88712	♂ ad.	Fuji-Yama	July 3, 1882	Iris bright chestnut; lower eyelid pure white; bare space around eye crimson.

Lagopus sp. Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 127.

Ptarmigan were said to be abundant in Shinshiu, being found on most of the high peaks of the Tate-Yama range.

We did not succeed in getting any specimens, although feathers were seen and identified. The summits of most of the peaks are very rugged. Broken masses of rock with crevasses and overhanging ledges bar the way. These are covered with a kind of dwarf pine the roots of which form a network over and around the rocks, leaving many sheltered places underneath. In these places the ptarmigan find protection in cold weather, where, of course, it is impossible to follow them.

In summer we were told by the natives that they were very abundant and tame, and quantities of them are killed for offerings at the mountain shrines.

These birds are popularly believed to be under the special protection of the God of Thunder, and no mountain on which they are found will be subject to violent thunder-storms. Hence they are held in high veneration by the natives.

Through the kindness of Captain Blakiston I have been able to examine two specimens, an adult and a young in first plumage, which

were obtained in Shinshiu in summer, through Mr. I. Arai, chief of the Survey Department.

The general plumage of the adult is dusky, all the feathers are closely barred with ochraceous. Middle of breast and belly white. No line through the eye. Wing pure white, the primaries with black shaft lines; tail black. This specimen measures, wing 180mm, tarsus 36mm, middle toe without nail 28mm, culmen 15mm, depth of bill 7mm.

Young in first plumage: Upper parts rich chestnut brown and dusky. All the feathers of the back with large white tips. Wing and tail barred with yellow and dusky. Sides of head, throat, and belly pale yellow. Crown and line from the bill rich chocolate brown. This bird, occurring in such an isolated region, is probably a localized race, but in default of adequate descriptions and specimens for comparison I have been unable to identify the species.

Ægialitis placida Gray. Swinhoe, 'Ibis,' 1874, p. 162: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 107.

Occasionally seen on the dry river courses and on the lake shore in autumn.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
667	91401	♂ ad.	Chiusenji Lake	Sept. 5, 1882	Iris black; bill black; base of lower mandible yellow; tarsi and toes pale flesh color; joints greenish.
754	.....	.....	Tate-Yama, Shinshiu	Nov. 2, 1882	

Scolopax rusticula L. Temm. et Schl. Faun. Japon., 1847, Aves, p. 112: Whitely, 'Ibis,' 1867, p. 206: Swinhoe, 'Ibis,' 1877, p. 145: Seebohm, 'Ibis,' 1879, p. 26: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 113.

Obtained in Shinshiu in the autumn. These birds are netted by the natives.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
732	91395	♀ ad.	Matsumoto, Shinshiu	Oct. 29, 1882	
765	91396	♂ ad.	.....do.....	Nov. 4, 1882	

Gallinago australis Lath. Blakiston, 'Ibis', 1863, p. 100: Swinhoe, 'Ibis', 1863, p. 444, et 1874, p. 163: Seebohm, 'Ibis', 1879, p. 26: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 114.

A single specimen was collected in Shinshiu. It is a female and apparently a young bird, as the measurements are considerably under the average for this species. The wing measures 140mm, bill 64mm, and tarsus 35mm.

This specimen was shot in a paddy field with the common snipe, and was the only one observed.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
701	91397	♀	Tate-Yama, Shinshiu	Oct. 19, 1882	Iris dark brown.

Gallinago solitaria Hodg. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lxviii, p. 112: Swinhoe, 'Ibis,' 1877, p. 146: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X, Pt. I, 1882, p. 114.

Found in Shinshiu as late as the middle of December. They frequent marshy places, the banks of streams, or any soft boggy ground, but are not found in paddies. They resemble the woodcock in their habits more than the true snipe.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
782	91398	♀ ad.	Matsumoto, Shinshiu	Nov. 15, 1882	
846	91399	♀ ad.	Tate-Yama, Shinshiu.....	Dec. 6, 1882	Iris very dark brown; bill lilaceous, tip dusky; legs pale olive yellowish.
877	91590	♂ ad.	.....do	Dec. 18, 1882	Iris dark umber brown.

Totanus incanus Gm. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lxv., p. 109: as *pulverulentus:* Whitely, 'Ibis,' 1867, p. 205, as *pulverulentus:* Swinhoe, 'Ibis,' 1874, p. 163, et 1875, p. 453: Blakiston and Pryer, Trans As. Soc. Japan, Vol. X. Pt. I. 1882, p. 109.

A single specimen was obtained from a bird shop at Matsumoto.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
783	91400	♀ ad.	Matsumoto, Shinshiu	Nov. 15, 1882	

Ardea cinerea L. Temm. et Schl. Faun. Japon., 1847, Aves, p. 111: Swinhoe, 'Ibis,' 1876, p. 335: Blakiston and Pryer, Trans. As. Soc., Japan, Vol. X. Pt. I. 1882, p. 118.

A single specimen of this bird was collected at Chiusenji Lake in September. Unfortunately it was so badly shot that it could not be preserved; the head and legs only being saved for identification.

Rallus indicus Blyth. Temm. et Schl. Faun. Japon., 1847, Aves, p. 122, as *aquaticus:* Whitely, 'Ibis,' 1867, p. 206, as *aquaticus:* Swinhoe, 'Ibis,' 1874, p. 163: Blakiston and Pryer, 'Ibis,' 1878, p. 225: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 122.

We did not meet with this bird in the interior in a wild state, but they undoubtedly occur there, as a specimen was obtained from a bird shop at Matsumoto.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
880	91402	♂ ad.	Matsumoto, Shinshiu	Dec. 21, 1882	Iris reddish-brown; bill dusky-purplish, under mandible reddish; legs lilaceous.

Anas zonorhyncha Swinhoe. Temm. et Schl. Faun. Japon., 1847, Aves, pl. lxxxii. p. 126, as *poëcilorhyncha* (hybrida): Swinhoe, 'Ibis,' 1874, p. 164: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 96.

Found on Chiusenji Lake in August.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
632	91454	♀ ad.	Chiusenji Lake.....	Aug. 28, 1882	

Aix galericulata (L.) Temm. et Schl. Faun. Japon., 1847, Aves, p. 127: Swinhoe, 'Ibis,' 1875, p. 457: Blakiston and Pryer, Trans. As. Soc. Japan, Vol. X. Pt. I. 1882, p. 97.

Found in quite large flocks on the lakes in the interior, in autumn. They also frequent the paddies with *Querquedula crecca*.

List of specimens.

Original number.	Museum number.	Sex.	Locality.	Date.	Remarks.
702	91453	♂ juv.	Tate-Yama, Shinshiu.....	Oct. 19, 1882	Iris black, with a narrow margin of yellow; bill pinkish-lilac; nail horn color; tarsi and toes chrome.

ON A COLLECTION OF SHELLS SENT FROM FLORIDA BY MR. HENRY HEMPHILL.

By W. H. DALL.

The marine fauna of the American coast south from Cape Hatteras and thence to the Mexico-Texan border is at present less known than that of any other part of the coast of North America. Every contribution* toward bettering our information possesses a certain value, even

*In the preparation of this list the following publications have been consulted, beside others of a more general nature:

CATALOGUE OF THE MARINE SHELLS OF FLORIDA, by W. W. Calkins. [Ext. Davenport Acad. Nat. Sciences, 1878, pp. 232–252, with errata and two short supplementary lists.]

LIST OF THE MOLLUSCA obtained in South Carolina and Florida, principally in the

if imperfect, and when those of all classes are enumerated the list remains still extremely meager, and so far without any first-class general work of reference.

In the absence of a good collection of named specimens from the region, it is difficult and tedious work identifying specimens connected, as the South Florida shells are, with the West Indian fauna. Consequently it is with a certain diffidence that I attempted, at Mr. Hemphill's request, to work up the extremely interesting collection he has given to the National Museum. The only catalogues relating to South Florida are extremely imperfect though praiseworthy attempts. Conrad's work was never complete and is antiquated; the paper of Mr. Melvill is marred by the inaccuracies of identification for which the present Mr. Sowerby is famous; Mr. Calkins' work is the best of all, but would have been more useful if the specimens actually collected by

island of Key West, 1871–'72, by James Cosmo Melvill, M. A., F. L. S. [In the Journal of Conchology, Leeds, vol. 3, Nos. 5 and 6, pp. 155–173, 1881.]

CATALOGUE OF WEST INDIA SHELLS in the collection of Dr. C. M. Poulsen, Copenhagen, by O. A. L. Mörch, pp. 16, 8°, 1878.

HISTOIRE [etc.] DE L'ILE DE CUBA [etc.], Mollusques, par Alcide D'Orbigny. 8°, 2 v. and atlas, folio, Paris, 1841–'53.

CONTRIBUTIONS TO CONCHOLOGY, conducted by C. B. Adams, vol. 1, 8°, New York, 1849–'52.

REMARKS on some species of West India marine shells [etc.], by Henry Krebs. [In Annals Lyc. Nat. Hist. New York, 1866, pp. 394–398.]

MOLLUSCA of the Bermudas, by J. Matthew Jones, esq., F. L. S. [In Trans. Nova Scotia Inst., i, part ii, 1864, pp. 14–26.]

CATALOGUE of recent marine shells found on the coasts of North and South Carolina, by J. D. Kurtz. 8°, pp. 9, Portland, 1860 [also a paper by Kurtz and Stimpson, in Proc. Boston Soc. Nat. Hist. iv, 115.]

DESCRIPTIONS of new genera and species of shells, by Augustus A. Gould, M. D. [In Proc. Boston Soc. Nat. Hist., viii, pp. 280–284, 1862, contains descriptions of several species of small shells obtained by officers of the United States Coast Survey in sounding off the coast of Georgia and the Carolinas.]

MOLLUSCA OF THE ARGO EXPEDITION to the West Indies, 1876, by the Rev. H. H. Higgins, M. A. Museum Report No. 1 [of the Free Public Museum of Liverpool]. 8°, pp. 20, 1 plate, Liverpool, 1876.

AMERICAN MARINE CONCHOLOGY [etc.] from Maine to Florida, by Geo. W. Tryon, jr. 8°, pl., Philadelphia, 1873–'74.

CATALOGUE des Coquilles recuillies à la Guadeloupe et ses dépendances, par M. Beau [etc.], précédé d'une introduction par M. Paul Fischer [Extr.' de la Revue coloniale, Déc. 1857. 8°, pp. 27; with title on cover.]

CONTRIBUCION a la fauna malacologica Cubana, por Rafael Arango y Molina. 8°, pp. 315, Habana, 1878–'80.

DESCRIPTIONS of new species of recent and fossil shells, etc., by T. A. Conrad in Proc. Acad. Nat. Sci., Philadelphia, 1846, iii, pp. 19–47, pl. 1, [and elsewhere.]

FAUNA of Gulf of Paria, etc., by R. J. L. Guppy, F. L. S., Part 1, Molluska. [In Proc. Sci. Assoc. of Trinidad, Dec., 1877, vol. ii, No. 3, pp. 134–157.]

REPORT on the "Blake" mollusks, by W. H. Dall, Bulletin Mus. Comp. Zoölogy, ix, No. 2, pp. 33–144, July–Dec., 1881. [Dredgings in the Gulf of Mexico.] Also numerous papers on particular species or groups of species, including those of the region, by Say, Binney, Bland, Tryon, Stimpson, Stearns in Proc. Phila. Acad. Nat. Sci. and Boston Soc. Nat. Hist., Gibbes, and others.

him had been discriminated in some way from those quoted from other authors, whose localities or identifications may not have been accurate, or at least may not have been confirmed. It is known to most persons interested that the Smithsonian collection of East American shells, especially those belonging south of New York, was in the hands of Dr. Stimpson, and with his own matchless collection was destroyed totally by the fire at Chicago in 1871.

Under these circumstances, believing it better to make some sort of start at cataloging the shells of our southern coast (even at the risk of some erroneous identifications) than to wait for opportunities which do not seem likely to be soon offered, the present list has been prepared in the hope that its deficiencies may stimulate others to correct and enlarge it from specimens actually obtained on the spot. Early collectors were less careful about localities than those of the present day, and frequently took the careless assertions of sailors and dealers as a sufficient statement for determining lots of shells which were often mixed with others from different regions. Varieties were often independently described as distinct species, and allied species lumped by undiscriminating writers or collectors under one name. This is very evident in some of the publications cited. In the present paper no attempt has been made to elaborate synonymy.

The present collection comprises only small and inconspicuous species. The large and common forms, though doubtless collected, were not sent. The careful notes as to station and locality made by Mr. Hemphill greatly increase the value of the catalogue. Few collectors equal him in painstaking care in these particulars, and the reputation he has so justly gained on the western coast will only be enhanced by his Florida work.

Several forms appear to be new. They are described subject to future corrections, but only after carefully searching the literature and monographs in vain. It is possible that some of them may have been previously named, yet if this should prove to be the case no great harm will ensue. Those identified from descriptions without figures are marked with an asterisk. Mr. W. G. Binney has kindly examined the Pulmonates and identified several doubtful species for me.

It must be clearly understood that the list makes no pretensions to completeness.

The fauna of South Florida is largely identical with that of the West Indies, and presents a curious mixture of tropical and temperate forms. When the species are thoroughly known the analogies between this fauna and that of the western coast of America in the same latitude will perhaps appear more prominently than at present. Certain west coast species have been wrongly ascribed to Florida, but there are some which are common to the two regions, and quite a number which present marked similarity, though entitled to different specific names. Certain northern species appear here with their ordinary characters; others

Vol. VI, No. 21. Washington, D. C. Dec. 27, 1883.

are modified so as to almost appear distinct. The demarcation between the molluscan fauna of Northern and Western Florida and that of the Keys is less distinct than has been supposed, but it is still sufficiently evident.

LAND AND FRESH-WATER GASTROPODA.

Veronicella floridana Binney.

Sarasota Bay, a new locality for the species. Mr. Hemphill observes that when at rest it becomes of a broad, oval form, but is long and narrow when in motion; its color changes very little by immersion in alcohol.

Helix (Mesodon) mobiliana Lea.

Rare at Tampa. This is the genuine *mobiliana*, not the species long confounded with it by authors. Mr. Binney names it *H. jejuna* Say, and considers the two nearly or quite identical.

Helix (Triodopsis) hopetonensis Shuttleworth.

Four dead specimens were found by Mr. Hemphill at Fernandina, in April, 1883. Also at Cedar Keys, not rare.

Helix (Polygyra) pustula Fèr.

Cedar Keys, not rare.

Helix (Polygyra) septemvolva Say.

Key West and Sarasota Key, plenty. Walls of Fort Marion (San Marco) and elsewhere at Saint Augustine, very abundant and variable. Mr. Hemphill sends series, showing wide variation in form, size, and color, and concludes that *septemvolva*, *cereolus*, and *carpenteriana* are possibly merely isolated terms in one really continuous specific series.

Helix (Polygyra) volvoxis Pow.

Tampa and Saint Augustine, abundant. Identified by Mr. Binney. A variety of the preceding.

Helix (Polygyra) carpenteriana Bland.

Cedar Keys and Key West, abundant. Extremely variable in color and form, as well as size.

Helix (Polygyra) avara Say.

Jacksonville, not very common.

Strobila labyrinthica Say.

Rare at Sarasota Bay, a new locality for the species.

Pupa incana Binney.

Key West, common.

Leuchocheila rupicola Say.

Tampa, not rare. Identified by Mr. Binney.

Macroceramus pontificus (Gould) Bland.

Key West.

Cylindrella poeyana D'Orb.

Key West, not rare.

* * *

Zonites suppressus Say.

Fernandina, not rare.

Zonites (Hyalina) arborea Say.

Cedar Keys. From the way in which European specialists are splitting up the older species of *Hyalina*, there seem to be fair reasons for retaining for the American forms their American names.

The same may be said for our common *Conulus*, for which, or for stages of which, some European authors have lately proposed new names.

Zonites (Hyalina) minuscula Binney.

Tampa, not rare.

Zonites (Conulus) egena Say.

Cedar Keys and Fernandina, not very rare. It differs slightly in form and color from the European *Conulus fulvus* Drap, though doubtless not more than European specimens of that species among themselves.

* * *

Succinea campestris Say.

Key West and abundantly at Fernandina, the latter of larger size. These are the genuine *campestris* of Say.

Succinea? aurea Lea.

Fernandina, not rare. Identified by Mr. Binney.

Succinea? obliqua Say.

Walls of Fort Marion, San Marco, Saint Augustine, abundant. Mr. Binney is disposed to refer these to *campestris* junior, but they appear to me more elongated.

Planorbis dilatatus Gould.

In a pond at Saint Augustine. This is about the most southern locality yet reported.

Melampus bidentatus Say.

Tampa, in marshes near high-water mark, abundant; Cedar Keys, in similar situations; Saint Augustine, plenty.

Melampus flavus Gmelin.*

Fernandina, abundant. Many specimens of *M. bidentatus* seem distinguished from this form chiefly by size. This group appears much in need of a general revision.

Melampus caffeus Lam.*

Key West, not very plenty; associated with the next species.

Tralia cingulata Pfr.

Key West, found at extreme high-water, burrowing under stones six inches below the surface; gregarious, nestling together in colonies, together with *Melampus caffeus*, but much more abundant.

Pedipes naticoides Stearns.

Key West, plenty under stones at high tide. The specimens are considerably larger than the type from which Mr. Stearns described this interesting species.

Leuconia hemphillii n. s. (Plate X, Fig. 6.)

Shell six-whorled, thin, elongate-oval, marked with fine striæ of growth; whorls inflated, but closely appressed at the suture, last whorl more than half the length of the shell; color, waxen whitish, with a broad wine-colored band around the periphery, except of the earlier whorls, a blush of the same color on the base and outer lip, darkening to a deeper stain on the columella; last whorl somewhat contracted toward the aperture; outer lip thin, not acute, rounded anteriorly and passing into the thick and strongly twisted columella without interruption. Lon., 3.75^{mm}; lat., 1.50^{mm}; lon. of last whorl, 2.50^{mm}; of aperture, 1.50^{mm}.

Habitat on the mudflats at Cedar Keys, rare. This little species is the first known to inhabit the United States, the *L. sayi* of Kuster being without doubt referable to *Tralia cingulata*. None of the genus are reported from the adjacent shores of the Antilles by the authorities I have been able to consult, and it is not liable to be confused with any of the exotic species.

* * *

Siphonaria alternata Say.

Key West, plenty on rocks between tides.

Siphonaria naufragum Stearns.

Saint Augustine, not rare.

This fine species should be compared with *S. lineolata* D'Orb. from Cuba.

TERRESTRIAL RHIPHIDOGLOSSA.

Helicina subglobulosa Shuttleworth.

Cedar Keys.

Chondropoma dentatum Say.

Key West, not rare.

TERRESTRIAL TÆNIOGLOSSA.

Truncatella caribbeënsis Sby.

Key West, under dead grass near high-water mark, very abundant.

Truncatella pulchella Pfr.

Key West, with the last, abundant.

MARINE GASTROPODA.

Aplysia protea Rang.

Key West, abundant on the beach, after a northerly gale.

Utriculus canaliculatus Say.

Sarasota Bay, plenty on the beach and abundant on the mud flats at Cedar Keys. Quite variable.

Bulla succinea Conrad.

Mud flats at Cedar Keys, not rare.

Bulla occidentalis A. Adams.

Sarasota Key, not rare on beach.

Actæon punctatus D'Orb.

Mud flats at Cedar Keys, not plenty.

Marginella roscida Redfield.

Abundant on the mud flats at Cedar Keys; much larger specimens at Sarasota Bay in similar localities.

Marginella redfieldii, Tryon.

Key West. Three specimens were found by Mr. Hemphill, on the beach, of a moderately large white *Marginella*, which appears from Tryon's figure to be the above species.

Marginella minima, Guilding.

Cedar Keys, rare, on the mud flats. According to Mörch this is the same as *M. lavalleana* D'Orb. It has three plaits.

Marginella opalina Stearns.

Cedar Keys, with the last species, rare.

Volutella lacrimula Gould.

Plenty on the mud flats at Cedar Keys. Off the coast of Georgia in four hundred fathoms (Gould).

Volvarina succinea Conrad.

Cedar Keys, muddy flats between tides, plenty. Tampa, Conrad. This may be *V. nitida* Hinds, according to Tryon.

Volvarina subtriplicata D'Orb.

Key West. Mr. Hemphill found but three specimens, on massive rocks at low water.

Olivella oryza Lam.

Sarasota Bay, on the sand between tides.

Olivella zonalis Lam.

Sarasota Bay, with the last species.

Olivella mutica Say.

Cedar Keys, on the mud flats, not rare.

Acus dislocatus Say.

Cedar Keys, between tides in the sand, abundant. These are rather darker and smaller than more northern ones.

Acus protextus Conrad.

Sarasota Bay, on the mud flats and in the sand between tides; those from the former locality differ a little in color from those of the sandy beaches; also rare on mud flats at Cedar Keys. The sculpture of this species varies in strength with its station. It was described by Conrad as a *Cerithium!*

Nassa ambigua Mor.

Key West, rare on the beach. A common West Indian form.

Ilyanassa obsoleta Say.

Saint Augustine, on mud between tides, abundant.

Phos intricatus n. s. (Plate X, Fig. 9.)

Shell with seven whorls, pale waxen, with a yellowish-brown epidermis, strongly sculptured surface, turreted spire, solid texture, and single oval varix. Nucleus smooth, involved like *Neritula;* next two whorls strongly cancellated, with two especially prominent spiral lines; later whorls subtabulate, moderately rounded, sculptured spirally, with strong, rounded, even threads, with single intercalary smaller threads in the interspaces; the third or fourth primary thread, counting forward from the suture, is stronger than the others, and forms the margin of the tabulation; anteriorly the primary threads become more distant and the interspaces deeper; counting forward from the marginal thread above mentioned, there are about fourteen of the primary threads on the front of the last whorl, all of which show traces of nodulation at the intersections, and the anterior six of which are strongly nodulous, though the transverse sculpture is hardly visible in the interspaces; the tranverse sculpture is composed of about fourteen rounded ribs, which cross the whorls, but are overrun by the spiral threads; also of rather well-marked lines of growth; the aperture is marked by a strong rounded varix, over which the sculpture runs, the shell being apparently contracted before and behind the varix; aperture rather small, within polished white, with five or six well-marked lirae inside the outer lip and the usual tooth like callus on the body near the suture; canal short, slightly recurved; suture distinct; operculum brownish, thin, resembling that of *Fusus*. Lon. of shell, 13.2; of last whorl, 8.7; of aperture, 6.0; max. lat. of shell, 6.2; of aperture, 2.5^{mm}. *Habitat*, Key West; abundant under stones between tides.

It is possible that this is "*Ocinebra cyclostoma* Sby." of Melvill's list, a species I do not know, but it is at all events a *Phos* and not cyclostomate. It is distinct from any of the species of *Phos* ascribed to the West Indies of which figures are accessible, and from any of the species

referred to in Petit's or Tryon's catalogue of the genus. Yet I describe it with hesitation, since it seems extraordinary that so common a shell should not have been already described.

Astyris lunata Say.

Tampa, abundant on the "coon oysters;" also at Cedar Keys, all varieties, very common on the sand between tides.

Nitidella cribraria Lam. Melanitic variety.

Key West, abundant under stones between high and low water.

Anachis avara Say.

Key West, on massive rocks at low water, abundant; many varieties of color.

Anachis semiplicata Stearns

Sarasota Bay, rare, on the beach. Also at Cedar Keys.

Anachis acuta Stearns.

Sarasota Key, on the beach, rare.

Anachis ostreicola Melvill.

Cedar Keys, on "coon oysters," stones, &c.

This species was not described by Melvill, but is evidently what he refers to. It is exactly like *A. cancellata* Gaskoin, except in size, being much smaller than Reeve represents the latter to be, but I have no specimens of Gaskoin's species to compare it with. Melvill says it is allied to *A. nigricans*, which is a Panama species.

Columbella rustica Lin.

Cedar Keys, living.

Eupleura caudata Say.

Cedar Keys, very fine. Stunted specimens of this species have been referred erroneously to *E. muriciformis* Brod., a west coast species.

Urosalpinx tampaënsis Conrad.

Sarasota, on oysters brought in by boats, and also on egg cases of *Busycon perversum*, which it is fond of devouring. This seems to me quite in place in this genus, and not referable to *Eupleura*, from the shell. Also at Cedar Keys. The operculum is purpuroid.

Urosalpinx cinereus Say.

Cedar Keys, on rocks, oysters, &c., and in similar localities at Saint Augustine. The Southern specimens are brighter colored and more neatly sculptured than those from New England, but doubtless quite as destructive. It is the "drill" of the oystermen, and very injurious to their young oyster "seed." Operculum purpuroid.

Muricidea floridana Conrad.

On rocks, oysters, &c., between tides at Sarasota Bay. The operculum is muricoid and it is not a *Urosalpinx*.

Muricidea n. s.?

Young specimens of a *Muricidea* were obtained by Mr. Hemphill at Cedar Keys, which do not agree with any species reported. It resembles the young of *Urosalpinx cinereus*, but is thinner, broader, and with a proportionally larger aperture within which are two brown revolving bands. The operculum is muricoid. If new, it may be called *M. Hemphillii*.

Leucozonia cingulifera Lam.

Key West, on rocks at low water, rare.

Not to be confounded with *L. cingulata*, a very distinct West American species. This is probably what is reported by several authors as *L. Knorrii* Deshayes. The animal is stated by Melvill to be of the color of raw beef. He obtained it from Key West on the coral reefs.

Tritonidea tincta Conrad.

Cedar Keys, rocks between tides. Florida Keys (Calkins).

This has been confounded with the quite distinct *T. ringens*, from the western coast of America. It is probably the "*Cantharus coromandelianus* Lam." of Melvill's list. He obtained it at Key West, abundantly, on the reefs. It recalls the *T. insignis* of Reeve much more than the *ringens*, but is quite different from either.

Tritonidea cancellaria Conrad.

Cedar Keys, Calkins and Hemphill. Ship Island, Gulf of Mexico, Conrad. It is likely that *Tritonidea floridana* Petit is a mere variety of this shell.

Mitra albicostata C. B. Adams.

Key West; reefs at low water, rare. Jamaica (C. B. Ad.) Adams described this species under the above name. Mörch apparently refers to it under the name *albocincta* "C. B. Ad.," but I have not been able to find that the name was altered by Adams.

Mitra sulcata Gmelin.

Key West; rare, with the last and next species. Not uncommon in the Antilles.

Mitra (Mitromorpha?) floridana n. s. (Plate X, Fig. 12.)

Shell stout, with four normal and two embryonic whorls, the latter smooth, the tip so obliquely twisted in as to appear reversed, the transition from smooth to sculptured surface abrupt; shell fusiform, slender, the last whorl about two-thirds of the whole length: the whole deep red-brownish-black; surface cancellated by transverse and spiral stout threads pretty equally distributed, nodulous at their intersections and with deep interspaces; principal spiral threads increasing from three on the early whorls to ten or more on the last one; suture distinct, not channeled; aperture narrow, outer lip thick, not reflected lirate posteriorly; inner lip with a thin varnish of callus; four spiral plaits nearly

at right angles transversely to the axis of the shell, the posterior plate strongest, the others diminishing anteriorly, the last one separated by quite a space from the anterior edge of the column; notch deep, not reflected. Lon. of shell, 6.00; of last whorl, 4.50; of aperture, 3.2; max. lat. of shell, 2.5; of aperture, 1.00mm.

Habitat.—On the reefs at Key West, at low water; rare. This pretty little shell resembles a *Mitra*, but also recalls the forms named *Mitromorpha*, by Carpenter, which seem to stand conchologically between the cones and mitras.

Mangilia stellata Stearns.*

Key West, abundant on the reefs at low water. I have not been able to compare this with a typical specimen, but there is little doubt of its identity.

Mangilia cerina Kurtz and Stimpson.

Sarasota Bay, mud flats between tides, plenty; also in similar situations at Cedar Keys.

Drillia ostrearum Stearns.

Key West, on reefs at low water, rare.

Drillia albomaculata D'Orb.*

Sarasota Bay, on mud flats between tides, rare. This does not agree precisely with D'Orbigny's figure, but the differences do not seem to be of specific value, and may be due to defects in the figure. I have not been able to compare types.

Drillia thea n. s. (Plate X, Fig. 5.)

Shell elongated, slender, eight whorled, colored olivaceous like the leaves of tea which have been steeped, weathering ashy; apex small, rather blunt; whorls moderately convex, covered with a shining very thin epidermis, marked by silky lines of growth, sculptured by about eleven somewhat oblique slightly curved ribs, which are broadest, stoutest, and paler than the rest of the shell on the periphery, fading away toward the sutures and not distinctly differentiated from the interspaces, somewhat irregularly waved, and concave anteriorly; also by evanescent spiral striæ not always visible and eight or ten raised spiral threads on the anterior third of the last whorl; notch deep, rounded, leaving no fasciole; canal short, straight; sutures distinct, slightly appressed; aperture wide, short, internally claret brown; inner lip with a slight callus; outer lip much curved forward, polished and smooth within. Lon. of shell, 15.0; of last whorl, 8.0; of aperture, 5.5; max. lat. of shell, 5.2mm.

Habitat.—Sarasota Bay, rare, on mud flats between tides. Two specimens.

Drillia leucocyma n. s. (Plate X, Fig. 8.)

Shell small, dark, solid, strongly sculptured, with about seven whorls, of which the basal color is a very dark olivaceous brown; the interior

is of a claret brown which modifies the external color by transmitted light; spiral sculpture, a strong broad thread close to the inconspicuous suture, separated by a rather broad spirally striated fasciole from a series of two (on the early) to four (on the last whorl) rather strong, spiral smooth rounded threads which are succeeded anteriorly by eight or ten similar spiral threads which, on the base, are nodulous and smoother on the anterior end of the shell; these are crossed by striæ of growth and partly by nine to eleven stout short ribs, beginning at the fasciole and ceasing just beyond the periphery; the most prominent part of these are white and the threads which pass over them become yellowish or white and stronger than they are between the ribs; the little nodules on the basal threads have a tendency to whiten as does also the sutural thread; this is, however, hardly noticeable without a lens; canal short, wide, straight, notch moderately wide, not deep; aperture rather narrow, smooth and claret brown, outer lip not much curved out: lon. of shell, 7.5; of last whorl, 4.0; of aperture, 2.75; lat. of shell, 2.70mm.

Habitat.—Key West; rare on the reefs at low water. This recalls *D. albomaculata* D'Orbigny, but is more slender, and differs in the details of sculpture. The last whorl of the specimen figured shows an interruption of the sculpture due to a fracture.

Drillia limonitella n. s. (Plate X, Fig. 10.)

Shell small, thin, translucent, lemon yellow; in fresh specimens the dried animal matter shows through and gives the upper whorls a livid ashy or greenish tinge; there is also a reddish tinge on the columella; the young shells have much the appearance of a *Bela*, but doubtless develop a thickened outer lip and more pronounced notch with maturity, since several nearly mature ones show indications of it. Whorls eight or nine, turrited, angulated by the ribs on the periphery, with a small nearly smooth nucleus, and sharply sculptured subsequent surface; spiral sculpture of numerous sharp threads, quite fine, and extending over the whole shell; two stronger closely adjacent threads at the hardly visible suture; transverse sculpture of strongly marked lines of growth, and about a dozen uniform, narrow, sharply elevated riblets, convex anteriorly, extending from suture to suture, and nodulated with an elongated nodule at the peripheral angle; fasciole faintly marked, notch distinct, canal short, straight, aperture rather narrow; lon. of shell, 6.75; of last whorl, 3.75; of aperture, 2.5; max. lat. of shell, 2.75mm.

Habitat.—Cedar Keys, on mud flats between tides. This resembles a miniature *M. cerina* K. & S., but is differently and much more sharply sculptured.

Clathurella jewettii Stearns.

Cedar Keys, on "coon oysters."

Conus stearnsii Conrad.

Sarasota Bay, near low water, abundant. This is probably only an immature stage of *C. floridana* Gabb.

Eulima conoidea K. & S.*

Cedar Keys, on mud flats between tides, not common. This agrees with the diagnosis of the species cited, but I have not seen an authentic specimen of Kurtz and Stimpson's shell.

Eulimella sp. indet.

Cedar Keys. A small pinkish-white and very pretty shell.

Eulima (Leiostraca ?) hemphillii n. s. (Plate X, Fig. 4.)

Shell slender, straight, acute, brilliantly polished, black when fresh (when faded, or by transmitted light, dark claret brown), with nine or ten flattened whorls; sutures appressed, nearly invisible except by transmitted light; aperture rounded in front, pointed behind; outer lip slightly thickened, passing imperceptibly into the inner lip, which is slightly twisted; shell rather thin and without noticeable deposit of callus. Lon. of shell, 3.00; of last whorl, 1.60; of aperture, 0.87; max. lat., 1.00mm.

Habitat.—Cedar Keys, mud flats between tides, six specimens only.

This very beautiful little shell appears to be in all respects, except color, a typical *Eulima*, but forms a remarkable exception to the glistening white which is so uniformly characteristic of the other species known. When first received they appeared absolutely black, but the color is less dense than at first, though still nearly black. Many of the species of *Eulimella* or *Leiostraca* have bands of color on the shell, and it is possible that this one may belong rather with them than with the typical Eulimas.

Obeliscus tesselatus Adams.*

Cedar Keys mud flats, between tides, abundant. I have not been able to compare specimens of Adams species. This is probably what is referred to as *O. terebellum* by Sowerby and Melvill; it is certainly not that species nor the *crenulatus* of Holmes. It is not at all improbable, however, that the *O. dolabratus* (=*terebellum*) may turn up in South Florida, as it is common in the Antilles.

Pyramidella ? vincta n. s. (Plate X, Fig. 7.)

Shell elongated, slender, subcylindrical, apex pointed, with a minute pellucid smooth sinistral half-immersed nucleus and ten or twelve strongly spirally sculptured whorls. Color whitish (specimens all dead, one immature, one fresh); spiral sculpture begins with two strong elevated ridges with deep channels between them and separating them from the ridges of the next whorl; the posterior ridge is crowded with strong fig-shaped nodules with the broad ends backward and axes parallel with the axis of the shell; the anterior ridge is not nodulous; on about the fifth whorl from the nucleus the nodulous ridge becomes double and the figs become oranges, or round nodules, which later are even somewhat elongated in the direction of the ridges; the other ridge remains simple and smooth; at the periphery of the base are two

closely approximated smaller ridges upon which the posterior nodulous ridge grows with the whorl; the suture therefore is invisible and the deep channel above it only simulates a suture; on the base are two very strong spiral ridges, rather squarish, which run directly into the throat of the aperture: the pillar is twisted, especially in the young; it forms a small sharp emargination like that in some species of *Bittium*. the outer lip is simple except so far as modified by the sculpture; if the outer lip be broken away half a turn, two very strong sharp plicæ, transverse to the axis, appear on the pillar and continue up the spire, exactly as in *Nerinea*; on the outside of the whorls there is little transverse sculpture except strong lines of growth; occasionally the stems of the "figs" are prolonged as pseudo-riblets in the interspaces. Lon. of shell, 8.5; of last whorl, 3.25; max. lat. of shell, 2.50mm.

Habitat.—Key West, rare, on the reefs at low water.

This is a remarkable shell. It closely resembles *Nerinea* in many particulars and externally is not unlike *N. trinodosa* as figured by Chenu. It differs from *Pyramidella*, to which it is provisionally referred, in its strong spiral sculpture, small number of plicæ, and total absence of callosities.

Odostomia impressa Say.

Tampa, on oysters, abundant; also in similar situations at Cedar Keys and at Saint Augustine. A variety(?) *granatina* occurs at Cedar Keys in which the posterior ribs are strongly nodulous, and the appearance thus rendered so different from the type as to suggest they are specifically distinct.

Odostomia acutidens n. s.

Shell solid, rude, yellowish-white, acute, six-whorled, marked with lines of growth merely; suture evident, but not channeled; whorls rather flat, except the last, which has a neatly rounded base; aperture with the outer lip acute, rounded to the columella, which stands out from the surface of the shell, with a groove behind it, but no umbilicus; column with one large, very sharp tooth at right angles to the axis of the shell; space between the columella and posterior end of the outer lip polished, not callous. Lon. of shell, 4.12; of last whorl, 2.50; of aperture, 1.75; max. lat. of shell, 2.00mm.

Habitat.—Cedar Keys, on the mud flats; not common.

Parthenia cedrosa n. s. (Plate X, Fig. 11.)

Shell slender, subcylindrical, whitish, thin, seven-whorled; nucleus sinistral, smooth, remainder except the base reticulated by equal, moderately strong plications, extending from suture to suture, but ceasing at the periphery of the base, about four to a millimeter, with lesser iter spaces; underlaid and reticulated by revolving threads, about six on the side of the whorls, and as many more, but fainter, on the base; apex minute, blunt; base rounded; aperture as in *Turbonilla*, with thin

margins and pillar, on which last is an obsolete, or extremely faint, plait-like callosity or twist; no umbilicus; operculum translucent, extremely thin, subspiral, horny. Lon. of shell, 5.5; of last whorl, 2.25; of aperture, 1.50; max. lat. of shell, 1.50mm.

Habitat.—Cedar Keys, on mud flats; very rare. I am not sure that I am right in referring this species to *Parthenia*. It appears like a white reticulately sculptured *Turbonilla*, with a faint plait.

Turbonilla viridaria n. s.

Shell slender, yellowish waxen, with red-brown spiral lines and base; sixteen whorls, with about (on the last whorl) twenty-five transverse riblets; base scored with fine spiral grooves, otherwise smooth; aperture squarish, rounded in front; nucleus smooth, sinistral, blunt; transverse ribs extending from suture to suture, slightly oblique, nearly continuous along the spire, the line from base to nucleus making about half a volution, in a posterior sense; whorls flattened, making the outline of the spine nearly a true conic section; suture distinct; riblets rounded, smooth, subequal from end to end; spiral grooves appear sharply and distinctly cut, running (apparently) under the ribs, with red or brown color in the grooves, as if rubbed in; there are three or four from the suture forward, then a distinctly wider interspace, then two more to the suture, or about five to the ends of the ribs on the last whorl, which little more than pass the periphery; base smooth, red-brown, with distinct spiral grooves, more crowded toward the axis; whole shell neatly polished, with a tendency to weather ashy or white. Lon. of shell, 11.0; of last whorl, 2.25; max. lat. of shell, 2.25mm.

Habitat.—Cedar Keys, among the sea grass on the mud flats; not rare.

This is nearest *T. rathbuni* Verrill, which has twelve whorls to a length of 13.0 and a width of 4.0mm.

Turbonilla (viridaria var.?) virga n. s.?

Shell resembling the last, but slenderer and more drawn out, much smaller, with a larger and narrower aperture, and with more regular spiral grooves, which are not colored, and fewer ribs. Whorls seven, with about fifteen transverse ribs, larger and carried farther over the periphery than in the preceding species; a tinge of claret color on the pillar, elsewhere greenish, translucent. Lat. of shell, 1.0; lon. of shell, 3.1; of last whorl, 1.5mm.

Habitat.—Cedar Keys with the last species. This was sent by Mr. Hemphill as the young of the preceding, but differs from specimens of its own size in having one whorl less in the same length and in having the grooves without color and evenly distributed, and in other features as above. It is probably distinct, but I prefer to leave it as a variety for the present.

Turbonilla (viridaria var.?) punicea n. s.?

Shell resembling *viridaria* but smaller, with thirteen whorls; color whitish at the tip, gradually becoming more and more tinted with a clear

claret brown, the last whorl being the darkest: riblets fainter, less produced anteriorly, last whorl with hardly any ribs; spiral sculpture finer and closer and lines much more numerous than in that species; they are also uncolored; the whorls are more rounded and there are about eighteen instead of twenty-five ribs, which do not reach so far forward. Max. lat. of shell, 1.67; lon. of shell, 8.0; of last whorl, 1.75mm.

Habitat.—Cedar Keys; with the last. This species at first sight appears extremely distinct from *viridaria*, but a careful examination with a lens shows that the differences are chiefly in color and strength of sculpture. However, it seems well entitled to a varietal name, and may on further examination prove to be distinct.

These Turbonillas are a very puzzling group, with few good characters for diagnosis, but the above appear distinct from any ascribed to the West Indies or the eastern coast of the United States.

Scalaria angulata Say.

Sarasota Bay, on the sand between tides, not common.

Scalaria lineata Say.

Cedar Keys, on the mud flats, rare.

Cerithium ferrugineum Say.

Sarasota Bay and Key West, abundant on the mud flats between tides.

Cerithium muscarum Say.

Sarasota Bay, mud flats between tides, abundant. This is one of the most lovely shells of the genus.

Cerithium septemstriatum Say.

Key West, between tides, common.

Cerithium nigrescens Menke.

Sarasota Bay, between tides. One of the most abundant shells of the region.

Cerithium thomasiæ Sby.

Key West, on the mud flats, scarce. A common Antillean species.

Cerithiopsis terebralis Adams.

Key West, on the reefs at low water, abundant: Tampa, abundant on the oysters; Cedar Keys, on the "coon oysters" and on the mud flats, abundant. Also over the whole eastern coast of the United States.

Cerithiopsis emersonii C. B. Adams.

Cedar Keys, very large and fine.

Cerithiopsis tuberculata Mont.

Key West, reefs at low water, not very common.

Triforis nigrocinctus Adams.

Cedar Keys, on "coon oysters," rare; Key West, reefs at low water, rare. The metropolis of this species is farther north.

Bittium nigrum Totten.

Tampa, abundant on "coon oysters;" Cedar Keys, abundant on the mud flats. The specimens exactly resemble New England specimens of this widely distributed species.

Bittium greenii C. B. Adams.

Cedar Keys, on "coon oysters," rather rare.

Cerithidea scalariformis Say.

Cedar Keys, near high-water mark.

Melvill reports "*C. crassilabrum* Ad." from Cedar Keys, which is probably this species, and a "*C. costata* Wood," which may be one of the others; neither name appears to be known to other authors in connection with the fauna of the southern coast or the West Indies.

Cerithidea turrita Stearns.

Key West, in the salt ponds, rather rare; all the specimens are somewhat distorted, perhaps from excess of salt.

Cerithidea tenuis Pfr.

Mouth of the Manatee River, abundant, but mostly immature. A good series should be compared with the preceding species.

Vermetus lumbricalis L., var. **nigricans.**

Sarasota Bay, in masses near high water. All the figures of *lumbricalis* seem to represent something quite different from the small, black, gregarious *Vermetus* of our Florida coast, which almost makes reefs with its solidly aggregated masses whose interstices rapidly fill with other solid matter. For this extremely familiar form the varietal term of *nigricans* is therefore proposed until a careful study of the group shall determine what the typical *lumbricalis* really is.

Rissoina dubiosa C. B. Adams.

Key West, plenty on the reefs at low water.

Rissoina pulchra C. B. Adams.

Key West, rare in the same localities as *R. dubiosa.*

Rissoina chesneli Mich.

Cedar Keys, plenty on the mud flats. The above are all common to the West Indies.

Bythinella obtusa Lea.

Key West, in the salt ponds, rare; also in the creek at Jacksonville.

Lea's species was erroneously attributed to Ohio, and hence has not since been recognized, but the specimens agree well with his figure and description, and it is probable that his correspondent's labels got mixed.

Melaraphe scabra L., vars.

Key West, on the mangrove bushes; sometimes ten feet above high water. There are numberless varieties, many of which are very beau-

tiful, and a good many of which have received names from closet naturalists.

Tectarius muricatus Born.

Key West, on rocks between tides, extremely abundant.

Planaxis lineata Lam.

Key West, on rocks between tides, gregarious and abundant. This common West Indian form has apparently not been hitherto reported from our shores.

Assiminea concinna C. B. Ad.*

Key West, reefs at low water, common. I have not been able to compare this with a specimen of Adams' shell, but the description agrees fairly.

Assiminea auberiana D'Orb.

Near high-water mark at Cedar Keys, among the grass. A Cuban species.

Natica canrena L.

Sarasota Bay, on the sand near low-water mark, not rare.

Neverita duplicata Say.

Cedar Keys, on the mud flats, common. A widely distributed species with several near relatives.

Phasianella umbilicata D'Orb.

Key West, rare on the reefs at low water. A Cuban species with which *P. affinis*, C. B. Adams is perhaps identical.

Neritina reclivata Say.

Tampa, abundant between tides. This, like many of the large species of *Neritina*, seems to be strictly an inhabitant of salt water.

Modulus lenticularis Chemn.

Key West only dead ones on the beach. It is closely allied to the next species.

Modulus floridanus Conrad.

Sarasota Bay, on the broad leaves of a marine grass, abundant. I have not seen typical specimens of either, but suspect it is the *M. corrugatus* of Stimpson referred to in some catalogues, but described I do not know where. Also at Cedar Keys.

Adeorbis adamsi Fischer.

Cedar Keys, on the mud flats, rare. Common to the Antilles.

Galerus candeanus D'Orb.

Sarasota Island, on the beach; not rare, but only dead ones were found. A Cuban species.

Crepidula unguiformis Lam.

Sarasota Bay, on the outside of "coon oysters," between tides, abundant.

Fissurella nodosa Born.

Key West, on rocks between tides, rather rare. A common West Indian species.

Fissurella alternata Say.

Cedar Keys, on rocks between tides.

Lucapina? fasciata Pfr.

Key West, on rocks at extreme low water; only two living ones were obtained. From these it is evident that this animal does not belong to the same genus as the great *Lucapina crenulata* of California, but in the present confused state of the *Fissurellidæ* it is impracticable to state positively where it should be placed. The shell is about one-third covered by the mantle and the anterior (shorter) end is depressed, the body of the animal being much thicker behind; the posterior part of the shell is raised and its upper surface is therefore directed forward and upward. The soft parts (in alcohol) are of a whitish color; the margin of the mantle, which has a smooth surface and simple or non-papillose edge, extends widely around the shell, falling and covering the head, sides, and back of the foot like a curtain; the branchiæ are symmetrical, their tips extend forward to the top of the head; the sides of the foot and top of the head and muzzle are speckled with reddish brown, smooth and with only a single series of lateral papillæ; these papillæ begin at the anterior part of the foot on a longitudinal line with the tentacles, the anterior ones are about one-third as large as the tentacles (every alternate one, however, being much smaller); they rapidly diminish in size backward and become more distant and uniform (or the small intercalary ones disappear); there are altogether about twenty on each side; the muzzle is long, granulose and rather broad at the end and divided in the middle line below; the tentacles are clavate, long, with large, black eyes situated on stout tubercles at their outer bases; behind the right eye-tubercle and proceeding from its base is a tentacular process, slender, cylindrical or longitudinally wrinkled and slightly hooked at the end, which may be an intromittent organ; it was much smaller in one specimen than in the other, and in that specimen the lateral papillæ were also smaller and less numerous; the difference seemed disproportionate to the difference in total size, but these organs are quite variable in this respect, and part of the difference may have been due to shrinkage from different strengths of alcohol in which they were originally immersed. The dorsal aperture, as in other *Fissurellidæ*, serves the purpose of an excurrent sewer and is nearly filled by the large, oval papilla, through which the rectum opens, and a simple frill of mantle edge. The whole creature is much more like *Fissurellidea bimaculata* Dall of California, both shell and soft parts, than like the so-called *Lucapina* referred to. The characters of the typical species must be more closely inquired into before the proper allotment of the different forms included in the different genera can be finally decided.

Vol. VI, No. 22. Washington, D. C. Dec. 27, 1883.

Hipponyx antiquatus L.

Key West, between tides, under stones, not rare. Exactly like Californian specimens, at least so far as the shell is concerned.

Patella puncturata Lam.

Key West, living on the reefs at low water; rare. A common West Indian species.

Ischnochiton pectinatus Sby.*

Key West, on rocks at low-water, abundant.

Ischnochiton multicostatus C. B. Adams.*

Key West, with the last, but rare. I have not been able to compare either of these species with authentic types of the species to which they are here referred, but they are certainly *Ischnochitons* and probably these species. Mr. Hemphill, whose experience and success in collecting Chitons is well known to those interested in that group, calls attention in his notes to the fact that he found only these two species in the localities in Florida which he visited. Mr. Calkins reports *Chiton piceus* Gmelin, and *Chætopleura apiculata* Say, abundant in the Keys; is this due to erroneous identifications (so frequent in this difficult group), or do the species have different times for approaching the shore? Melvill does not mention any Chitons. They are comparatively rare in the West Indies. In the Blake Mollusca I have described a fine species, *Hanleyia tropicalis*, from one hundred and twenty-eight fathoms off Sand Key.

LAMELLIBRANCHIATA.

Pholas (Martesia) cuneiformis Say.

Cedar Keys.

Teredo ? megotara Hanley.

Cedar Keys. This does not agree with the figures, but seems nearest to *T. megotara*. The figures extant of Teredines seem particularly poor.

Teredo (Lyrodus) chlorotica Gould.

Cedar Keys. Nearly related to Gould's species if not identical.

Xylotrya fimbriata Jeffreys, var. **subæqualis.**

Cedar Keys. This differs from the type in having the anterior and posterior areas subequal in size.

Solen americanus Gould (**S. ensis** of earlier American authors).

Very young specimens were sent from Cedar Keys, where Mr. Hemphill obtained them on the mud flats.

Tagelus gibbus Spengler.

Abundant on the mud flats near the mouth of the Manatee River. Of extremely wide distribution.

Mactra fragilis Chemn.

Cedar Keys, young.

Lyonsia hyalina, var. **floridana** Conrad.

Plenty on the mud flats at Sarasota Bay and Cedar Keys.

Macoma proxima Gray.

Abundant at the mouth of the Manatee River. Large and fine, approaching the form *calcarea*.

Tellina lævigata L.

Young specimens sent from mud flats at Sarasota Bay. Large and extremely fine ones are abundant at Tampa, judging by specimens obtained by Conrad and others.

Tellina agilis Stm.*

Specimens which appear to belong to this species, of which no authentic type is accessible to me, are reported by Mr. Hemphill to be found abundantly on the mud flats at Sarasota Bay, and a variety of the same from similar localities at Cedar Keys. It seems to be quite variable.

Tellina mera Say.*

Key West, rare on the beach. The specimens sent, though slightly rounder in outline than Say's figure, agree with it and with his description in all essentials. The species has been, in a manner, lost sight of for many years.

Syndosmya æqualis Say.

Cedar Keys.

Semele nexilis Gould.

Cedar Keys, young, probably this species; rare at low water.

Donax variabilis Say.

Abundant in the sand at low water at Sarasota Key and at Fernandina. A most common species on the southern coast everywhere.

Lucina tigerina L.

Young specimens plenty on the beach at Key West.

Lucina sp. indet.

Three species of Lucina have been received from Cedar Keys but not yet identified.

Loripes edentula L.

Abundant between tides at Sarasota Bay.

Cyrena floridana Conrad.

Mud flats near high water at Sarasota Bay. This species was described a second time by Mr. Conrad himself in 1869 as *Cyrena protexta*.*

* Cf. Am. Journ. Conch. v, p. 107, pl. 12, Fig. 3, Oct., 1869.

It is apparently a salt-water mollusk, and varies from pure white to dark purple, with, in general, little or no epidermis.

Cyrena carolinensis Lam.

Numerous rather small specimens, all dead, were obtained in the "salt ponds" at Key West. They appear to be uniformly purplish.

PARASTARTE Conrad.

Parastarte Conrad. Proceedings Acad. Nat. Sci. Philadelphia, June, 1862, p. 288.

Callicistronia Dall, MS. Science ii, p. 447, Sept. 28, 1883.

Shell porcellanous, thick; with color markings; covered with a glistening dense vernicose epidermis; without lunule or escutcheon: ligament stout, very short, wholly external, nearly central, but placed a little more to the same side of the beaks as the pallial sinus, that is to say, posterior; almost covered by the umbones; margin crenulated; muscular impressions large, strong, subequal; pallial line with a small rounded sinus; hinge with one simple large ungrooved triangular tooth in the right valve under the subcentral umbo; the posterior margin of the shell obsoletely grooved; left valve with two stout divaricating simple teeth, with a triangular space between them; an obsolete groove on the anterior shell margin; soft parts unknown; animal viviparous.

I am indebted to Mr. Tryon for informing me of Conrad's description which I had overlooked, as it is in the midst of irrelevant matters and I believe has never been noticed by any other author. His diagnosis contains no differential characters, and he seems to have overlooked altogether some of the most important. He was afterwards, according to Mr. Tryon's note, disposed to unite it with *Goodallia* of Turton, which it resembles in a general way; but that shell appears not to differ from *Astarte;* has an entire pallial line; the large triangular tooth is generally grooved, though sometimes very faintly; the ligament is long as in *Astarte*, and there is a distinct lunule. With regard to its reproduction nothing is known.* *Goodallia* dates from 1822, and *Mactrina* Brown is synonymous with it.

Parastarte triquetra Conrad. (Pl. X Figs. 1–3.)

Astarte triquetra Conrad, Proc. Acad. Nat. Sciences Philadelphia, vol. iii, p. 24, pl. 1, fig. 6, 1846.

This little shell was very briefly described by Mr. Conrad. It is of a yellowish color, with a purple stain inside in many specimens, which is visible outside as a purple ray which includes and is strongest on the beaks; the epidermis is straw-colored and of most brilliant polish; the form of the shell subtriangular, becoming ventrally elongated with

*After examination of many specimens of the type of *Goodallia* I have been able to find nothing but eggs. These were few in number in each specimen, and disproportionately large. The genus is probably oviparous.

age and disproportionately thick; in one specimen I found nearly fifty young ones, about 0.20mm in diameter, lenticular, extremely thin, but already showing the purple tinge, rather compressed and with hardly perceptible beaks, while the adult is inflated with very prominent beaks. The dimensions of a fully adult specimen are 3.0mm high, 2.25mm in greatest length, and 2.5mm in greatest thickness. They were obtained by Mr. Hemphill at Cedar Keys on mud flats, and at Sarasota Bay on the beach, abundantly. Conrad's specimens came from Tampa Bay. The relations of this beautiful little shell are uncertain, but until more is known I should be disposed to keep it in the vicinity of *Astarte*, which, so far as the shell is concerned, appears to be its nearest relative, though I do not feel confident that this will be its permanent location.

Crassatella (Eriphyla) lunulata Conrad.

Beach of Sarasota Island, plenty but dead.

There is little room for doubt that this name should take precedence over *mactracea* Linsley and that the two names refer to one and the same species. The specimens are the bright southern form of "*Gouldia*" *mactracea* of authors.

Cytherea (Transennella?) conradina n. s.

Shell of much the same general form of *C. cuneimeris* Conrad, but without the radiating sculpture and the strong sculpture on the ribs. The color is nearly white with fine zigzag markings of yellow; a touch of pink internally in some valves; exterior smooth, or concentrically grooved; lunule marked by a strongly impressed line, proportionately large; escutcheon not distinguishable; shell moderately inflated, beaks not very prominent, recalling *Cyrena floridana* in shape but more rounded off; interior smooth, pallial sinus moderate, angular; beaks subcentral; margin internally grooved at right angles to the hypothetical radii of growth. Long, 8.0mm; altitude, 5.7mm; diameter, 3.5mm.

Habitat.—Rare at Cedar Keys, in mud between tides.

The most remarkable feature of this shell is the internal grooving of the margins. The ventral margin is deeply scored parallel to the long axis of the shell, the grooves turning upward at the ends, while on each side of the beaks the margin is closely and deeply grooved in a direction nearly parallel to the anterior and posterior slopes. I have seen nothing like it in any other bivalve. The grooves are not, as might be supposed, parallel with the lines of growth but invariably, except at the center of the base, form a more or less acute angle with them. The only analogue to such sculpture known to me occurs on the outside of such *Lucinidæ* as the Lamarckian *L. divaricata*, *Woodia*, and some *Nuculidæ* and Yoldias. But on the inside of any shell such sculpture has not, so far as I am aware, been reported, apart from structures appertaining to the hinge. Several gentlemen to whom the form in question has been submitted are unanimous in considering it as worthy of more than specific rank, and while I am yet in doubt as to the systematic value of the structure de-

scribed, I would suggest for it, in case it be deemed worthy of separation, the name of *Transennella*.

Anomalocardia flexuosa Lin.

"Salt Pond" at Key West, numerous but immature.

Cardium mortoni Say.

In sand between tides near the mouth of the Manatee River. The colors are more vivid than in northern specimens, and the shell is usually much inflated.

Cardita floridana Conrad.

Plenty on the mud flats at Sarasota Bay.

Leda? eborea Conrad.

Cedar Keys at low water. Like *L. jamaicensis* but slenderer, more pointed, and with coarser concentric ribs.

Arca (Barbatia) dominguensis Lam.*

Rare, under stones at Key West.

Arca (Barbatia) gradata Broderip.

With the last.

Perna ephippium Lam.

Rather rare. Rocks between tides at Key West.

Modiola papyria Conrad.

Plenty; on the mud flats at Cedar Keys. Tampa Bay (Conrad).

This exquisite species deserves a more thorough examination. It appears to exist around the borders of the Gulf and of the Caribbean sea; at least I have seen very much larger specimens from near Aspinwall on the Isthmus. It resembles *Mycetopus* in several particulars, and it is doubtful if the soft parts are similar to those of typical *Modiolæ*. It is extremely similar to (and perhaps identical with) *Modiola petagnæ* Scacchi as figured by Reeve.

Mytilus exustus Lam.

Plenty on the beach at Key West. Exists throughout a great part of the Antilles.

Lima? tenera Chemn.

Cedar Keys, rare; also in the West Indies.

The following species are noted or described as new in the papers of Messrs. Calkins and Melvill:

Triton veliei Calkins l. c., p. 235, pl. viii, figs. 1, 2.

Key West, Ve'ie, and Marco, Collier.

Odostomia alba Calkins l. c., p. 259, pl. viii, fig. 3.

Cedar Keys; 2–6 fathoms; Calkins.

It may be noted that the specific name *alba* is several times preoccupied in this genus, while neither Mr. Calkins' figure nor description are sufficient to identify the shell by. Indeed, so far as the former indicates anything, it is that the shell is not an *Odostomia*, but some form of *Eulimella* or *Turbonilla*. It is to be hoped Mr. Calkins will give further information in regard to it.

Cancellaria stimpsonii Calkins l. c., p. 250, pl. viii, figs. 4, 5.

Cape Sable, Florida, Dr. J. W. Velie.

Hemifusus corona *β* **estephomenos** Melvill l. c., p. 157. Sowerby, P. Z. S., 1878, pp. 795, 796, pl. xlviii, fig. 13.

One of the endless varieties of the very variable *H. corona*.

Latirus cayohuesonicus Sow., jr., and Melvill P. Z. S., p. 795, 1878. Melvill l. c., p. 159.

Key West; from which the authors have apparently derived their extraordinary specific name.

Anachis ostreicola Melvill l. c., p. 160.

Not described but said to be "allied to *C. nigricans* but smaller"; "found on oyster shells at Appalachicola." Noted in the preceding list.

Natica campechiensis (Recluz) Melvill l. c., p. 161.

The author includes under this name *Neverita duplicata* and *Lunatia heros*.

Conus melvillii Sow., jr., P. Z. S., p. 795, 1878.

Key West. Mr. Sowerby identifies among Mr. Melvill's shells *Conus japonicus* Hvass and *C. nebulosus* Solander, neither of which has been known from this region, and it may fairly be said, in view of some of the other identifications, that they still need confirmation by a competent authority.

In a note Mr. Melvill adds in regard to—

"*Melaniadæ and Unionidæ*.—At Key West I did not come across a single specimen of these families, which is not surprising in the inland torrents, but are fond of fresh water. I found several species in my North American travels, but very few in South Carolina, and those of no particular peculiarity of form" (l. c. p. 173).

Perhaps some of our winter sojourners in Florida will take the hint, and more particularly examine the "inland torrents" of Key West for the missing shells.

Mr. Hemphill also collected specimens of *Glottidia pyramidata* Stimpson, at Cedar Keys; which have been received as this paper was passing through the press.

W. H. DALL.

JUNE 19, 1883.

LIST OF BIRDS FOUND AT GUAYMAS, SONORA, IN DECEMBER, 1882, AND APRIL, 1883.

By L. BELDING.

[The following list may be relied on as correct, for, though less than half the species enumerated are verified by specimens, Mr. Belding's well-known accuracy of observation is a sufficient guarantee that the remainder were properly identified. Species of which specimens were sent are marked with a*.—R. R.]

1. *Mimus polyglottus* (Linn.).
*2. *Harporhynchus bendirei* Coues.
*3. *Harporhynchus palmeri* Ridgw.[1]
4. *Phainopepla nitens* (Sw.).
5. *Polioptila cærulea* (Linn.).
6. *Polioptila plumbea* Baird?
7. *Auriparus flaviceps* (Sund.).
*8. *Campylorhynchus brunneicapillus* (Lafr.).
9. *Salpinctes obsoletus* (Say).
10. *Catherpes mexicanus conspersus* Ridgw.
11. *Vireo pusillus* Coues.
*12. *Vireo vicinior* Coues.
13. *Lanius ludovicianus excubitorides* (Sw.).
14. *Tachycineta bicolor* (Vieill.).
15. *Carpodacus frontalis rhodocolpus* (Cab.).
*16. *Passerculus rostratus* (Cass.).
17. *Chondestes grammica strigata* (Sw.).
*18. *Spizella breweri* Cass.
19. *Amphispiza bilineata* (Cass.).
20. *Calamospiza bicolor* (Towns.).
*21. *Pipilo fuscus mesoleucus* (Baird).
*22. *Cardinalis virginianus igneus* (Baird).
23. *Pyrrhuloxia sinuata* Bp.
*24. *Molothrus ater obscurus* (Gm.).
25. *Icterus cucullatus* Sw.
26. *Scolecophagus cyanocephalus* (Wagl.).
*27. *Quiscalus palustris* Sw.
28. *Corvus corax carnivorus* (Bart.).
29. *Myiarchus cinerascens* Lawr.
30. *Calypte costæ* (Bourc.).

[1] HARPORHYNCHUS PALMERI Ridgway. Moderately common in April, when it was mated, and probably breeding. A specimen of *H. bendirei* was shot here by me December 11, 1882, and this species may also be resident.

I am indebted to Mr. Ridgway for the precise determination of these, as well as a considerable number of other species collected by me at various localities, although he should not be held responsible for several of the species mentioned in the Guaymas list, as no specimens were forwarded to him.

L. B.

31. *Iache latirostris* (Sw.).
*32. *Picus scalaris* Wagl.
*33. *Centurus uropygialis* Baird.
34. *Colaptes chrysoides* Malh.
35. *Geococcyx californianus* (Less.).
36. *Polyborus cheriway* (Jacq.).
37. *Parabuteo unicinctus harrisi* (Aud.).
38. *Pandion haliætus carolinensis* (Gm.).
39. *Buteo borealis calurus* (Cass.).
40. *Cathartes aura* (Linn.).
41. *Catharista atrata* (Bartr.).
42. *Zenaidura carolinensis* (Linn.).
43. *Melopelia leucoptera* (Linn.).
44. *Chamæpelia passerina* (Linn.).
45. *Scardafella inca* (Less.).
46. *Lophortyx gambeli* Nutt.

The species observed only in April are Nos. 6, 11, 12, 14, 20, 31, and 39.

Thirty-five of the forty-six species are also represented on the opposite side of the Gulf, in Lower California, while five others are represented there by closely allied species or races, as follows:

GUAYMAS.	LOWER CALIFORNIA.
1. *Harporhynchus bendirei.*	1. *H. cinereus* Xantus.
2. *Campylorhynchus brunneicapillus.*	2. *C. affinis* Xantus.
3. *Pipilo fuscus mesoleucus.*	3. *P. fuscus albigula* (Baird).
4. *Picus scalaris.*	4. *P. scalaris lucasanus* (Xant.).
5. *Lophortyx gambeli.*	5. *L. californicus* (Shaw).

The six species unrepresented, so far as known, in Lower California, are:

1. *Harporhynchus palmeri.*
2. *Vireo vicinior.*
3. *Quiscalus palustris.*
4. *Iache latirostris.*
5. *Catharista atrata.*
6. *Scardafella inca.*

SECOND CATALOGUE OF A COLLECTION OF BIRDS MADE NEAR THE SOUTHERN EXTREMITY OF LOWER CALIFORNIA.*

By L. BELDING.

(Edited by R. Ridgway.)

Some of the more prominent characteristics of Lower California, south of the parallel of 24° 30′, are as follows:

The Gulf coast, including the islands of Espiritu Santo and Ceralvo, and the Pacific coast, from Cape St. Lucas to Todos Santos, is mount-

*See these Proceedings, Vol. 5, pp. 532–550.

ainous, rocky, sandy, and very barren. The Victoria Mountains range from north to south in the center of the peninsula, parallel, in a general sense, to the Coast ranges, having their greatest height and breadth between Triumfo and Miraflores. The remaining portion of the tract under consideration consists principally of low table-lands or mesas and sandy arroyos.

There is a belt of low, mostly fertile, land 15 or 20 miles wide, extending from the Gulf at La Paz to the Pacific at and north of Todos Santos, so low, indeed, that if it should happen to sink about a hundred feet it would be submerged, and that portion of the peninsula lying south of it would become—what it has probably already been—an island.

Taking this into consideration, together with the influence the Victoria Mountains have had and are having in this direction, it is not difficult to account for a local fauna of which it may be said much remains to be learned.

I have observed the following species, with others on the Pacific coast, from Cape St. Lucas to a point 30 miles north of Todos Santos, namely: *Mimus polyglottus*, *Harporhynchus cinereus*, *Phainopepla nitens*, *Auriparus flaviceps*, *Campylorhynchus affinis*, *Pipilo fuscus albigula*, *Cardinalis virginianus igneus*, *Pyrrhuloxia sinuata*, *Icterus cucullatus*, *Centurus uropygialis*, *Colaptes chrysoides*, and *Picus scalaris lucasanus*. These are a part of what I have termed the species of the cactus and mesquite thickets. The same species have been observed by me on the Gulf side as far north as 24° 30′ or thereabouts. All of them are likely to occur much farther north on the Gulf side, being probably confined thereto by the desert, which covers nearly all the peninsula east of Magdalena Bay, and north to Commonder and far south toward Todos Santos.

Other quite similar deserts northwest of Magdalena Bay must tend to restrict these birds to the Gulf coast, which is mountainous, and has more or less fresh water, whereas, on the Pacific coast, for a distance of four or five hundred miles, there is not a drop of water, as I believe, upon what I consider reliable information, and actual observation.

a. BIRDS OF THE MOUNTAINS.

Arriving at La Paz December 15, 1882, I remained in Southern Lower California until March 23, 1883, much of this time being spent in the saddle. Only a small number of specimens were secured, although among them were several new or undescribed species.

The most important localities visited were in the Victoria Mountains, which were probably never previously explored by any collector. I ascended these mountains by three different trails on as many different spurs. The trail leading to Laguna is the longest, highest, and possibly the worst; however, I suppose either of them would be considered impassable in any other country than Mexico. On this trail an altitude of about 5,000 feet was reached. From an altitude of about 3,500 feet and upward the flora was partly that of the temperate zone.

This region is well watered and well timbered with medium-sized oaks and pines, the latter constituting about a tenth of the forest, being distributed unevenly among the oaks. Bunch grass was everywhere abundant. On February 1, the date of our arrival here, a Blackberry (*Rubus*), a Black Currant (*Ribes*), the Madroña (*Arbutus menziesi*), a Monkey Flower (*Mimulus*), the Painted Cap (*Castilleia*), a fine Lupine, (*Lupinus*), and a few other plants, were in flower and thriving, although the tender shoots of some of the annuals had been nipped by frost.

An interesting *Nolena* reminded us we were still in the tropics, although we had left the cactus and mesquite thickets with their characteristic species far beneath us, or below an altitude of 1,500 feet.

Upon meeting the first pines, I discovered almost simultaneously the long sought Cape Robin (*Merula confinis* Baird), the beautiful new Snowbird (*Junco bairdi*), and other interesting species.

The purpose is not to give at this time an extended account of experiences here; but, instead, the following list is presented. It contains all the species known by me to occur in these mountains, although a change of season may change the avifauna, some species perhaps going north in spring, others from the surrounding low lands replacing them. Perhaps some species escaped my notice by being in the deep gorges so numerous in the Victoria Mountains.

1. Hylocichla unalascæ (Gm.).

Common; possibly resident.

2. Merula confinis (Baird.)

Only about a dozen Cape Robins were seen, and these were all on the Laguna trail. About half were found singly, one as low as 2,500 feet above sea level.

Mr. Cipriano Fisher, an American, who had often hunted deer at Laguna, informed me that Robins were sometimes abundant there. This may be the case when the berries of the California Holly (*Heteromeles*), which grows abundantly in the neighborhood, are ripe.

The type specimen, shot by Xantus at Todos Santos in summer, may have been a straggler from the mountains. Possibly there was a mistake made in recording it, as I suspect was the case with the *Oreortyx picta plumifera* (see Proc. U. S. Nat. Mus., Vol. 5, p. 533), which is not at present a bird of Cape St. Lucas; and this leads me to remark that I consider the term "Cape species," when it covers all the birds from La Paz and south of it, an inappropriate one—inappropriate for the good reason that so few of the so-called Cape species really occur at Cape St. Lucas—its only special advantage as a collecting ground being its well-sheltered harbor, which affords good opportunities for shooting marine species.

3. Polioptila cœrulea (Linn.).

Common, and probably the only *Polioptila* seen; but it is not possible to be positive, as all the *Polioptila* of Southern Lower California look

much alike in the field, the black capped species being rarely met with in winter, or before March or April.

4. **Regulus calendula** (Linn.).

Moderately common; from 3,000 feet altitude upward.

5. **Lophophanes inornatus cinerasceus** Ridgw. (See these Proceeding, p. 154.)

Common from 3,000 feet altitude upward; probably a constant resident. Nothing special noted concerning its habits.

[A second specimen, from the Victoria Mountains, February 22, agrees exactly with the type. Measurements: Wing, 2.80; tail, 2.40; culmen, .45; tarsus, .80; middle toe, .50. The sex not determined.—R. R.]

6. **Psaltriparus grindæ** Belding. (See these Proceedings, p. 155.)

Same remarks.

[Two additional specimens agree exactly with the type. Their measurements are as follows: No. 90069, ♂ ad., San Francisco Mountains, February 22, 1883: Wing, 1.85; tail, 2.10; culmen, .23; tarsus, .60; middle toe, .31. No. 90070 (sex not determined), Victoria Mountains, February 20, 1883: Wing, 1.90; tail, 2.15; culmen, .25; tarsus, .60; middle toe, .32.—R. R.]

7. **Sitta carolinensis aculeata** (Cass.)?

Less common than the preceding.

8. **Catherpes mexicanus conspersus** Ridgw.

Moderately common throughout all altitudes.

9. **Anthus ludovicianus** (Gm.).

A large flock seen at Laguna, supposed to be this species. The only suitable ground observed was a meadow, containing about a square mile.

10. **Helminthophila celata lutescens**, Ridgw.

Very common.

11. **Dendrœca auduboni** (Towns.).

Common.

12. **Dendrœca nigrescens** (Towns.).

Very common above 3,000 feet altitude; also of occasional occurrence in mountain cañons of about 1,000 feet altitude.

13. **Vireo huttoni stephensi** Brewster.

Common above 3,000 feet altitude; not observed below this.

14. **Pyranga ludoviciana** (Wils.).

Rare; also seen at La Paz.

15. **Astragalinus psaltria** (Say).

Only one flock observed.

16. **Spizella socialis arizonæ** Coues.

Rather rare; not seen below 3,000 feet altitude.

17. **Spizella atrigularis** (Caban.).

The only individual observed was shot and wounded, but it escaped in rocks just as I was about to grasp it.

Afterward, near Pescadero, I saw a small flock, and secured a specimen. It must be rare in Southern Lower California.

18. **Junco bairdi** Belding. (See these Proceedings, p. 155.)

This interesting bird was very common in the Victoria Mountains above 3,000 feet altitude. Nothing worthy of note in connection with its habits was noticed.

This species is so named in consideration of the valuable ornithological services of Prof. S. F. Baird, in field and office, not the least of such services being his original, full, and accurate descriptions of so many North American birds.

[Two specimens received since the original description of the species was published agree exactly with the types in coloration, and measure as follows: No. 90048 ♀ ad., Laguna, Feb. 1883: Wing, 2.75; tail, 2.60; culmen, .49; depth of bill at base, .23; tarsus, .80; middle toe, .55. No. 90047, ♀ ad., Victoria Mountains, Feb. 21, 1883: Wing, 2.75; tail, 2.65; culmen, .42; depth of bill at base, .23; tarsus, .80; middle toe, .55—R. R.]

19. **Peucæa ruficeps boucardi** (Scl.).

Common on grassy hillsides above 2,500 feet altitude; usually seen in pairs in February.

20. **Melospiza lincolni** (Aud.).

Less common than the preceding in similar localities.

21. **Pipilo maculatus megalonyx** (Baird).

Very common.

22. **Pipilo chlorurus** (Towns.)

Common.

23. **Icterus parisorum** Bonap.

Very rare. Three individuals were seen as high as 4,500 feet.

24. **Corvus corax carnivorus** (Bartr.).

Common.

25. **Aphelocoma californica** (Vig.).

Moderately common.

26. **Tyrannus vociferans** Swain.

Rare; seen only around the meadow at Laguna.

27. **Empidonax difficilis** Baird.

Rare.

28. **Calypte costæ** (Bourc).

A humming bird, supposed to have been a female of this species, was observed, at about 4,000 feet altitude. Not observed at any other time above 2,000 feet. *C. costæ* thrives in barren, waterless tracts.

29. **Basilinna xantusi** (Lawr.).

Decidedly abundant in the highest mountains, much more so than in the low country, where it is usually found near fresh water.

30. **Picus scalaris lucasanus** (Xant.).

Rarely seen.

31. **Sphyrapicus varius nuchalis** Baird.

A specimen was obtained at Laguna, on February 1. Probably seen upon two other occasions.

32. **Melanerpes formicivorus angustifrons** Baird.

Very abundant in the higher mountains. Colonies are occasionally found in the oaks as low as 700 feet altitude.

33. **Colaptes chrysoides** (Malh.).

I was unable to get a specimen of the flicker in the mountains. Saw but two or three individuals. As these had golden wing and tail shafts, I presume the species was as above given.

34. **Scops** ———.

The tremulous notes of a screech-owl were heard at several of the camps. Also at Agua Caliente and Miraflores.

[This was, perhaps, *S. trichopsis* Wagl. The National Museum possesses two young specimens collected by Xantus at Cape St. Lucas, of a species allied to but apparently distinct from *S. asio*, but adults from this region are as yet unknown. *Cf.* Hist. N. Am. Birds, iii, p. 52.—R. R.]

35. **Bubo virginianus sabarcticus** (Hoy).

Horned owls—which were supposed to have been of this species—were frequently heard and occasionally seen.

[A wing, undoubtedly of this race, was among Mr. Belding's specimens.—R. R.]

36. **Micrathene whitneyi** (Cooper.)

This diminutive owl appeared to be less common here than in the cactus region; however, it was heard at several of our camps. I tried more than an hour, one night, to see one which I had brought near me, by imitating its cries; but I could not with the advantage of bright moonlight and the assistance of opera glasses see the little fellow, though he sat in a lone tree not 20 feet from me, and remained in this particular tree five or ten minutes. Neither myself nor Dr. H. Ten Kate, my esteemed companion of two subsequent ascents in the Victoria Mountains, was able to get an owl of any sort in all our wanderings here and elsewhere in Lower California. In a single instance I think I heard a *Glaucidium*, and again a noise I referred to some unknown animal, but the guide said it was a "Tapa Camino," or Whippoorwill. It may have been the notes of *Phalænoptilus nuttalli*, with which I am not acquainted. Have resided in California twenty-seven years, and do not think I have yet heard it.

37. **Tinnunculus sparverius** (Linn.).

Common.

38. **Buteo borealis calurus** (Cass.).

The Red Tailed Hawk, common in the low country, was quite as common in the mountains.

39. **Cathartes aura** (Linn.).

Very common and sociable.

40. **Columba fasciata** (Say.)

Abundant and breeding in February. Several nests were seen in oak trees, but not closely examined, however, they were so frail, twigs alone having been used in their construction. The eggs could be seen by looking through them from below. Their flesh was here excellent, notwithstanding they were subsisting principally upon the acorns of the deciduous oak (*Quercus grisea*).

41. **Melopelia leucoptera** (Linn.).

Very common.

b. BIRDS OF THE LOWLANDS (VICINITY OF LA PAZ AND SOUTHWARD).

Additional specimens from La Paz and south of it.

1. **Anthus cervinus** (Pall.). (See page 156 of these proceedings.)

The single specimen was shot at San José del Cabo, on the bank of an irrigating ditch, February 7, 1883. Finding it in such a locality, at first sight I supposed it was a water thrush, as it was alone.

I was unable afterward to find the species, although I persecuted a large flock of *A. ludovicianus* for several days after shooting it.

2. **Myiodioctes pusillus pileolatus** (Pall.).

Rare, but observed at several localities.

3. **Setophaga ruticilla** (Linn.).

Shot in a dense thicket at Miraflores February 24, 1883. An individual probably seen at La Paz in March following.

4. **Passerculus sandwichensis alaudinus** (Bp.)

Rare.

[A specimen from San José del Cabo is peculiar in several respects, and may be a different species. For the present, however, I place it here, pending the examination of more specimens, should any be procured.—R. R.]

5. **Pœcetes gramineus confinis** Baird.

Rare.

6. **Melospiza lincolni** (Aud.).

Rare.

7. **Agelæus phœniceus** (Linn.).

Rare.

8. **Sturnella neglecta** Aud.
Rare.

9. **Accipiter cooperi** Bonap.
Rare.

10. **Gallinago wilsoni** (Temm.).
Rare.

11. **Steganopus wilsoni** (Sab.).
One specimen. Very rare.

12. **Porzana carolina** (Linn.).
Rarely seen.

13. **Chaulelasmus streperus** (Linn.).
Very common.

14. **Erismatura rubida** (Wils.).
Very common.

15. **Tachybaptes dominicus** (Linn.).
Very common at San José, Miraflores, and Santiago, in the winter of 1882–'83, but not recognized the previous winter.

BIRDS OF LOWER CALIFORNIA SOUTH OF 24° 30′.

c. Species positively identified by me, but no specimens preserved.

1. **Æsalon columbarius** (Linn.).
Dr. H. Ten Kate got a specimen at La Paz in January.

2. **Botaurus lentiginosus** (Montag.).
Moderately common in winter.

3. **Hæmatopus palliatus** Temm.
Of occasional occurrence on the mud flats at La Paz.

4. **Oxyechus vociferus** (Linn.).
Common at many localities.

5. **Ægialitis semipalmata** Bonap.
Moderately common.

6. **Pelidna alpina americana** Cass.
Very common in winter.

7. **Totanus melanoleucus** (Gmel.).
Same remark as the preceding.

8. **Symphemia semipalmata** (Gmel.).
Same remarks.

9. **Recurvirostra americana** Gmel.
Not common.

10. **Himantopus mexicanus** (Müll.).

Not common.

11. **Anas boscas** Linn.

Shot at several localities.

12. **Dafila acuta** (Linn.).

Common.

13. **Nettion carolinensis** (Gmel.).

Moderately common.

14. **Fulix affinis** (Eyt.).

Rare.

15. **Fulix collaris** (Donov.).

Rare.

16. **Æthyia americana** (Eyt.).

An adult male shot at La Paz February 12 is the only example.

17. **Mergus serrator** Linn.

Common at La Paz in winter.

18. **Lophodytes cucullatus** (Linn.).

Rare.

19. **Pelecanus erythrorhynchus** Gmel.

Two seen at La Paz February 17.

20. **Sula leucogastra** (Bodd.).

Dr. H. Ten Kate shot an individual near Pichalinque Bay in January.

21. **Colymbus torquatus** Brünn.

Two seen by me at La Paz January 27.

In the "Catalogue of a collection of birds made near the southern extremity of Lower California" (see these Proceedings, Vol. 5, pp. 532–549), 135 species are mentioned as having been observed by me.

To these may be added—

21 species positively identified, but no specimens preserved.
17 additional from the Victoria mountains.
14 additional from the low lands of La Paz and south.

—

52 total additions.

Total observed to date, 187 species, excluding several unidentified species, among them, at least two falcons and one owl. The most of them, however, are water birds, which are in the aggregate abundant in winter.

Vol. VI, No. 23. Washington, D. C. Jan. 12, 1884.

NOTES ON A COLLECTION OF FISHES MADE IN 1882 AND 1883 BY CAPT. HENRY E. NICHOLS, U. S. N., IN ALASKA AND BRITISH COLUMBIA, WITH A DESCRIPTION OF A NEW GENUS AND SPECIES, PRIONISTIUS MACELLUS.

By TARLETON H. BEAN, M. D.,

Curator of the Department of Fishes in the United States National Museum.

The United States National Museum has again received from Captain Nichols two collections of forty-eight species of fishes, many of which are additions to the fauna of Alaska, while one has hitherto been unknown to ichthyologists. The Alaskan species are all from the southeastern part of the Territory. The following are especially interesting: *Triglops pingelii*, *Gymnacanthus galeatus*, *Cottopsis gulosus*, *Sebastichthys nebulosus*, *Sebastichthys nigrocinctus*, *Micrometrus aggregatus*, and *Somniosus microcephalus*, all of which are now for the first time definitely recorded from the region under discussion.

These collections, like all others received from Captain Nichols, are in excellent condition, and it is a matter for congratulation that the same efficient officer has again visited a region so rich in interest which has been so little investigated by collectors.

The quotations are from the notes accompanying the collection, and the numbers in marks of parenthesis are from the inventory of Captain Nichols.

1. **Gasterosteus cataphractus** (Pall.) Tilesius.

31959 (138). Near Duncan's Bay, Brit. Col., June, 1882.

2. **Gasterosteus microcephalus** Girard.

31960 (187). Mountain Lake, near Ward's Cove, Alaska, October, 1882.

3. **Pleuronectes stellatus** Pallas.

31983 (166). Port Simpson, Brit. Col., June, 1882.
32012 (165). Port Simpson, Brit. Col., June 29, 1882.

4. **Citharichthys sordidus** (Girard) Günther.

31991 (143). Johnston's Straits, Brit. Col., June, 1882.
31992 (147). Safety Cove, Brit. Col., June 21, 1882.

No. 31992 has the following radial formula: D. 96; A. 79.

5. **Lepidopsetta bilineata** (Ayres) Gill.

31993 (154). Carter Bay, Brit. Col., June, 1882.

A "flounder with white spots" and with the following radial formula: D. 77; A. 58. Teeth in upper jaw, 8+22; in lower jaw, 10+23.

I have had some hesitation in referring this example to the species named above on account of certain peculiarities which must be subsequently considered.

6. **Limanda aspera** (Pallas) Bean.

31982 (159). Port Simpson, Brit. Col., June, 1882.
32000 (155). Cardenas Bay, Brit. Col., June, 1882.

This is the "flounder with brown spots."

33803 (237). Tongass, Alaska, July 26, 1883.

7. **Atheresthes stomias** Jordan & Gilbert.

33792 (235). Wrangel, Alaska, July 19, 1883.
33795 (242). Naba Bay, Alaska, Aug. 23, 1883.

8. **Pollachius chalcogrammus** (Pallas) Jor. & Gilb.

31978 (157). Port Simpson, Brit. Col., June, 1882.

9. **Gadus morrhua** Linné.

31977 (146). Alert Bay, June, 1882.

10. **Ammodytes personatus** Girard.

31963 (167). Port Simpson, Brit. Col., June, 1882.
33782 (211). Port Wrangel, Alaska, May, 1883.
33783 (244). Port Chester, Alaska, Aug. 30, 1883.
33789 (217). Wrangel, Alaska, May 28, 1883.

11. **Delolepis virgatus** Bean.

33790 (210). Port Wrangel, Alaska, winter of 1882–'83.

12. **Lumpenus anguillaris** (Pallas) Girard.

31985 (130). Esquimalt, Brit. Col., May, 1882.
33781 (234). Wrangel, Alaska, July 19, 1883.
33786 (224). Nakat Harbor, Alaska, June 8, 1883.
33787 (223). Boca de Quadra, Alaska, June 6, 1883.

13. **Xiphister mucosus** (Girard) Jordan.

33800 (233). Mary Island, Alaska, July 12, 1883.

14. **Anoplarchus atropurpureus** (Kittlitz) Gill.

31961 (175). Mary Island, Alaska, July, 1882.
33788 (213). Port Wrangel, Alaska, winter 1882–'83.
33910 (232). Tongass, Alaska, 1883.

15. **Murænoides ornatus** (Girard) Gill.

33802 (212). Port Wrangel, Alaska, winter 1882–'83.
33912 (232). Tongass, Alaska.

16. **Bathymaster signatus** Cope.

31966 (173). Mary Island, Alaska, July, 1882.
31973 (153). Carter Bay, Brit. Col., June, 1882.
32016 (195). Port Wrangel, Alaska, Nov., 1882.
33784 (240). Port Chester, Alaska, Aug. 11, 1883.
33796 (227). Nakat, Alaska, June 10, 1883.
33797 (231). Nakat, Alaska, June 23, 1883.
33798 (228). Nakat, Alaska, June 21, 1883.
33799 (229). Nakat, Alaska, June 21, 1883.
33801 (200). Nakat Harbor, Alaska, May 25, 1883.

17. **Liparis** sp.

31962 (137). Duncan's Bay, Brit. Col., June, 1882.

These examples are too young to be definitely made out.

18. Liparis pulchellus Ayres.

33913 (232). Tongass, Alaska, 1883.

19. Cottus polyacanthocephalus Pallas.

32017 (177). Mary Island, Alaska, July, 1882.

20. Aspidocottus bison Girard.

31997 (131). Esquimalt, Brit. Col., May, 1882.

Radial formula : D. VIII, 12; A. 9.

21. Ceratocottus diceraus (Pallas) Gill.

32007 (188). Tolstoi Bay, Alaska, Oct., 1882.
32015 (169). Fort Tongass, Alaska, July, 1882.

Radial formula: D. VIII, 13; A. 10.

22. Cottopsis gulosus Girard.

31968 (180). Mountain Lake near Mt. Tongass, Alaska, Aug., 1882.

A single specimen "caught with a hook": D. VIII, 22; A. 17.

23. Gymnacanthus galeatus Bean.

31967 (191). Steamer Bay, Alaska, Oct., 1882.

24. Hemilepidotus trachurus (Pallas) Günther.

31969 (170). Fort Tongass, Alaska, July, 1882.
32010 (141). Duncan's Bay, Brit. Col., June, 1882.
32001 (171). Fort Tongass, Alaska, July, 1882.

"Sculpin."

33794 (230). Nakat, Alaska, June 21, 1883.

25. Leptocottus armatus Girard.

32009 (160). Port Simpson, Brit. Col., June, 1882.

26. Oligocottus maculosus Girard.

31964 (172). Mary Island, Alaska, July, 1882.
33911 (232). Tongass, Alaska, 1883.

27. Triglops pingelii Reinhardt.

31957 (194). Wrangel Straits, Alaska, Nov, 1882.

"Sculpin."

PRIONISTIUS new genus, COTTIDÆ.

A genus resembling *Triglops*, from which it differs in numerous important particulars, among which are the following: (1) its much slenderer form, (2) the absence of a series of bony tubercles along the bases of the dorsal fins, (3) the elongation of the exserted pectoral rays so that the lower portion of the fin is considerably longer than the upper, (4) the presence of serrations on all dorsal spines, and on the first soft ray, and (5) the emargination of the caudal fin.

28. Prionistius macellus, new species.

31958 (186). Carter Bay, Brit. Col., Aug., 1882.
33793 (196). Carter Bay, Brit. Col., May 13, 1883.

The type of the present species (catalogue number 31958) was obtained by Captain Nichols in Carter Bay, British Columbia, in August,

1882. Its length to the end of the upper caudal lobe is 172 millimeters; to the origin of the middle caudal rays it measures 154 millimeters, which length is taken as the unit for comparison with parts of the body.

DIAGNOSIS: *Prionistius macellus* differs greatly from *Triglops pingelii*, particularly (1) in its more slender body, (2) in its shorter jaws, (3) in its longer dorsal and anal fins, (4) in its emarginate caudal, (5) in having the uppermost exserted pectoral ray considerably longer than the rays above it, (6) in the more advanced position of the ventral fin, which is also much shorter than in *T. pingelii*, (7) in the greater number of rays in its dorsal and anal fins.

These differences are clearly brought out in the table of measurements accompanying this description. By a very happy coincidence Captain Nichols, during the same cruise, obtained an individual of *Triglops pingelii* which is only 8 millimeters longer than the type of *P. macellus*, thus securing the first recorded Alaskan specimen of *T. pingelii*, and at the same time adding an interesting new genus related to *Triglops*.

DESCRIPTION: The body is slender and elongate; its greatest height equals the length of the lower jaw, and is contained 8 times in the unit of length. The height at the ventrals equals $\frac{1}{2}$ of the distance of the pectoral from the tip of the snout, and is contained $8\frac{1}{2}$ times in the standard body length. The caudal peduncle is shorter than in *T. pingelii;* its least height equals the width of the interorbital space. The length of the caudal peduncle, measured from the end of the anal fin to the origin of the middle caudal rays, is contained 7 times in the standard total length. There are no bony plates along the dorsal fins. The lateral line contains well developed ossoeus tubercles, and beneath it are ciliated scales similar to those of *T. pingelii;* the breast, however, unlike that of the species just named, is naked.

The head agrees in the main with that of *T. pingelii*, but is not so deep nor so wide; the jaws are about equal in front. The greatest length of the head is contained $4\frac{1}{5}$ times in the unit of length; its greatest width is slightly more than $\frac{1}{2}$ its length, and is contained $7\frac{1}{2}$ times in the standard body length. The width of the interorbital area, measured on the bone, is nearly $\frac{1}{3}$ of the long diameter of the orbit, which equals the snout in length. On the top of the head, close behind the orbits, are two short, interrupted furrows similar to those observed in some species of *Prionotus*. The length of the upper jaw is contained $2\frac{1}{3}$ times in that of the head, equals that of the postorbital part of the head, and is contained $9\frac{1}{2}$ times in the unit of length. The maxillary extends nearly to the vertical through the middle of the eye, the mandible nearly to that through the posterior margin of the eye. The length of the mandible is about $\frac{1}{2}$ that of the head. The dentition is the same as in *T. pingelii*. The length of the eye equals that of the snout, and is contained $3\frac{1}{2}$ times in the length of the head. The branchiostegal membrane is not very deeply emarginate, and is free from the

isthmus. The slit behind the fourth gill is a little more than half as long as the pupil. The gill-rakers on the anterior arch are quite rudimentary, their length being rather less than their width; there are 8 below the angle.

The distance of the spinous dorsal from the tip of the snout equals that of the pectoral from the same point and is contained $4\frac{1}{4}$ times in the standard body length; the base of this fin is twice as long as the longest ray of the soft dorsal. The length of the first spine equals that of the first ray of the soft dorsal and is contained $3\frac{1}{3}$ times in that of the head. The fourth spine is the longest, its length being contained $2\frac{1}{2}$ times in that of the head. The last spine is very little more than $\frac{1}{3}$ as long as the first. The first line is serrated along the lower third of its anterior edge, and all the following spines except the last are similarly armed along the anterior edge of their exserted tips. Even the first ray of the second dorsal is thickly set with minute spines.

The length of the base of the soft dorsal is contained $2\frac{1}{5}$ times in the standard body length (or unit of length). Its first ray equals in length the longest anal ray; it is also as long as the first spine and as the distance from the snout to the orbit. The fourth, fifth, sixth, and seventh rays are the longest and about equal in length; they are twice as long as the last ray and one-fifth as long as the soft dorsal base. The membrane behind the last dorsal spine extends to the base of the first soft ray. The origin of the anal fin is vertically beneath the base of the second soft ray. The distance of the anal origin from the snout is less than the length of the anal base. The length of the first anal ray equals the least height of the tail and is slightly more than $\frac{1}{2}$ that of the fifth to the eighth, which are the longest. The last ray is $\frac{1}{2}$ as long as the orbit. The vent is nearly midway between the origin of the ventrals and that of the anal.

The caudal is distinctly emarginate when fully expanded. The length of the middle rays is contained 9 times, and that of the external rays $7\frac{7}{10}$ times in the unit of length.

The structure of the pectoral is similar to that in *T. pingelii*, but the longest of the exserted lower rays extends considerably farther back than the upper portion of the fin. The origin of the pectoral is directly under that of the spinous dorsal. The length of the longest exserted ray (11th) is contained $4\frac{1}{2}$ times in the standard body length. Five of the lower pectoral rays are modified. The tenth pectoral ray, which is the longest of the non-exserted portion, is only about $\frac{5}{6}$ as long as the eleventh and extends to near the end of the spinous dorsal.

The ventral is situated farther in advance than in *T. pingelii*, and does not quite reach to the vent when extended. Its length is contained nearly 12 times in the unit of length.

Radial formula.—Br. VI; D. XI, 29; A. 29; C. 11 (developed); P. 10+5; V. I, 3; L. Lat. 51.

Colors.—There are traces of the same half bars which ornament the

back and sides of *T. pingelii*, but the dorsal portion of the markings is very faint and the lower limits of the dark areas are the most intense and form a succession of elongate blotches along the median line of the body, partly below and partly on the lateral line. Dorsal fins with 3 series of dark spots on the rays and spines, but not on the connecting membrane; these spots forming broken bands which are oblique on the first dorsal and nearly horizontal on the soft dorsal when the fins are raised. A crescent-shaped broken band crosses the top of the body at the ninth dorsal spine. A short, dark blotch near the root of the pectoral on the 10th, 11th, and 12th rays. Another dusky blotch in the upper axil of the pectoral. Four dusky bars on the pectoral, the first of which is very short, involving only about five of the rays, the 2d and 3d extending to the first exserted ray, and the 4th, which is near the tip of the fin, extending on the 7 upper rays only. Caudal dusky at base and with 4 bars, the first of which is faint in the middle and the last interrupted by the emargination of the fin. Lips and upper portion of maxilla dusky. A dark blotch on the interoperculum. Membrane lining the inner surface of the operculum dusky. Ventrals and anal whitish.

Measurements.

Species	*Prionistius macellus.*		*Triglops Pingelii.*	
Current number of specimen	31958		31957	
Locality	Carter Bay, British Columbia, August, 1882.		Wrangel Straits, Alaska, November, 1882.	
	Millim.	100ths of length.	Millim.	100ths of length.
Extreme length	172	.....	180	.....
Length to origin of middle caudal rays	154	100	159	100
Body:				
Greatest height	19	12.3	30	19
Greatest width	17	11	24	15.1
Height at ventrals	18	11.7	30	19
Least height of tail	6	3.9	6	3.8
Length of caudal peduncle	22	14.3	29	18.2
Head:				
Greatest length	37	24	45	28.3
Greatest width	20	13	29	18.2
Width of interorbital area	3	1.9	4	2.5
Length of snout	10	6.5	11	7
Length of upper jaw	16	10.4	21	13.2
Length of lower jaw	19	12.3	26	16.4
Distance from snout to orbit	11	7.1	15	9.4
Diameter of orbit	10	6.5	13	8.2
Dorsal (*spinous*):				
Distance from snout	36	23.4	43	27
Length of base	28	18.2	34	21.4
Length of first spine	11	7.1	10	6.3
Length of fourth spine (longest)	15	9.7	.....	.....
Length of seventh spine	.....	.....	14	8.8
Length of last spine	4	2.6	5	3.1
(*soft*)—Length of base	70	45.5	65	41
Length of first ray	11	7.1	13	8.2
Length of longest ray (4th to 7th)	14	9.1	(4th) 17	10.7
Length of last ray	7	4.5	6	3.8
Anal:				
Distance from snout	65	42.2	72	45.3
Length of base	70	45.5	58	36.5
Length of first ray	6	3.9	10	6.3
Length of longest ray (5th to 8th)	11	7.1	14	8.8
Length of last ray	5	3.2	6	3.8
Caudal:				
Length of middle rays	17	11	21	13.2
Length of external rays	20	13	22	14
Pectoral:				
Distance from snout	36	23.4	44	28
Length of 11th ray	34	22	(12th) 35	22
Length of 10th ray	27	17.5	(11th) 35	22
Ventral:				
Distance from snout	37	24	49	30.8
Length of ventral	13	8.4	19	12
Branchiostegals	VI	.....	VI	.....
Dorsal	XI, 29	.....	XI, 25	.....
Anal	29	.....	24	.....
Caudal	11	.....	11	.....
Pectoral	10+5	.....	11+7	.....
Ventral	I, 3	.....	I, 3	.....
Number of scales in lateral line	51	.....	50	.....

29. Sebastichthys ciliatus (Tiles.) Jor. & Gilb.

32008 (176). Mary Island, Alaska, July, 1882.
32014 (190). Tolstoi Bay, Alaska, Oct., 1882.

Radial formula: D. XII, I, 15; A. III, 8.

33785 (199). Nakat Harbor, Alaska, May 25, 1883.
33791 (243). Port Chester, Alaska, Aug. 29, 1883.

30. Sebastichthys proriger Jor. & Gilb. subsp. **brevispinis** nov.

32004 (185). Hassler Harbor, Alaska, Aug., 1882.

This individual has the peritoneum white and the second anal spine shorter than the third. There are two other examples of the same form

in a previous collection from Captain Nichols, both of which have the characters of No. 32004. Other differences exist between typical *proriger* and its Alaskan ally, which may necessitate their consideration as distinct species, but, for the present, we may regard them as sufficiently distinguished by the peculiarities and the nomenclature above mentioned.

31. **Sebastichthys caurinus** (Rich.) Jor. & Gilb.

31998 (136). Duncan's Bay, Brit. Col., June, 1882.

This individual has the following radial formula: D. XII, I, 13; A. III, 6.

31999 (133). Departure Bay, Brit. Col., June, 1882.

"Color mottled brown."

32005 (139). Duncan's Bay, Brit. Col., June, 1882.

The radial formula of the last is as follows: D. XII, I, 14; A. III, 6.

31984 (178). Mary Island, Alaska, July, 1882.

32. **Sebastichthys maliger** Jor. & Gilb.

32002 (149). Safety Cove, Brit. Col., June. 1882.

"Rock cod." The dorsal spines are not so greatly developed as usual in the species.

33. **Sebastichthys nebulosus** (Ayres) Jor. & Gilb.

32013 (181). Near Mary Island, Alaska, July, 1882.

This beautifully colored example has the following radial formula: D. XII, 13; A. III, 7.

34. **Sebastichthys nigrocinctus** (Ayres) Jor. & Gilb.

32006 (182). Near Mary Island, Alaska, July, 1882.

The fin-rays are as follows: D. XII, I, 14; A. III, 7.

35. **Hexagrammus asper** Steller.

31980 (161). Port Simpson, Brit. Col., June 28, 1882.
31981 (174). Alaska, July, 1882.

36. **Hexagrammus decagrammus** (Pall.) Jor. & Gilb.

31995 (140). Duncan's Bay, Brit. Col., June, 1882.
32011 (189). Tolstoi Bay, Alaska, Oct., 1882.

37. **Ophiodon elongatus** Girard.

31956 (151). Head of Safety Cove, Brit. Col., June, 1882.

"Codfish. The only one caught. Length 42 inches between extremes; weight 20 pounds; 16 fathoms, sandy bottom."

38. **Anoplopoma fimbria** (Pall.) Gill.

31974 (156). Cardenas Bay, Brit. Col., June, 1882.
31975 (148). Safety Cove, Brit. Col., June 21, 1882.
32003 (184). Hassler Harbor, Alaska, Aug., 1882.

39. **Damalichthys argyrosomus** (Girard) Jor.& Gilb.

32018 (134). Departure Bay, Brit. Col., June, 1882.

"Bass." D. X, 21; A. III, 27; scales 7–67–17.

40. Ditrema laterale (Agassiz) Günther.

32019 (135). Departure Bay, Brit. Col., June 9, 1882.

Two specimens measuring 9 inches in length. One of them has the following characters: D. XI, 23; A. III, 29; scales 64 (in the other 65).

41. Micrometrus aggregatus Gibbons.

31970 (163). Port Simpson, Brit. Col., June, 1882.
31971 (193). Port Wrangel, Alaska, Oct., 1882.
31972 (132). Departure Bay, Brit. Col., June, 1882.

D. IX, 23; A. III, 25; scales 4–42–11.

This is the first Embiotocoid recorded from Alaska, so far as I know.

42. Salmo gairdneri Rich.

31989 (179). Mountain Lake near Mt. Tongass, Alaska, Aug., 1882.

43. Salmo purpuratus Pallas.

31990 (144). Johnston's Straits, Brit. Col., June, 1882.

44. Salvelinus malma (Walb.) Jor. & Gilb.

31979 (162). Port Simpson, Brit. Col., June, 1882.

45. Clupea mirabilis Girard.

31976 (192). Port Wrangel, Alaska, Oct., 1882.

A single individual 9 inches long.

31987 (168). Port Simpson, Brit. Col., July, 1882.
31988 (164). Port Simpson, Brit. Col., June, 1882.

46. Raia binoculata Girard.

31996 (150). Head of Safety Cove, Brit. Col., June, 1882.

Teeth in 40 rows in each jaw.

47. Squalus acanthias Linné.

31965 (145) ♂. Johnston's Straits, Brit. Col., June, 1882.

48. Somniosus microcephalus (Bloch) Gill.

31994 (183). Hassler Harbor, Alaska, August 10, 1882.

"Mackerel-shark, eight feet long, four feet girth; color black." Only the jaws were preserved.

NOTE.—The portion relating to collection of 1883 was written Dec. 10, 1883.

UNITED STATES NATIONAL MUSEUM,
Washington, June 22, 1883.

NOTES ON SOME FISHES COLLECTED BY JAMES G. SWAN IN WASHINGTON TERRITORY, INCLUDING A NEW SPECIES OF MACRURUS.

By TARLETON H. BEAN, M. D.,

Curator of the Department of Fishes in the United States National Museum.

The following notes on one of the recent collections received from Mr. Swan were nearly finished two months ago, but other duties interrupted their completion until now. Eleven species are mentioned, one of which is described as new to science. Another (*Delolepis virgatus*) was previously unknown so far south, and a third (*Brama raii*) was only recently brought to notice by Mr. Swan as an inhabitant of the coast of his territory and waters northward to Vancouver Island.

1. **Macrurus acrolepis**, new species.

The credit of discovering the first species of *Macrurus* known to occur on the Pacific coast of the United States is due to Mr. Swan, who is well aware that even a mutilated fish is not to be thrown away until its identity is fully established. The type of the present description was rescued by Mr. Swan from the stomach of a seal; its catalogue number is 32496; its length, 635 millimeters; a small portion of the tail is wanting, and the belly is almost wholly digested. There is no difficulty, however, in making out the characters which distinguish this species from all others known to me.

Description.—The shape of the body does not differ materially from that of *M. fabricii*. The height at origin of ventral is contained 7 times in extreme length; at origin of anal the body height is contained 9½ times in extreme length. There are about 7 or 8 rows of scales between the lateral line and the base of the first dorsal.

The length of the head is contained 4½ times in extreme length; its greatest height is little more than one-half its length, and is contained 8 times in total length. The greatest width of the head equals three-fourths of its greatest height. The width of the interorbital area equals one-half the length of the lower jaw, or three-fourths of the diameter of the orbit. The snout is moderately long and pointed, its length being about one-fourth that of the head. The length of the upper jaw is a little more than one-third of that of the head, and is contained 12½ times in extreme length. The length of the lower jaw equals the width of the head and twice the interorbital distance. The distance from the tip of the snout to the orbit equals the length of the orbit.

The first dorsal is constructed after the usual form, consisting of a minute first ray, followed by a long ray serrated along its anterior margin, and by additional rays which diminish in size rapidly. The distance of this dorsal from the snout equals 3 times the length of the upper jaw; the length of its base equals the length of the orbit. The second

ray is imperfect; the portion now present is about as long as the lower jaw.

The second dorsal is separated from the end of the first by a short space equal to only one-third the length of the snout and three-tenths the length of the base of first dorsal. Its first ray is quite short, only one-third as long as the longest, which is about one-third as long as the orbit.

The distance of the anal from the snout is contained $2\frac{1}{2}$ times in extreme length. That which is apparently the first ray is nearly as long as the snout, while the longest ray is nearly as long as the orbit.

The distance of the pectoral from the snout is slightly greater than the length of the head. The length of the pectoral is nearly one-half that of the head.

The distance of the ventral origin from the snout is contained 5 times in extreme length; the length of the ventral is about one-eighth of extreme length and equals twice that of the longest anal ray.

Radial formula: B. VI; 1st D. II, 11; 2d D. 111 +; A. 94 +; P. 20, V. 8.

Measurements.

[Current number of specimen, 32496. Locality, Port Townsend, Wash.]

	Millimeters.	100ths of length.
Extreme length	635	.....
Body:		
Height at ventrals	90	14.0
Height at anal origin	68	10.7
Head:		
Greatest length	139	22.0
Greatest height	80	12.6
Greatest width	61	9.6
Width of interorbital area	30	4.7
Length of snout	36	5.7
Length of operculum	29	4.6
Length of upper jaw	50	8.0
Length of lower jaw	61	9.6
Distance from snout to orbit	40	6.3
Diameter of orbit	40	6.3
Dorsal (spinous):		
Distance from snout	149	23.5
Length of base	40	6.3
Length of first spine	3	.....
Length of second spine	62+	.....
Soft:		
Distance from snout	201	31.7
Length of first ray	5	.....
Length of longest ray	14	.....
Anal:		
Distance from snout	250	40.0
Length of first ray (?)	35	5.5
Length of longest ray	39	6.0
Pectoral:		
Distance from snout	142	22.4
Length	66	10.4
Ventral:		
Distance from snout	127	20.0
Length	78	12.3
Branchiostegals	VI	.....
Dorsal	II, 11, 111+	.....
Anal	94+	.....
Pectoral	20	.....
Ventral	8	.....

2. **Gadus morrhua** Linné.

32494 (306). Port Townsend, Wash. Terr., 1882.

3. **Delolepis virgatus** Bean.

32547. Port Angelos, Wash. Terr., Feb. 8, 1883.

This example was picked up on the beach by Capt. Thomas Stratton. The tail is imperfect. Mr. Swan writes that the species is seen occasionally in the Victoria market. Port Angelos is the most southern locality for the species so far known, and this is the third example seen by us.

4. **Xiphister mucosus** (Grd.) Jordan.

32499 (308). Port Townsend, 1882.

A single large individual with the following radial formula: D. LXXIV; A. II, 48.

5. **Anarrhichthys ocellatus** Ayres.

32492 (305). Port Townsend, 1882.

6. **Hexagrammus superciliosus** (Pall.) Jor. & Gilb.

32500 (307). Port Townsend, 1882.

7. **Brama raii** (Bloch) Schn.

32493 (313). Port Townsend, 1882.

Mr. Swan has previously sent examples of this species from Washington Territory, and a paper based upon them and a specimen from Grand Banks was prepared for Volume IV of these Proceedings, but it was lost and not printed. The fish, according to Mr. Swan, is not uncommon off Vancouver Island, and is esteemed for its edible qualities.

8. **Hypomesus pretiosus** (Grd.) Gill.

32502. Port Townsend, 1882.

9. **Salmo purpuratus** Pallas.

32503. Port Townsend, 1882.

10. **Ptychochilus oregonensis** (Rich.) Girard.

32495 (311). Port Townsend, 1882.
32497 (310). Port Townsend, 1882.
32498 (309). Port Townsend, 1882.

The last has the following among other characters: D. iii, 8; A. iii, 7; scales 13—76—9.

11. **Chimæra colliei** Bennett.

32501 (302). Port Townsend, 1882.

UNITED STATES NATIONAL MUSEUM,
Washington, June 22, 1883.

NOTES ON FISHES OBSERVED AT THE HEAD OF CHESAPEAKE BAY IN THE SPRING OF 1882; AND UPON OTHER SPECIES OF THE SAME REGION.

By TARLETON H. BEAN, M. D.,

Curator of the Department of Fishes in the United States National Museum.

Early in June, 1882, the writer made a short visit to the station of the United States Fish Commission near Havre de Grace, Maryland, while the work of hatching eggs of the shad and other economic fishes was in progress. An immense seine was in use here by the Commission, and in it were captured most of the species which are the subjects of the present brief sketch. Information concerning species not seen by me, but perfectly well known to persons employed at the station, and taken in the seine previous to the time of my visit, or by some other means of capture, was furnished by one of the most experienced of the fishermen, and is here reproduced. The species marked by an asterisk were taken June 9 and 10 and examined after they reached the Museum, where they are now preserved. The common names given are in use at Havre de Grace.

1. **Achirus lineatus** (L.) Cuv. *Hogchoke.*
2. **Liostomus xanthurus** Lac. *Spot.*

The "spot" is said to occur only in very dry seasons.

3. **Lepomis auritus** (L.) Raf. *Sun-fish.*

Said to be present throughout the year.

4. ***Lepomis gibbosus** (L.) McKay. *Moccasin.*

Said to be present all the year.

5. **Micropterus dolomiei** Lac. *Black Bass.*
6. ***Perca americana** Schranck. *Yellow Perch; Ring Perch; Yellow Ned.*

In February yellow perch come into the creeks to spawn; the spawning season ends in March, when the fish go out to the flats. They remain in the vicinity all the year. The maximum weight here is about 2 pounds.

7. **Stizostedium vitreum** (Mitch.) Jor. & Copel'd. *Salmon Trout; Salmon.*

This species is highly esteemed in the Susquehanna. In the year 1862 or 1863 an individual weighing 8 pounds was sold at Bainbridge, Pennsylvania, for $2.

8. **Roccus saxatilis** (Bl. Schn.) Jor. & Gilb. *Rock.*

Rock-fish are said to be present from April to October, and to be most abundant in August and September on the flats in the celery grass. They are always plentiful, occurring in hundreds of thousands. They will live in "live cars," and a great many are so kept now. The species reaches a length of 4 feet and sometimes weighs 60 pounds.

9. * **Roccus americanus** (Gmel.) Jor. & Gilb. *White Perch.*

This fish is found from April to October, and is gravid in May and June. It is most plentiful in August and September.

10. **Pomatomus saltatrix** (L.) Gill. *Tailor.*

In very dry seasons small examples of this species are found here.

11. * **Tylosurus marinus** (Bl. Schn.) Jor. & Gilb. *Silver Gar.*

The silver gar makes its appearance in April. A gravid female was seen June 9.

12. * **Esox reticulatus** Le Sueur. *Pickerel.*

The species is said to remain throughout the year.

13. **Fundulus diaphanus** (Le S.) Agassiz.

14. **Brevoortia tyrannus** (Latrobe) Goode. *Bug-fish; Alewife.*

The species occurs here only in very dry seasons.

15. * **Clupea sapidissima** Wilson. *Shad.*

Shad measuring 4½ inches in length were seined June 10. It is said that quantities of the young about 4 inches long were seen in 1882 with the adults. The species appears in April and spawns on the flats. Shad have been caught plentifully in July; on the 3d of the month, one year, a man caught 44 in a gill-net in the swash just below the light-house. The shad has until recently been considered one of the weakest of fishes, and it was astonishing to see the treatment which it survived at Battery station; examples were taken from the seine, carried several steps to the pool in dip-nets, afterward seined out of the pool and pressed to see if the eggs were mature, and then returned to the pool, where they seemed to suffer no injury from the handling they had received. Sometimes, in taking shad from the gill-nets, lampreys, presumably the young of *Petromyzon marinus*, are hauled in fastened to the side of the fish.

16. **Clupea vernalis** Mitchill. *Branch Herring.*

The branch alewife first appears in February. It comes along shore and runs up all the small streams; it spawns in the creek, and departs in May. Plenty of young alewives 2½ to 3 inches long are seen in the creek in May. On the 10th of June a young branch alewife 4⅕ inches long was caught in the pool with a dip-net. Many of the young were seen in this inclosure.

17. * **Clupea æstivalis** Mitchill. *Glut Herring.*

These appear late in April, coming up through the deepest water. They spawn on the flats and go up the river, departing in June. A small number were caught in the large seine June 9.

18. * **Clupea mediocris** Mitchill. *Hickory Shad; Hickory Jack.*

This species comes early in March; it spawns in the creek, with the branch alewife, on gravel and rocks, well out of the tide. It leaves in May.

19. **Dorosoma cepedianum** (Le S.) Gill. *Mud Shad.*

The mud shad is a permanent resident, but it is said to be rare.

20. * **Carpiodes cyprinus** (Le S.) Agassiz. *Carp Sucker.*

This handsome sucker is considered a pretty good food-fish, and is often supposed to be the German carp (*Cyprinus carpio.*) It is comparatively abundant.

21. * **Catostomus teres** (Mitch.) Le S. *Black Mullet.*

This species arrives in February, spawns in creeks on gravel and rock bottom until March, and departs in May or June. It reaches 18 inches in length and 3 pounds in weight.

22. **Catostomus nigricans** Le Sueur. *Horn Mullet; Stone-roller.*
23. * **Moxostoma macrolepidotum** (Le S.) Jor. *Bay Mullet.*
24. * **Semotilus bullaris** (Raf.) Jor. *Fall-fish; Chub.*
25. **Notemigonus chrysoleucus** (Mitch.) Jor. *Roach.*

This is said to be present all the year.

26. * **Amiurus catus** (L.) Gill. *Cat.*
27. * **Amiurus albidus** (Le S.) Jor. *White Cat.*
28. * **Anguilla rostrata** (Le S.) De Kay. *Eel.*

The eel is a permanent resident. It is very destructive to spawning shad when these are caught in gill-nets, often completely disemboweling the fish before they can be taken from the nets.

A very effective trap for the capture of eels is in use at Havre de Grace. It consists of a keg or barrel with gunny sack at one or both ends. In one end there is a funnel made of a stocking leg, or anything of a similar form that may be at hand, and this is fastened to the opposite end by four cords. Auger-holes are bored in the staves. Bricks or stones are placed inside to sink the trap. A line is attached for the purpose of lowering the contrivance, and to this a buoy is fastened to mark the place of setting. A small trap-door is made in the top of the keg to put in bait and remove the eels. Fish entrails and heads or stale fish are used for bait.

29. **Lepidosteus osseus** (L.) Agassiz. *Green Gar.*

This gar comes in May and is not plentiful.

30. **Acipenser oxyrhynchus** Mitchill.

A sturgeon which I suppose to be this species is common at Havre de Grace, coming in June or July, running into creeks, and leaving in September.

31. **Petromyzon marinus** L. *Sea Lamprey; Shad Lamprey.*

The sea lamprey comes up into the river to spawn about the time shad appear. The young of this species is apparently the "shad lamprey" of the fishermen.

UNITED STATES NATIONAL MUSEUM,
Washington, June 21, 1883.

NOTES ON SOME JAPANESE BIRDS RELATED TO NORTH AMERICAN SPECIES.

By ROBERT RIDGWAY.

A very fine collection of Japanese birds, made for the United States National Museum by Mr. Pierre Louis Jouy, includes several species of more or less interest to students of North American ornithology, on account of their relationship to species belonging to our fauna. The very complete series of specimens enables me in each case to make a satisfactory comparison of the representative species.

1. **Anthus japonicus** Temm. & Schleg.

This is so much like our *A. ludovicianus* that their distinctness might almost be questioned. Comparing specimens No. 91468, ♀ ad., Yokahama, Japan (Jan. 3, 1883), and No. 90644, ♂ ad., New Orleans, La. (Dec. 13, 1882), the difference in coloration is microscopic—far less, in fact, than between many American examples from the same locality and of same date of capture. The only tangible difference is the darker feet of the Louisiana specimen, in which the toes are nearly black and the tarsi a very dark horn-color, while in the Japanese specimen the tarsi are clear horn-color, the toes slightly darker. In measurement they compare as follows:

	Wing.	Tail.	Culmen.	Tarsus.	Middle toe.	Hind claw.
No. 91468, ♀ ad., Japan	3.40	2.65	.42	.90	.60	.45
No. 90644, ♂ ad., Louisiana	3.40	2.65	.45	.85	.58	.45

The shades of coloration, as well as the pattern, are identical to the minutest degree, as is also the form of the bill and the proportions of the primaries. Moreover, three other specimens from New Orleans agree closely in coloration with No. 90644, and are much more like Japanese specimens than any others in a series of more than 50 North American examples, *except in the color of the legs and feet*, which in all North American specimens examined are nearly black, whereas those of Japanese examples are decidedly brown, or horn-colored.

In the National Museum series of *A. ludovicianus*, which embraces specimens from all parts of the continent, decided variations are noticeable, which, however, appear to be only in part correlative with difference of locality. Thus, most winter specimens from the Atlantic States (New England to District of Columbia, at least) are decidedly brown above and tawny buff beneath; the pectoral markings are broad and distinct, and sometimes, (though not usually) as dark colored (nearly black) as in *A. japonicus*. With these, Alaskan specimens obtained in August and September agree strictly. Many western specimens in winter plumage differ from Atlantic coast examples in paler lower parts

Vol. VI, No. 24. Washington, D. C. Dec. 29, 1883.

with narrower streaks on the breast; but the difference is not great, except in extreme cases, and by no means constant. As to summer specimens (*i. e.*, those in breeding dress), I am unable to distinguish differences between certain skins from Labrador, Colorado, and Alaska; but I have been able to examine a comparatively small number of specimens. Possibly a large series of specimens in breeding plumage from the proper localities (say Labrador, Alaska, the Rocky Mountains, and the Sierra Nevada) might exhibit differences upon which two or more geographical races could be based, but, with present facilities, I find the attempt to define differences sufficiently characteristic of region quite hopeless.

It is possible that in its breeding plumage, which I have not seen, *A. japonicus* may be quite distinct from *A. ludovicianus*, but the four winter specimens examined appear to differ only, so far as constant characters are concerned, in the paler color of the legs and feet.

In Proc. U. S. Nat. Mus., vol. 6, p. 95, I have with much doubt referred to this species six examples of an *Anthus* obtained by Dr. L. Stejneger on Bering and Copper Islands, Kamtschatka, but being not at all satisfied that they were thus correctly determined, I proposed the name *stejnegeri* in view of their probable distinctness. I now find that they do not *at all* resemble *A. japonicus*, but are much more like *A. arboreus*, *A. spraguei*, and other species having the upper parts conspicuously variegated. They seem to come near *A. gustavi* Swinh., which Mr. Seebohm says (Ibis, 1878, p. 342) occurs on Bering Island; but I cannot reconcile certain marked discrepancies between the only description which I have been able to consult (the original one by Swinhoe, in Proc. Zool. Soc. London, 1863, p. 90) and the characters presented by the series before me. I therefore incline to the opinion that while the species *may* be *A. gustavi*, it seems more likely to be different, and probably new.

2. Regulus japonicus.

This kinglet is a very near relative of *R. satrapa* and *R. cristatus*, but is sufficiently distinct. The principal differences from the former consist (1) in the absence of the black bar across the forehead, immediately in front of the colored crown-patch, the whole forehead being smoky gray, paler toward the bill; (2) narrower black stripes on side of crown; (3) absence of the whitish superciliary stripe, only the orbits being whitish; (4) absence of the dusky streak through the eye, and (5) much more olivaceous sides and flanks. In all these characters it agrees with *R. cristatus;* but from the latter it differs (as does also *R. satrapa*) in grayish nape and side of hinder head, and in some other minor features. Upon the whole it is most nearly related to the European species, though the coloration of the nape, back, and rump is precisely that of the

American bird. The white terminal spots of the tertials are much larger than in either of its allies, being, in fact, a very conspicuous and characteristic feature.

3. Anorthura fumigata (Temm.).

In the Ibis for January, 1875 (pp. 143, 144), the late Mr. Robert Swinhoe suggested the identity of this species with *A. alascensis* Baird, his reasons for this determination being given as follows:

"With reference to the birds of Hakodadi, a suspicion crossed my mind that possibly I had made a mistake in identifying the Wren from Hakodadi with the *Troglodytes fumigatus*, Temm., of Nagasaki, and that while the latter might be the Wren of Southern Japan, the northern bird might be distinct, and identical with *T. alascensis*, Baird. To clear the doubt I sent a skin to Dr. G. Schlegel, and begged him to get me in exchange from his father, of the Leyden Museum, a specimen of genuine *T. fumigatus*. His reply I have unfortunately mislaid; but it was to the purport that the museum had no duplicate to spare, but that my bird, which he and his father had carefully compared with the type specimen, was identically the same. We must therefore conclude that *T. alascensis*, Baird, is a synonym of *T. fumigatus*, Temm."

As many authors have adopted without question Mr. Swinhoe's erroneous determination, I give below average measurements of an equal number of adult males of the two species, and also, for sake of comparison, those of the same number of specimens of *A. troglodytes*, *A. hyemalis*, and *A. hyemalis pacifica*.

	Wing.	Tail.	Culmen.	Bill from nostril.	Gonys.	Tarsus.	Middle toe.	Number of specimens measured.
A. alascensis	2.05	1.39	.59	.45	.36	.74	.57	Six adult males.
A. fumigata	2.07	1.49	.41	.29	.27	.70	.49	Do.
A. hyemalis pacifica	1.84	1.25	.41	.30	.26	.66	.49	Do.
A. hyemalis	1.91	1.35	.41	.30	.25	.69	.46	Do.
A. troglodytes	1.97	1.36	.43	.31	.29	.68	.49	Do.

In coloration, *A. fumigata* comes much nearer the Pacific coast race of *A. hyemalis* (*A. hyemalis pacifica*) than any of the other species with which it has been compared; but the lower parts are much less tawny (though equally dark), and with the dark bars and lighter specks extending further forward. The sides of the neck are also quite conspicuously streaked with whitish or pale brownish.

4. Certhia familiaris.

A specimen from Sapporo is snowy white beneath; the ground-color above is nearly hidden by the unusually broad pale longitudinal markings. Another from Tate-Yama is very tawny above, and hardly distinguishable from some German examples. The bill, however, is unusually small and but little curved, the culmen measuring only .45 of an inch.

5. Ampelis phœnicopterum.

This lovely bird is much more nearly related to *A. garrulus* than to *A. cedrorum*, having, like the former, a very long crest, black throat, cinnamon-rufous forehead and cheeks, and rufous crissum; the latter, however, is stained, more or less, with blood-red. It also agrees more nearly with *A. garrulus* in size, and like that species has the outer web (sometimes inner web also) of the primaries tipped with white. The tip of the tail, however, instead of being yellow, as in the two American species, is of an exquisite rose-red color, and the greater wing-coverts are, for their exposed portion, dark purplish red. What is most remarkable, however, is that neither sex possesses the wax-like appendages to the shafts of the secondaries that are so characteristic of both *A. garrulus* and *A. cedrorum*, although in occasional specimens (as No. 91596, ♂ ad.) they are developed to a very minute degree on the two innermost feathers. In perfect plumage, the outer webs of the secondaries are tipped with a narrow crescentic bar of pure rose-red; the outer webs of the primaries are tipped with clear rose-pink (or "pink madder"), and the inner webs tipped, transversely, with white. In four out of five specimens sent, however, there is no white at all on the inner webs of the primaries, while the outer web of each has a longitudinal bar of pure white. In a male and a female the red spots are wanting on the secondaries, which are concolored throughout; but in two others, both males, the secondaries have the red spots, very small in one, well developed in the other.

6. Leucosticte brunneonucha.

The series includes ten specimens, all in winter plumage, and with yellow bills. Of one, the sex is not determined; but of the others, three are males and six are females. Of the latter, two are quite as brightly colored as the brightest male, while the third is very nearly equal in richness of coloration to the dullest of the three males. The other three females, however, are very much duller colored, and are probably young birds in their first winter.

7. Ægiothus linaria.

There are three specimens, two of them from Sapporo, being cage birds, the third a wild bird from Tate-Yama. They are decidedly referable to *linaria* as distinguished (by me) from *exilipes*, but look a little different from North American specimens, and may, on comparison, prove to belong to a distinct race.

8. Loxia albiventris.

This Crossbill is more like *L. curvirostra*, of Europe, than the American species, or race (*L. americana*).

ON A COLLECTION OF BIRDS FROM NICARAGUA.

By CHARLES C. NUTTING.

Edited by R. Ridgway.*

In the early part of 1883, the writer visited Nicaragua for the purpose of making a collection of birds for the Smithsonian Institution.

In order to procure as large a representation of Nicaragua birds as possible, four regions were visited. The first of these, San Juan del Sur, is situated on the Pacific coast; the second, Sucuyá, on the west shore of Lake Nicaragua; the third, Ometepe,† is an island in the lake; and the fourth, Los Sábalos, is on the river San Juan del Norte, about 30 miles from the east shore of the lake.

It will be seen that these four stations form a chain across the greater part of Nicaragua, reaching from west to east. In order to present more forcibly the difference in the avifaunæ of these regions, induced by the marked difference in the physical characteristics of the four stations, a separate list of species will be given for each region visited.

I.—San Juan del Sur.

On the 4th of January, 1883, the writer landed in San Juan del Sur, on the Pacific coast of Nicaragua, a few miles north of the Costa Rican boundary.

The port is situated in a beautiful harbor surrounded by low mountains, and is said to be the healthiest port on the Pacific coast of Central America. A small river empties into the bay, and the banks of this stream are the favorite resort of numerous species of water birds.

A dense growth of small, thorny trees situated between the river and the town of San Juan affords a good field for collecting many kinds of small birds, while in a dense marshy forest beyond the river many larger and more wary species are to be found.

The avifauna is not nearly so rich here as in the other localities which I visited, the water birds being the only ones found in unusual abundance. Several species of this class were observed, but not secured, the writer deeming it best to devote his time to families more likely to produce novelties.

All species marked with an asterisk are for the first time recorded from Nicaragua.

---

*The editor of this paper is responsible for the nomenclature adopted and all critical remarks.

†I have adopted this spelling of the word *Ometepe*, from the fact that it is the one used by the natives of the country. I have in my possession an official paper in which the word occurs several times and is spelled in this way. I notice also that Captain J. M. Dow, of Panama, and Dr. Earl Flint, of Rivas, both use the same spelling. While the original Indian name was doubtless *Ometepec*, I prefer to spell it in accordance with the usage of the country.—C. N.

FAM. SYLVIIDÆ.

***1. Polioptila albiloris** Salv.

Common, especially in the thicket south of the river. These diminutive birds are extremely familiar and fearless, approaching within two or three feet of the collector, without seeming to notice his presence, in their busy search for the various insects which constitute their food. In their manner of climbing about trees and bushes they remind one of our Black-capped Titmouse (*Parus atricapillus*).

Five specimens secured.

FAM. TROGLODYTIDÆ.

***2. Campylorhynchus capistratus** (Less.).

Common, but not so abundant as I found it on the Gulf of Nicoya, Costa Rica. Found generally in the more open country, especially along the "piñuella" hedges, in which they often construct their nests.

Song very voluble, both male and female often joining in a lively duet, which fills the air with melody. Two specimens.

3. Thryophilus pleurostictus Scl.

Abundant. Four specimens.

FAM. MNIOTILTIDÆ.

4. Siurus nævius (Bodd.).

Apparently not common. The single specimen secured was shot in the deep, swampy forest across the river. A diligent search on several occasions failed to discover other specimens.

5. Dendrœca æstiva (Gm.).

Common. For some reason, inexplicable to me, this warbler was exceedingly shy and difficult to approach, much more so than in Costa Rica, or the other localities visited in Nicaragua. Two specimens secured.

***6. Myiodioctes pusillus** (Wils.).

Seen, but not secured.

FAM. TANAGRIDÆ.

***7. Euphonia humilis** (Cab.).

Not common. The single specimen secured was shot out of the top of a large tree. Song exceedingly voluble and melodious, perhaps the most pleasing that I heard in this region.

FAM. FRINGILLIDÆ.

***8. Cyanospiza cyanea** (Linn.).

One specimen shot in open field up the river.

FAM. CORVIDÆ.

*9. **Calocitta formosa** (Sw.).

This elegant jay is quite common around San Juan. I noticed that the natives here, as in Costa Rica, ascribe to it the power of speaking, although I never saw one which had acquired that accomplishment.

FAM. TYRANNIDÆ.

10. **Myiozetetes texensis** (Giraud).

Abundant. Apparently gregarious, being almost always found in small flocks. A lively and interesting bird, sure to attract the attention of the collector by its bright color, activity, and peculiar cries. The latter I can compare to nothing but the cry of a little chicken in distress. It is found both in the woods and more open country, seeming to prefer isolated trees in the vicinity of water.

Three specimens secured.

*11. **Rhynchocyclus cinereiceps** Scl.

Iris white. Only one specimen.

*12. **Pitangus derbianus** Kaup.

Abundant. One of the most conspicuous birds of the region. It is most frequently seen on the margin of the water perching on some low branch awaiting its insect prey. Its cry is extremely harsh and monotonous, proving an annoyance to one listening for the notes of other birds. It is, moreover, of a decidedly quarrelsome disposition, even more so than the rest of its family. Two specimens.

13. **Megarhynchus pitangua** (Linn.).

Not so common as the last. Habits much the same, but it does not show such a marked preference for the vicinity of the water.

Two specimens secured.

*14. **Myiarchus nuttingi** Ridgw.

Common, but rather solitary in its habits. It is usually seen sitting quietly on a low limb in the thick woods. It is quieter than many of its kind.

Three specimens.

15. **Tyrannus melancholicus satrapa** (Licht.).

Apparently rare. One specimen secured.

16. **Milvulus forficatus** (Gm.).

This graceful Flycatcher is more abundant in the vicinity of San Juan than in any other region in which I have collected.

It is gregarious in its habits, being usually found in flocks of from six to ten. It is much more silent than is usual among the Flycatchers, and more timid and difficult to approach than any that I can think of.

I had ample opportunity to observe this bird, and was struck with

the fact that it never seemed to associate with any other member of its family, although all the other common species seemed to mix indiscriminately. This latter fact may, however, be due to a community of interests.

The peculiar scissor-like motion of the long tail-feathers, from which this bird derives its vernacular name, is always seen during a flight of any length.

All the specimens obtained were shot from trees bordering the shore of the bay, and they do not seem to penetrate into the forest to any great extent. Five specimens.

17. Milvulus tyrannus (Linn.).

One day while collecting up the river a bird flew over which I took to be this species, principally from the fact that there was no motion of the tail-feathers.

Fam. DENDROCOLAPTIDÆ.

***18. Dendrornis eburneirostris** (Less.).

One specimen shot near the river. Noticed a marked absence of birds of this family, although the woods in many places seemed well suited to their pursuits.

Fam. TROCHILIDÆ.

***19. Chlorostilbon osberti** Gould.

One specimen.

Fam. CAPRIMULGIDÆ.

***20. Antrostomus carolinensis** (Gm.).

Common. Two specimens secured.

***21. Nyctidromus albicollis** (Gm.).

Seen, but not secured.

Fam. PICIDÆ.

***22. Centurus aurifrons hoffmanni** (Cab.).

Abundant. The common Woodpecker of the region.

23. Ceryle torquata (Linn.).

Common, especially in the swampy country across the river. Noisy and active, like all its American relatives. One specimen.

***24. Ceryle alcyon** (Linn.).

Not common. The only one that I saw was shot in the swamp mentioned above.

25. Ceryle americana cabanisi (Tschudi).

Common along the river.

FAM. TROGONIDÆ.

26. Trogon melanocephalus Gould.

Probably common, although I secured only one specimen. The difference of avifaunæ of regions only a few miles apart is a fact continually forcing itself upon the notice of the explorer in the tropics. San Juan del Sur, for example, is not more than 40 or 50 miles from "La Palma," Costa Rica, and they are both on the Pacific coast. At the latter point I found three species of *Trogon* very abundant, *i. e.*, *T. melanocephalus*, *T. massena*, and *T. caligatus*. At San Juan del Sur a diligent search failed to discover a single specimen of the last two species, and only one of the first was taken.

Iris brown. Bare orbital region sky-blue.

FAM. CUCULIDÆ.

27. Crotophaga sulcirostris Sw.

Abundant. Delights in hedge-rows and feeds largely upon the worst enemy of the collector, the "garrapata" or tick. One specimen.

***28. Diplopterus nævius** (Gm.).

One specimen shot out of a hedge in an open field. Appears to be terrestrial in its habits.

29. Piaya cayana mehleri (Bp.).

Common. The loud mournful cry of this bird is frequently heard around San Juan.

It is graceful in its movements and is conspicuous both for its cry and the peculiar and constant flirting of its long tail. Strictly arboreal. Iris deep red. Skin exceedingly tender. Three specimens.

***30. Coccyzus seniculus** (Lath.).

Not rare. Is less shy than any other member of its family with which I am acquainted. Arboreal. Never heard its note.

FAM. PSITTACIDÆ.

***31. Ara macao** (Linn.).

Common, but not nearly so abundant as in other parts of the country. None secured.

***32. Chrysotis albifrons** (Sparm.).

Abundant. Iris very pale yellow. Bill lemon yellow.

This beautiful parrot is much sought after by the natives on account of its bright plumage, and has been made quite shy by continual persecution. So much is this the case that I found it difficult, at first, to secure specimens, and finally succeeded by a method almost inexcusable from its cruelty.

Having succeeded in wounding one, I took advantage of its piercing screams of distress, not dispatching it at once, as humanity dictated,

but allowing it to continue its cries and attract its numerous companions. They came fairly swarming around the spot, and I secured all I needed.

*33. **Chrysotis auripalliata** (Less.).

Saw a pair of these domesticated at San Juan del Sur. They are remarkably good talkers.

*34. **Brotogerys tovi** (Gm.).

Exceedingly abundant.

FAM. FALCONIDÆ.

*35. **Pandion haliætus carolinensis** (Gm.).

Seen, but not secured.

*36. **Asturina plagiata** (Schl.).

Common. Quite fearless. Has a loud, clear cry.

Two specimens. Cere and legs yellow. Iris brown.

*37. **Rupornis ruficauda** (Scl. & Salv.).

Abundant.

*38. **Buteo borealis costaricensis** Ridgw.

I was informed by an English resident that this bird is not uncommon in the region.

39. **Urubitinga anthracina** (Nitzsch.).

Common and fearless.

*40. **Micraster melanoleucus** (Vieill.).

Rather rare. One specimen. Iris brown, legs lemon yellow.

41. **Tinnunculus sparverius** (Linn.).

Common.

*42. **Harpagus fasciatus** Lawr.

Not common. The single specimen secured was brought to me alive by the natives. I put him in a cage with the intention of trying to tame him, but he absolutely refused to eat or drink, and savagely attacked my hand whenever I tried to feed him. The color of the iris is different from any other that I know of and lends a peculiar beauty to the bird in life. Iris brownish pink. Cere and eyelids greenish. Legs brownish.

*43. **Polyborus cheriway** (Jacq.).

Very abundant. Associates with the buzzards and is fully as offensive to the smell. In encounters between the buzzards and the Caracara the latter is generally worsted.

None secured.

FAM. CATHARTIDÆ.

*44. **Carthartes aura** (Linn.).

Extremely abundant.

*45. **Catharista atrata** (Bartr.).

Not so common as the last.

*46. **Gyparchus papa** (Linn.).

Rare. Only one seen.

FAM. COLUMBIDÆ.

*47. **Melopelia leucoptera** (Linn.).

Common. The note of this bird is uncommonly musical and varied for one of its family. Circumorbital region sky-blue. Three specimens.

*48. **Chamæpelia passerina** (Linn.).

Abundant.

*49. **Engyptila verreauxi** (Bp.).

Iris yellow. Circumorbital region sky-blue.

FAM. TACHYPETIDÆ.

*50. **Tachypetes aquila** (Linn.).

Native name "*Tijereta.*" One of the specimens shot ejected twenty-three small fishes from its pouch. These birds seem to be almost always on the wing and are exceedingly graceful in their evolutions, moving their long outer rectrices exactly in the same manner as *Milvulus forficatus*. They never appear to dive for their food, but skillfully pick up the fish from near the surface of the water, or pounce upon those left ashore by the receding waves. Two specimens. Iris brown. Gular pouch light red.

FAM. PELECANIDÆ.

*51. **Pelecanus fuscus** Linn.

Abundant. Always to be seen diving for fish along the sea-coast.

FAM. SULARIDÆ.

*52. **Sula leucogastra** (Bodd.).

Abundant along the entire Pacific coast.

FAM. PHALACROCORACIDÆ.

*53. **Phalacrocorax brasilianus** (Gm.).

Common. One specimen.

FAM. PLOTIDÆ.

*54. **Plotus anhinga** Linn.

Not common. Only one seen.

FAM. ARDEIDÆ.

*55. **Ardea herodias** Linn.

Common. One specimen.

*56. **Herodias egretta** (Gmel.).

Common. None secured.

57. **Garzetta candidissima** (Gmel.).

Common. Iris yellow. Tarsi black in front, greenish yellow behind. One specimen.

*58. **Hydranassa tricolor ludoviciana** (Wils.).

Abundant. One specimen.

59. **Florida cærulea** (Linn.).

Abundant. Iris light yellow. Tarsi light green in young specimens. Two specimens.

60. **Butorides virescens** (Linn.).

Abundant. One specimen.

61. **Nycticorax violaceus** (Linn.).

Common. Young specimen. Iris orange and legs greenish.

62. **Tigrisoma cabanisi** Heine.

Not common. Seen, but not secured.

FAM. CICONIIDÆ.

*63. **Tantalus loculator** (Linn.).

Rather rare. One specimen.

FAM. IBIDIDÆ.

*64. **Eudocimus albus** (Linn.).

Common. One specimen. Iris light blue. Bill red.

FAM. PLATALEIDÆ.

*65. **Ajaja rosea** Reich.

Common along the muddy banks of the river. Moves its bill from side to side while feeding, like a duck.

Two specimens secured.

FAM. CHARADRIIDÆ.

*66. **Oxyechus vociferus** (Linn.).

Common. One specimen.

FAM. SCOLOPACIDÆ.

*67. **Totanus melanoleucus** (Gmel.) Vieill.

Common. One specimen.

*68. **Tringoides macularius** (Linn.).

Abundant. One specimen.

FAM. ANATIDÆ.

*69. **Dendrocycna autumnalis** (Linn.).

Saw a flock of these birds flying over, and knew them by their peculiar cry, which is different from that of any other bird with which I am acquainted.

*70. **Querquedula discors** (Linn.).

Examined one which a native had killed. Said to be abundant at certain seasons.

II.—SUCUYÁ.

The hacienda "Sucuyá," is about 22 miles northwest of San Juan del Sur, and about 4 miles north of Rivas, a town of considerable size. This hacienda is quite extensive and stretches for several miles along the west shore of Lake Nicaragua, or rather along a great lagoon which is an arm of the lake. The surrounding country is low, and to the east and north exceedingly thickly wooded and swampy. This shore of the lake might fitly be called the garden spot of Nicaragua, and, perhaps, of Central America. It supports an exceedingly dense population, and agriculture, together with stock-raising, is the main, almost the sole, support of the people.

The avifauna of this region is much richer than in San Juan del Sur. Families not at all, or very meagerly, represented in San Juan, become quite abundant at Sucuyá. As the most prominent examples of this fact, I would mention the *Tanagridæ*, *Cotingidæ*, *Dendrocolaptidæ*, *Formicariidæ*, and *Momotidæ*. The forest in Sucuyá is denser and more tropical in appearance than at San Juan, and insect life is much more varied and troublesome to the collector. Scorpions, ants, mosquitoes, and "garapatas" are unrelaxing in their efforts to turn the attention of the naturalist from other and pleasanter pursuits.

"Sucuyá" is owned by a company consisting of Sr. Don JUAQUIN ZAVALA, ex-President of Nicaragua, Sr. Don ADAN CARDENAS, President of Nicaragua, and Sr. Don NARCISO FERIA, prefect of Rivas. I am thus particular in mentioning their names, from the fact that it is to them I owe a pleasant home in an excellent collecting ground for a month. I am also under great obligation to Sr. Don ALEJANDRO CHAMBERLAIN, "administrador" of Sucuyá, a gentleman who spared no effort to make my stay at the hacienda both pleasant and profitable. Science has no truer well-wishers than the gentlemen above mentioned.

FAM. TURDIDÆ.

1. **Merula grayi** (Bp.).

Common. Three specimens.

FAM. SYLVIIDÆ.

*2. **Polioptila bilineata** (Bp.).

Abundant. Seems to replace *P. albiloris* in this region, at least I did

not see any of the latter. Found principally on the edge of a large clearing near the swamp.

Their nests were apparently built among the branches of fallen trees, and they appeared to be living in much the same manner as wrens.

FAM. TROGLODYTIDÆ.

***3. Campylorhynchus capistratus** (Less.).

Common. This species seems to be confined to the west side of the lake. At least I failed to find a single specimen either on the island Ometepe or the river San Juan del Norte. I consider it one of the most pleasing songsters I have met in Central America. A more jolly, rollicking melody would be hard to imagine, and is in perfect keeping with the familiar, almost audacious, manner of the bird.

Three specimens.

[NOTE.—The differences between Costa Rican specimens of this species, and others from Guatemala and Honduras, alluded to on page 389 of volume 5 of these Proceedings, are well borne out in five specimens (two from San Juan del Sur and three from Sucuyá) collected by Mr. Nutting, the Nicaraguan bird agreeing with those from Costa Rica in the more variegated back, which in two examples from the above-named countries (No. 30654, Savana Grande, Guatemala, O. Salvin, and No. 42588, Spanish Honduras, Ilges and Sauter) have the entire back an unbroken rusty chestnut color. The two specimens from San Juan del Sur are decidedly larger than the three from Sucuyá, and have light buff rather than white lower parts; but these differences may not be constant in a larger series.—R. R.]

4. Thryophilus rufalbus (Lafr.).

Common, more especially in thick forests. This bird presents a marked contrast to the preceding, both in habits and song. Thus, while *C. capistratus* is conspicuous, fearless, and self-asserting, and prefers the hedge-rows and edges of the woods, *T. rufalbus* is retiring, timid, and modest in disposition, and is almost invariably found in the deep forests. While the note of the former is loud, voluble, and merry, that of the latter is low, hesitating, and sad, but wonderfully sweet and expressive.

***5. Thryophilus pleurostictus** Scl.

Abundant. Found principally in the very densest forest. Song sweet, but less demonstrative than that of *Campylorhynchus capistratus*.

Three specimens.

FAM. MNIOTILTIDÆ.

6. Siurus auricapillus (Linn.).

Not common. Contrary to its usual choice of locality, the specimen obtained was shot in a dense swampy forest where *S. nævius* is abundant.

*7. **Siurus nævius** (Bodd.).

Abundant in the swampy forest above mentioned. Lives mostly on, or near, the ground. Three specimens.

8. **Dendrœca æstiva** (Gm.).

Abundant. Not nearly so shy as in San Juan del Sur. One specimen.

*9. **Geothlypis trichas** (Linn.).

Abundant, especially along edges of marsh. Three specimens.

Fam. CŒREBIDÆ.

10. **Cœreba cyanea** (Linn.).

Rare. Only one specimen secured. Legs red.

Fam. TANAGRIDÆ.

*11. **Phœnicothraupis rubicoides** (Lafr.).

Abundant. Habits very similar to those of the *Dendrocolaptidæ*. Gregarious. Usually silent.

Curiously enough, although a Tanager, this bird is usually seen clinging to the tree-trunks, like the *Dendrocolaptidæ*, and hops about the ground like the *Formicariidæ*. Indeed it seemed to be living almost entirely upon ants. There were many places where the ground was actually swarming with these insects, and there *P. rubicoides* would congregate in large numbers, either picking up the ants from the ground, or climbing about the trunks of trees in pursuit of the same insect.

This latter fact is so peculiar for a bird of this family that I would not state it, had I not had ample opportunity to convince myself that it was not an accidental or rare position for these birds to take, but that it was *habitual* with them while feeding, a fact proven to me by scores of instances.

Found always in the thickest parts of the forest. Four specimens.

12. **Eucometis spodocephala** (Bp.).

Very abundant. Like the last, it was found feeding largely upon ants, and lived near the ground. But it did not cling to the tree-trunks like *P. rubicoides*, and was generally found near the edges of the forest. I do not remember its note distinctly, but think it was little more than a chirp. Gregarious. Nine specimens.

*13. **Saltator atriceps** Less.

Common. Gregarious. Note loud and rather harsh. Usually found along the edge of the forest. Does not seem to feed largely upon ants, and spends very little of its time upon the ground. Six specimens.

*14. **Saltator grandis** Lafr.

Common. Habits similar to preceding. Three specimens.

FAM. FRINGILLIDÆ.

15. Volatinia jacarina (Linn.).

Common. Lives in open fields. Nests on or near the ground. Gregarious.

16. Cyanospiza cyanea (Linn.).

Common. Habits similar to preceding species. Four specimens.

***17. Cyanospiza ciris** (Linn.).

Abundant. It is a curious fact that, while I saw hundreds of these birds every time I went out collecting, and had ample opportunity to observe them at close quarters, I did not see a single male *C. ciris* at Sucuyá. There were many large flocks composed, apparently, entirely of females. I would certainly have seen the gaudily-colored males, had there been any considerable number in the region. Six specimens.

***18. Hæmophila ruficauda** (Bp.).

Rather common along the hedges. Three specimens.

FAM. ICTERIDÆ.

19. Ostinops montezumæ (Less.).

Abundant. Iris brown. Basal half of bill black, terminal half red. Wattles white. Bare spot under eyes light blue.

The "*Oropendola*," as this bird is called by the natives, is one of the most familiar and conspicuous birds of the region.

It feeds largely on plantains, bananas, mangoes, and other cultivated fruits, thus making itself obnoxious to the inhabitants.

The "*Oropendola*" lives in colonies which, in this region, are generally located in cocoanut palms. The nests are long and purse-like, and are generally composed of fine grasses, the entrance being near the top. There are often fifty or more of these nests in a single tree. The birds have a curious way of getting into the nests and shaking them violently, producing a rattling noise. It would be almost impossible to describe the note of this bird, as it is so totally different from any other with which I am acquainted. I have sometimes heard a similar noise produced by a cart-wheel that needed greasing, but a cart-wheel makes so many different noises that the comparison is almost a useless one. Seven specimens.

I am told that forty or fifty years ago there were no *Oropendolas* in this region.

20. Cassicus prevosti (Less.).

Not common. Seems to be gregarious. Three specimens. Iris light yellow. Bill light yellowish green.

21. Quiscalus macrurus (Swain.)

Iris white. Common.

FAM. CORVIDÆ.

*22. **Calocitta formosa** (Sw.).

Very abundant and audacious. Four specimens.

FAM. TYRANNIDÆ.

*23. **Platyrhynchus cancrominus** Scl. et Salv.

One specimen shot in the deep woods. Wren-like in its movements.

24. **Todirostrum cinereum** (Linn.).

Not very common; habits like the last. Two specimens.

25. **Myiozetetes granadensis** Lawr.

Abundant. One specimen.

26. **Myiozetetes texensis** (Giraud).

Two specimens.

*27. **Rhynchocyclus cinereiceps** Scl.

Abundant. Iris white. A rather silent bird, fond of the deep woods. Five specimens.

*28. **Pitangus derbianus** (Kaup).

Common. Noisy. One specimen.

*29. **Empidonax pusillus** (Sw.).

Rare. One specimen.

*30. **Empidonax flaviventris** Baird.

Apparently rare. One specimen.

31. **Myiarchus lawrencei nigricapillus** (Cab.).

Rather common. Two specimens.

32. **Tyrannus melancholicus satrapa** (Cab.).

Common. Two specimens.

33. **Milvulus forficatus** (Gm.).

Abundant. Associated more with others of its family than it did in San Juan del Sur. Three specimens secured.

FAM. PIPRIDÆ.

34. **Chiroxiphia linearis** Bp.

Abundant. Spanish name "Tolédo" (pronounced "Tolay'do") on account of a fancied likeness to their whistling note. The natives also call this bird "Bailador" or "Dancer." It was not until I had been in the region for some time that I understood why it was given this name. One day, while hunting through the dense forest, the profound silence was suddenly broken by the regularly repeated note of "El Bailador," and softly making my way toward the spot whence the sound proceeded, I witnessed one of the most remarkable performances it has ever been my lot to see.

Vol. VI, No. 25. Washington, D. C. April 9, 1884.

Upon a bare twig which overhung the trail at a distance of about four feet from the ground, two male "Bailadors" were engaged in a "song and dance" act that simply astounded me. The two birds were about a foot and a half apart, and were alternately jumping about two feet into the air and alighting exactly upon the spot whence they jumped. The time was as regular as clock-work, one bird jumping up the instant the other alighted, each bird accompanying himself to the tune of "*to-lé-do—to-lé-do—to-lé-do*," sounding the syllable "*to*" as he crouched to spring, "*lé*" while in the air, and "*do*" as he alighted.

This performance was kept up without intermission for more than a minute, when the birds suddenly discovered that they had an audience, and made off.

With a little practice one can learn to call the birds very readily. I could have secured a very large number in this manner, had I been so disposed.

Twelve specimens.

FAM. COTINGIDÆ.

*35. **Pachyrhamphus cinereiventris** Scl.

Not common. Iris brown. Found in deep woods. Silent. Two specimens.

*36. **Attila citreopygia** (Bp.).

Rather common. Iris pink. Two specimens.

FAM. DENDROCOLAPTIDÆ.

*37. **Sittasomus olivaceus** (Max.).

Abundant. Silent. Found in deep woods. Two specimens.

*38. **Dendrocincla homochroa** Scl.

Abundant. All birds of this family that I have collected habitually climb like woodpeckers, but do not seem to tap with their bills. Three specimens.

39. **Dendrocolaptes sancti-thomæ** (Lafr.).

Rare. Only one specimen shot, and that was engaged in eating ants in company with a flock of *Eucometis spodocephala*.

*40. **Dendrornis eburneirostris** (Less.).

Abundant. Habits like preceding. Three specimens.

FAM. FORMICARIIDÆ.

41. **Thamnophilus doliatus** (Linn.).

Abundant. Iris white. Habits wren-like. This bird has a chattering note almost exactly like that of *Trogon melanocephalus*, which has often misled me. It also has a scolding note precisely like many of the wrens. The female seems to be shyer and more retiring in her manner than the male. The nest is often placed in a brush heap, or, rather, in

a dense mass of fallen timber. Although many are often found in the same locality, I do not believe that this bird is truly gregarious. Six specimens.

*42. Cercomacra tyrannina Scl.

Rare. Only one specimen shot in the dense forest.

43. Rhamphocænus rufiventris Bp.

Common. Prefers dense woods. Climbs around trees like our nuthatches. Three specimens.

FAM. TROCHILIDÆ.

44. Chrysuronia eliciæ (Bourc. & Muls.)?

Rare. Only one specimen.

[NOTE.—An adult male of this species from Sucuyá, is so decidedly different from another from Guatemala (No. 33655, Masagua, Pacific coast; O. SALVIN) that should the differences observable prove constant the birds from the two countries would undoubtedly prove distinct races. The differences may be tabulated as follows:

Guatemalan specimen: Above dark grass-green, becoming bronzy only on upper tail-coverts, which are bronze-green, tinged with coppery bronze; tail bright bronze-green, with more or less of a green cast in all lights. Throat and jugulum rich violet, changing to bluish, but never to greenish. Wing 2.05, tail 1.25, culmen .72.

Nicaraguan specimen: Above bronzy green, the whole back and wing-coverts changing to golden bronze, in certain lights; upper tail-coverts rich copper-bronze, not changing to greenish; tail very brilliant golden bronze, with only a very faint green tinge, in certain lights. Throat and jugulum rich violet-blue, changing to greenish. Wing 2, tail 1.15, culmen .70.

An adult female from Costa Rica (No. 91308, A. R. ENDRES) is exactly like the Nicaraguan specimen, except that the throat and jugulum are without the blue.

The locality of the type specimen of *C. eliciæ* is unfortunately unknown, and upon referring to the original description (in Ann. Soc. Agr. Lyons, vol. ix, 1846, p. 314), I am unable to decide which form it agrees with best. I therefore hesitate to formally institute a new race by giving a name to the one not already provided.—R. R.]

*45. Amazilia cinnamomea (Less).

Common. Two specimens shot in dense forest.

FAM. CAPRIMULGIDÆ.

*46. Nyctidromus albicollis (Gm.).

Exceedingly abundant. On bright moonlight nights these birds keep up their weird cry from night until morning.

The day is spent on the ground in the dense forests, where they seem to prefer the almost impenetrable growth of cane which, in some instances, is very extensive. Six specimens.

FAM. PICIDÆ.

*47. **Campephilus guatemalensis** Hartl.

Common. Two specimens.

*48. **Hylotomus scapularis** (Vig.).

Apparently rare. Iris white. One specimen.

*49. **Centurus aurifrons hoffmanni** (Cab.).

The common Woodpecker of the region, called "Carpintero" (Carpenter) by the natives. Two specimens.

FAM. MOMOTIDÆ.

50. **Momotus lessoni** (Less.).

Rare in this region. One specimen.

51. **Eumomota superciliaris** (Sw.).

Common. Native names "Dragon" and "Guarda Barranca." Usually seen sitting silently upon some branch not more than 10 or 12 feet from the ground, where it seems to be lost in profound meditation. Upon being disturbed it flies only a short distance, alights again and indicates its uneasiness only by repeated jerks of its peculiar spatulate tail-feathers.

Although I have observed many of these birds, I never heard it emit a sound of any kind. Four specimens.

FAM. ALCEDINIDÆ.

52. **Ceryle torquata** (Linn.).

Many specimens seen.

53. **Ceryle americana cabanisi** (Tsch.)

Seen, but not secured.

FAM. TROGONIDÆ.

54. **Trogon melanocephalus** (Gould).

Abundant. Prefers the edge of the forest. Circumorbital region sky blue. Eight specimens.

55. **Trogon** ——?

I saw one specimen of a small species of *Trogon*, possibly *T. caligatus*.

FAM. CUCULIDÆ.

56. **Crotophaga sulcirostris** Sw.

Abundant. Native name "Tinta." Gregarious. Two specimens.

*57. **Diplopterus nævius** Gm.

Uncommon. One specimen.

58. Piaya cayana mehleri (Bp.).

Abundant. Two specimens.

***59. Morococcyx erythropygia** (Less.).

Abundant. Native name "Bobo" or "Stupid." Bare space around eye, blue. Lives on, or near, the ground in open country. Nests in the grass. The natives claim that it "strikes the hours" by singing a song at the end of each hour. Three specimens.

***60. Coccyzus seniculus** (Lath.).

Not common. Only one specimen.

FAM. RHAMPHASTIDÆ.

61. Pteroglossus torquatus (Gm.).

Not common. Iris clear yellow. Bill yellow, red, and black. The single specimen secured was shot out of a solitary tree in an open field.

The natives apply the name "Féliz" (happy) to all toucans, though I fail to see the application.

FAM. PSITTACIDÆ.

***62. Ara macao** (Linn.).

Abundant. Iris very pale yellow, nearly white. One specimen.

***63. Chrysotis albifrons** (Sparrm.).

Very abundant and noisy. Native name "Chocoyo."

64. Chrysotis autumnalis (Linn.).

I saw several parrots which I refer, with some doubt, to this species.

FAM. STRIGIDÆ.

***65. Pulsatrix torquata** (Daud.).

Not common. Saw two of this species, and killed one, but could not save the skin. Iris yellow.

FAM. FALCONIDÆ.

***66. Asturina plagiata** (Schl.).

Rather common. Iris brown. Cere and legs yellow. Hunts in pairs. Four specimens.

67. Urubitinga zonura (Shaw).

Not common. One specimen.

***68. Rupornis ruficauda** (Scl. & Salv.).

Very abundant. Two specimens.

69. Tinnunculus sparverius (Linn.).

Abundant in open country. One specimen.

*** 70. Harpagus fasciatus** (Lawr.).

Rare. The specimen obtained was shot out of a tree in a sparsely wooded tract of land.

71. Herpetotheres cachinnans (Vieill.).

Not common. Iris brown. Cere yellow. One specimen shot in swampy country.

72. Polyborus cheriway (Jacq.).

Abundant.

FAM. COLUMBIDÆ.

*** 73. Zenaidura carolinensis** (Linn.).

Common. Two specimens.

*** 74. Engyptila verreauxi** (Bp.).

Abundant. One specimen.

*** 75. Melopelia leucoptera** (L.).

Common. None secured.

*** 76. Scardafella inca** (Less.).

Rare. One specimen.

*** 77. Chamæpelia passerina** (L.).

Very abundant. Two specimens.

FAM. ARAMIDÆ.

*** 78. Aramus pictus** (Bartr.).

Abundant. Native name "Coréo." The flesh of this bird is excellent eating.

Note loud, harsh, and unpleasant. One specimen secured.

The water birds in this region are fully as abundant as in San Juan del Sur, but I only secured those species which I could not identify at sight or those which were specially interesting. All those mentioned in this list were positively identified.

FAM. CICONIIDÆ.

*** 79. Mycteria americana** Linn.

Not very common; three specimens seen. They are well known to the natives by their Costa Rican name "Galan sin ventura."

FAM. IBIDIDÆ.

***80. Eudocimus albus** (Linn.).

Common. One specimen.

FAM. ŒDICNEMIDÆ.

***81. Œdicnemis bistriatus** (Wagl.).

Abundant. Iris yellow; legs greenish yellow. This curious bird is gregarious, and lives in the pastures surrounding the haciendas, where it makes itself useful in eating the various insects that annoy and in-

jure the cattle. On this account it is protected by the inhabitants of the country, and it was only as a particular favor that I could persuade "Don Alejandro" to allow me to shoot a couple of specimens. The bird is exactly like a gigantic plover in appearance and motions, and is frequently seen in a state of domestication in the little flower gardens which occupy the inner courts of the houses of the aristocracy, and here it works for its living by keeping the garden clear of insects, worms, reptiles, &c.

Contrary to its appearance, this bird is remarkably difficult to skin, especially around the breast and shoulders, where the skin is so firmly attached that a constant use of the knife is necessary.

Native name "Caraván," in imitation of its note. Two specimens.

Fam. PARRIDÆ.

82. Parra gymnostoma Wagl.

Abundant. Called by the natives "Oropendolita" or "Little Oropendola," on account of a resemblance in color. One specimen.

I was told by several parties in this region that there is another species which differs from *P. gymnostoma* in having the frontal leaf bright *blue* instead of *yellow*. It is described as being about the same size and color as *P. gymnostoma*.

Fam. ANATIDÆ.

***83. Dendrocygna autumnalis** (Linn.).

Abundant. No specimens.

***84. Caraina moschata** (Linn.).

Abundant. Not so shy as they seemed to be in Costa Rica. No specimens.

***85. Querquedula discors** (Linn.).

Common. No specimens.

***86. Dafila acuta** (Linn.).

Common. No specimens.

Fam. PERDICIDÆ.

***87. Oxtyx leyandi** Moore?

Seen, but with insufficient distinctness for certain identification.

Fam. CHARADRIIDÆ.

***88. Oxyechus vociferus** (Linn.).

Abundant.

III.—The Island of Ometépe.

The island of Ometépe is situated in Lake Nicaragua, about ten miles from the western shore, opposite the cities of Rivas and San Jorge.

As its name signifies, its most prominent features are two bold and

lofty volcanic peaks, which cover the greater portion of the island. One of these peaks, "El Volcan de Ometépe," although there is no history of its being in eruption previous to my visit to the island, commenced to show signs of activity while I was there. At the request of the alcalde of Moyogalpa, I made the ascent to the crater, but the absence of water rendering it impossible to remain on the peak, I was unable to accomplish anything in the way of collecting.

The island is an extremely fertile one, and is inhabited mostly by a race of the pure Indian or Aztec stock. Agriculture is the principal occupation of the people.

The main products are cacao, plantains, mangoes, watermelons, marañons, cocoanuts, corn, beans, and in fact all the fruits, natural or introduced, which thrive in the tropics, besides valuable woods of various kinds.

The climate is simply delightful, a fact to which General Walker testified by constituting Ometépe the sanitarium of his expedition.

The avifauna of the island is not nearly so rich and varied as on the mainland. Numerically, birds are abundant, but the number of species is more restricted than elsewhere in the republic. Water birds are abundant, especially in a large lagoon about a mile north of the village of Moyogalpa. The Parrots, Kingfishers, and Jays are the most numerous and conspicuous birds on the island.

An apparently entire absence of the *Turdidæ*, *Tanagridæ*, *Dendrocolaptidæ*, *Formicariidæ*, and *Rhamphastidæ*, families well represented in other portions of Nicaragua, is noticeable.

The deer is, so far as I have been able to learn, the only large mammal found on the island.

Fam. TROGLODYTIDÆ.

* 1. **Thryophilus pleurostictus** Scl.

Abundant. This Wren seems to replace *C. capistratus* of the adjacent mainland. After a diligent search I was unable to find any other species of Wren on the island.

Song very melodious, clear, and sprightly, although not so loud as that of many of its family. Six specimens.

Fam. MNIOTILTIDÆ.

* 2. **Parula inornata** Baird.

Common. Habits similar to our Warblers. Two specimens.

3. **Dendrœca æstiva** (Gm.).

The most abundant species of its family on the island. Nine specimens.

* 4. **Dendrœca maculosa** (Gm.).

Apparently rare. One specimen.

* 5. **Euthlypis lacrymosa** (Bp.).

Common, although by an unfortunate combination of circumstances I was able to secure only one specimen. This Warbler is gregarious, and spends most of its time on or near the ground in the densest portions of the forest, curiously resembling, in its feeding habits, *Eucometis spodocephala*. The only note I ever heard it utter was a kind of chirp.

FAM. VIREONIDÆ.

* 6. **Lanivireo flavifrons** (Vieill.).

Not common. Two specimens.

FAM. HIRUNDINIDÆ.

* 7. **Tachycineta albilinea** (Lawr.).

Abundant. Generally seen along the shore of the lake, sitting on the dead trees overhanging the water, whence it makes short excursions after insects in much the manner of Flycatchers. Two specimens.

FAM. FRINGILLIDÆ.

8. **Guiraca cærulea** (Linn.).

Not very common. The single specimen secured was shot from a hedge-row in the open country.

9. **Cyanospiza cyanea** (Linn.).

Apparently rare. One specimen.

*10. **Cyanospiza ciris** (Linn.).

Common. Gregarious. The preponderance of females, although not so striking as in *Sucuyá*, is still quite noticeable. Four specimens.

FAM. ICTERIDÆ.

11. **Icterus galbula** (Linn.).

Apparently rare. One specimen.

12. **Icterus spurius** (Linn.).

Rare. One specimen.

18. **Quiscalus macrurus** Sw.

Abundant, especially along the shore. Gregarious. Iris yellow (?). The long tail of this bird seems to cause it considerable inconvenience in a strong wind, and it frequently has to shape its course to accommodate this unruly member. Six specimens.

FAM. CORVIDÆ.

* 14. **Calocitta formosa** (Sw.).

Extremely abundant. Probably the most familiar and conspicuous bird on the island, where it renders itself quite obnoxious to the natives by its incessant depredations among the oranges and mangoes.

It is one of the most audacious and impudent of all the members of its impudent family with which I am acquainted.

It has an exceedingly jaunty, dandified appearance, and, in flight, has the habit of slowly sailing over any suspicious object, especially a human being, uttering a curious, querulous note, and opening and shutting its long graceful tail-feathers in a manner very similar to the Scissor-Tail Flycatcher (*Milvulus forficatus*).

The vocal powers of this Jay are indeed remarkable. I am not acquainted with any other bird which has so many distinct cries and notes, not even excepting the Parrots in their native state.

I am almost certain that it imitates other birds, and it has often lured me into useless excursions into the dense, thorny forest, only to find that the supposed rarity was nothing but a rascally Jay, after all. The natives call it "Urráca," and insist that it can be taught to talk like a Parrot. Four specimens.

Fam. TYRANNIDÆ.

***15. Elainea frantzii** Lawr.

Rather common. Found generally in dense woods. Three specimens.

16. Megarhynchus pitangua (Linn.).

Not very common. Has an unusually harsh, disagreeable note. Two specimens.

17. Myiarchus lawrencei nigricapillus (Cab.).

Abundant. Seems to prefer sparsely wooded country. Five specimens.

***18. Myiarchus nuttingi** Ridgw.

Very abundant. Six specimens.

19. Tyrannus melancholicus satrapa (Caban.).

Apparently rare. One specimen shot on the shore of the lake.

Fam. COTINGIDÆ.

20. Tityra personata Jard. et Selb.

Common. Gregarious. It is generally seen in the tops of the tallest trees, where it usually congregates in small flocks of six or eight. Its manner of obtaining its food is much like that of the Flycatchers, being insectivorus and catching its prey on the wing. Its note, although perfectly familiar to me, is entirely beyond my powers of description, being neither a whistle or cry.

Iris brown. Bill and bare orbital region dark red. Eight specimens.

***21. Hydrostomus "latirostris"** (Scl.).

Not common. Habits similar to last. Did not hear the note. Three specimens.

[Note.—Two adult males from Ometépe agree pretty well with Mr. Sclater's *Pachyrhamphus latirostris* (cf. P. Z. S., 1857, p 74), one of them having no trace whatever of rose-color on the throat, which, like the other lower parts, is uniform ash-gray. The

other, however, has a very faint rose tinge on the jugulum. Both have the pileum glossy slate-black, and the back slaty plumbeous. The single female collected has the back clear ochraceous-rufous and the pileum slate-color, and, except that the pileum is not quite so dark colored, agrees exactly with the La Palma (Costa Rica) specimen referred by me (see these Proceedings, vol. 5, p. 307), with doubt, to *H. homochrous* Scl. (P. Z. S., 1859, p. 142).

In examining the National Museum collection of these birds, which includes 16 adult males and 13 females and young males (which seem to be much alike), I note great variations in plumage, affecting chiefly the color of the back, which varies from clear plumbeous-gray, in marked contrast with the glossy black of the pileum, to glossy black; and that of the lower parts, which varies from deep slaty gray, through intermediate shades, to nearly pure white. These variations do not seem to coincide with any definite geographical areas, however, and, remarkable though they appear, I cannot, from this material, formulate characters by which two or more races may be trenchantly defined.—R. R.]

Fam. TROCHILIDÆ.

***22. Trochilus colubris** (Linn.).

Apparently not common. One specimen.

***23. Chlorostilbon osberti** Gould.

Abundant. Especially along an isolated row of trees by the roadside, about one mile northeast of Moyogalpa. Two specimens.

Fam. CAPRIMULGIDÆ.

***24. Nyctidromus albicollis** (Gm.).

Abundant. Two specimens.

Fam. PICIDÆ.

***25. Centurus aurifrons hoffmanni** (Cab.).

Abundant. Three specimens.

Fam. ALCEDINIDÆ.

26. Ceryle torquata (Linn.).

Abundant. Four specimens

***27. Ceryle alcyon** (Linn.).

Common. No specimens.

29. Ceryle amazona (Lath.).

Abundant. This elegant Kingfisher is by far the most numerous or of any on the island.

The natives call it "El Pescador" ("The Fisherman"), although this name is also applied to the other members of the family. Seven specimens.

30. Ceryle americana cabanisi (Tschudi).

Common. No specimens.

FAM. TROGONIDÆ.

32. Trogon melanocephalus Gould.

Common. I saw no other Trogon on the island. One specimen.

FAM. CUCULIDÆ.

33. Crotophaga sulcirostris Sw.

Abundant. One specimen.

FAM. PSITTACIDÆ.

***34. Ara macao** (Linn.).

Common. No specimens.

***35. Conurus holochlorus** Scl.

Extremely abundant. The number of these parrots to be seen around the lagoon is something almost incredible, and the air seems to fairly tremble with their cries. I do not remember seeing any other species of birds swarming in such numbers. Eight specimens.

***36. Brotogerys tovi** (Gm.).

Abundant. Four specimens.

***37. Chrysotis guatemalæ** Scl.

Common, more especially around the base of the volcano, where the dense, unbroken forests afford a quiet retreat. It is considered a good talker, and is frequently seen tame in the huts of the natives. Iris yellow. Cere black. Five specimens.

FAM. FALCONIDÆ.

***38. Rupornis ruficauda** (Scl. et Salv.).

Abundant. Three specimens.

***39. Rosthramus sociabilis** (Vieill.).

Not common. Found on the lake shore, where it is usually seen hunting for the small univalve shell which constitutes a large proportion of its food. Iris dark red. One specimen.

***40. Busarellus nigricollis** (Lath.).

Rather common. Seems to prefer low, swampy country. Very easily approached.

One specimen. Iris brown.

FAM. COLUMBIDÆ.

***41. Columba erythrina** Licht.

Common. Especially along lake shore.

Three specimens. Iris yellow. Bill dull red. Legs and feet clearer red.

***42. Melopelia leucoptera** (L.).

Not common. One specimen

*43. **Chamæpelia passerina** (L.).

Very abundant along the sandy beach. Two specimens.

*44. **Engyptila verreauxi** (Bp.).

Abundant. Iris yellow. Orbital region sky blue. Legs red. Two specimens.

FAM. ARDEIDÆ.

45. **Garzetta candidissima** (Gmel.).

Abundant. Two specimens.

46. **Butorides virescens** (Linn.).

Abundant. One specimen.

FAM. CANCROMIDÆ.

*47. **Cancroma cochlearia** Linn.

A bird was described to me by the natives as being common on the island during certain seasons, which I can refer to no other species.

FAM. PARRIDÆ.

48. **Parra gymnostoma** Wagl.

Abundant. The downy young of this bird has, I believe, never been described, and, although I saw a great number, I was unable to secure a single specimen. The parent birds seemed to take particular care to keep their broods out on the lily pads in the swamp, quite a distance from firm ground, where it was impossible to go either on foot or in a boat. I knew it to be useless to shoot them under these circumstances, as they would have been devoured by alligators. I can only say that the downy young of *P. gymnostoma* is of a grayish color, and looks, at a distance, like a little chicken with remarkably long legs.

Iris brown. Basal portion of frontal leaf bright red, and the rest bright yellow. Wing-spur yellow. Seven specimens.

FAM. ARAMIDÆ.

*49. **Aramus pictus** (Bartr.).

Abundant. Good eating. One specimen.

FAM. PHALACROCORACIDÆ.

*50. **Phalacrocorax mexicanus** (Brandt).

Abundant. Three specimens.

IV.—LOS SÁBALOS.

"Los Sábalos" is the name of a hacienda owned by a German-American gentleman, and is situated about thirty miles from Lake Nicaragua, on the river San Juan Del Norte.

Mr. F. W. A. Lange, the courteous owner of "Los Sábalos," and a

man of unusual intelligence and enterprise, is conducting what might be called an experimental farm, and has made a veritable oasis in the gloomy wilds of the dense, virgin forests which cover the entire basin of the San Juan Del Norte.

"Los Sábalos" contains about the only cultivated ground between San Carlos, on the lake, and "El Castillo," on the river, a distance of about forty miles. It is situated at the junction of the San Juan and a large tributary stream. Here Mr. Lange is raising rubber, cacao, plantains, bananas, oranges, cocoanuts, bread fruit, "marañons," corn, beans, and potatoes, besides a number of other vegetables, the names of which I do not know.

I am thus particular in speaking of his work because the experiment of raising all these fruits, many of them entirely new to the region, is a matter of practical and scientific interest to the world at large.

Here Mr. Lange, a veritable "Robinson Crusoe," is absolutely "monarch of all he surveys," and almost entirely independent of the outside world, for, besides the fruits and vegetables mentioned, the river yields an abundance of excellent fish (principally shad) and lobsters, and the surrounding forests afford plenty of meat in the shape of deer, peccary, gnatousa, curassow, tinamou, and many other edible mammals and birds. There are also hot springs on his land to which medicinal virtues are ascribed.

As a field for the ornithologist "Los Sábalos" surpasses by far any region the writer has ever visited. Three weeks' collecting at this point resulted in the securing of *six* entirely new and distinct species of birds. That is, one new species for every thirty skins secured! Such a collecting ground should certainly receive more attention.

The most prominent characteristics of the avifauna of this region may be briefly summarized as follows; but it must be borne in mind that a more thorough exploration may modify or even reverse conclusions, which are little more than speculations based upon imperfect explorations.

The *Troglodytidæ*, *Tanagridæ*, *Fringillidæ*, *Dendrocolaptidæ*, *Formicariidæ*, and *Trochilidæ* are the families most abundantly represented. The *Sylviidæ*, *Icteridæ*, *Tyrannidæ*, *Cotingidæ*, *Momotidæ*, *Alcedinidæ*, *Rhamphastidæ*, *Psittacidæ*, *Falconidæ*, *Columbidæ*, and *Cracidæ* are ordinarily well represented. The remaining families are poorly represented, and in some cases seem to be entirely wanting.

On account of my time in this region being very limited, little attention was given to the various water birds, which seem to be abundant.

FAM. TURDIDÆ.

1. Merula grayi (Bp.).

Common. One specimen.

FAM. TROGLODYTIDÆ.

***2. Cyphorinus lawrencii** Scl.

Apparently not common. While taking an evening walk through the thick forest I was suddenly startled by a number of these Wrens which I had disturbed in their nest, for it was quite dusk. They seemed to be on every side of me, uttering a shrill chirping protest against my intrusion. I could barely discern their dusky forms as they flitted through the bushes. I fired almost at random, and succeeded in securing one specimen.

They seemed to be gregarious, as I do not think there were less than ten or a dozen roosting together when I disturbed them.

***3. Henicorhina leucosticta** (Cab.).

Rare. Only one specimen secured in the dense forest.

***4. Thryophilus zeledoni** Lawr.

Apparently rare. The single specimen secured was shot from a little bush in open ground.

***5. Thryophilus castaneus** (Lawr.).

Rather common; especially in the deep woods. Two specimens.

6. Thryophilus thoracicus Salvin.

Apparently rare. One specimen killed at the edge of the forest.

FAM. MNIOTILTIDÆ.

7. Geothlypis trichas (Linn.).

Abundant. Three specimens.

***8. Geothlypis bairdi** Nutting, sp. nov.

Adult ♂: Entire forehead and fore part of crown, lores, orbits, auriculars, and malar region deep black. Upper parts rather dark but bright olive-green (much as in *G. velata*), including whole of occiput and hinder portion of crown; lower parts bright yellow (much as in *G. velata*), the entire sides, however, yellowish olive-green. Bill brownish black, the gonys sometimes paler; legs and feet horn-brown. Wing, 2.30–2.35; tail, 2–2.10; culmen, .60; depth of bill at base, .20; tarsus, .85; middle toe, .60.

Adult ♀: Similar to the ♂, but lacking the black on the head, which is olive-green, the forehead and superciliaries distinctly, but not abruptly, more yellowish. Wing, 2.20; tail, 1.90; culmen, .55; depth of bill, .18; tarsus, .85; middle toe, .55.

Hab. Los Sábalos Nicaragua (NUTTING).

This species is apparently not very closely related to any other hitherto described. In coloration it most resembles *G. speciosa*, with which it agrees in the extent and distribution of the black mask; but this in *G. speciosa* is not clearly defined on the crown, as in the present species, but fades insensibly into the olive of the occiput. *G. speciosa*

is likewise much browner above, of a much duller yellow beneath, and the proportions are totally different. While *G. speciosa* has much the slenderest bill of any member of the genus (with the possible exception of *G. semiflava*, which I have not seen), *G. bairdi* has this member much larger than any of its congeners except *G. rostrata*. In the latter the bill is longer but less robust, a striking character of the present species consisting in the distinctly curved culmen, with the basal portion prominently ridged and unusually elevated, thus calling strongly to mind a characteristic feature of *Helonœa swainsoni* Aud.

The species is based on three examples, two males and a female, as follows:

No. 91150, ♂ ad., Los Sábalos, Nicaragua, May 15, 1883; C. C. Nutting.
No. 91151, ♂ ad., Los Sábalos, Nicaragua, May 2, 1883; C. C. Nutting.
No. 91152, ♀ ad., Los Sábalos, Nicaragua, May 14, 1883; C. C. Nutting.

NOTE.—Since the above was written specimens have been sent to Mr. Osbert Salvin, who writes thus respecting them: "*Geothlypis bairdi* is very close indeed to *G. semiflava* of Ecuador. The colors are slightly more olivaceous." It is not likely, however, that they are identical, geographical considerations decidedly favoring their distinctness.—R. R.

Common. The three specimens secured were all shot in an open, marshy piece of ground near the river. This ground is covered with water in the rainy season, and a luxuriant growth of tall, coarse grass and weeds in the dry season. It is in these weeds that *G. bairdi* prefers to make its home. Song, loud, clear, and sprightly. Habits very similar to those of *G. trichas*.

***9. Basileuterus leucopygius** Scl. & Salv.

Common. Always seen near running water, where they flit along the bed of the stream in the same manner as do our *Cinclidæ*. One specimen.

FAM. CŒREBIDÆ.

10. Cœreba cyanea (Linn.).

Apparently not common. Only one specimen secured.

FAM. TANAGRIDÆ.

11. Tanagra cana diaconus (Less.).

Apparently not very common. One specimen seen but not secured.

12. Ramphocœlus passerinii Bp.

Very abundant. This richly colored Tanager is one of the most conspicuous birds at "Los Sábalos." It seems to be gregarious, and evidently prefers marshy ground. There are large tracts of land near the river which are covered by a luxuriant growth of a large-leafed plant (probably a *Caladium*), and *R. passerinii* can almost always be seen apparently feeding on the species of insects peculiar to these plants.

I have never heard these birds utter any note other than a short chirp.

Thirteen specimens. Iris brown. Bill light blue.

13. Phœnicothraupis fuscicauda Cab.

Abundant. Apparently gregarious. Prefers the most impenetrable recesses of the dense forest.

It is a very silent and rather timid bird as a rule, and the females seemed to greatly exceed the males in numbers, both at Sucuyá and Los Sábalos. Seven specimens secured.

14. Phlogothraupis sanguinolenta (Less.).

Although I only secured one specimen of this bird, Mr. Lange informed me that it is abundant at Los Sábalos at certain times, when it feeds largely on bananas. Iris red.

14. Arremon aurantiirostris Lafr.

Rather common. Lives on or near the ground in tangled thickets and brush heaps. Three specimens.

***15. Saltator atriceps** Less.

Abundant. Habits the same as at Sucuyá. One specimen.

16. Saltator magnoides (Lafr.).

Apparently rare. One specimen.

***17. Saltator grandis** Lafr.

Abundant. Four specimens.

18. Pitylus poliogaster Du Bus.

Abundant. Gregarious. Generally seen in small flocks of eight or ten in the edge of the forest. Their note is a short whistle rather than chirp. It does not seem so timid as many other Tanagers, being more noisy and sociable. Three specimens.

FAM. FRINGILLIDÆ.

19. Guiraca concreta (Du Bus).

Abundant. These birds seemed to be especially partial to the vicinity of Mr. Lange's plantain patch, and also a patch of high marsh grass, with occasional brush heaps. Five specimens.

***20. Oryzoborus funereus** Scl.?*

Apparently common. Habits similar to preceding species. Two specimens.

---

* *Adult* ♀ (No. 91193, Los Sábalos, Nicaragua, May 16, 1883, C. C. Nutting): Above uniform dark umber-brown; beneath deep cinnamon-brown, shaded with umber anteriorly. Axillars and entire lining of wing white. Bill uniform brownish black; feet dusky. Wing, 2.10; tail, 2.05; culmen, .55; depth of bill at base, .50; width of mandible, .42; tarsus, .70; middle toe, .48.

Young ♀ (No. 91194, same locality and collector, April 20, 1883): Similar to the adult, but rather darker above, with the tertials and wing-coverts very indistinctly edged with dull rusty; fulvous of anterior lower parts more obscured by brown, and white of under wing-coverts tinged with ochreous-buff. Bill blackish, but gonys varied with yellowish white. Wing, 2.20; tail, 2.10; culmen, .52; depth of bill, .50; width of mandible, .42; tarsus, .65; middle toe, .47.

These specimens are referred with some doubt to *O. funereus*, the female of which

Vol. VI, No. 26. Washington, D. C. April 11, 1884.

21. Oryzoborus nuttingi sp. nov.

Rather common. Found in the patch of marsh grass referred to under *G. concreta*. They seem to be rather stupid birds, as they remained on a little bush on which they were perched until I had loaded and fired three times, securing three specimens.

Apparently gregarious. Four specimens.

22. Spermophlia corvina Scl.

Common. Prefers open ground covered with grass and weeds. Four specimens.

23. Embernagra striaticeps (Lafr.).

Abundant. Found in brush heaps at the edge of the forest. Six specimens.

FAM. ICTERIDÆ.

24. Ostinops montezumæ (Less.).

Not nearly so abundant as on the other side of the lake. One specimen.

---

appears to be hitherto undescribed. As they agree very well, however, with the males of that species in dimensions and white under wing-coverts, I have thought best to so name them provisionally, or until males may be obtained.—R. R.

NOTE.—Mr. Salvin, to whom these specimens have been sent for comparison, says that they "are probably the female of *O. æthiops* of Western Ecuador, but the male is wanted to make certain. Anyhow, the two birds are closely allied." Should the species prove to be distinct from *O. æthiops*, as will most likely be the case, I propose for it the name of *O. salvini*.—R. R.

* ORYZOBORUS NUTTINGI Ridgw. MS.

SP. CH.—*Adult* ♂: Uniform black, without white on underside of wing or base of primaries; under surface of primaries dull dark grayish, paler (but not inclining to white) basally. Bill pale brown. Wing, 2.70–2.75; tail, 2.70–2.75; culmen, .70; depth of bill at base, .65; width of mandible, .55; tarsus, .70–.75; middle toe, .55. (Types 91195 and 91196, Los Sábalos, Nicaragua, C. C. NUTTING.)

Adult ♀: Above uniform dark umber-brown; beneath uniform, rather dark, cinnamon-brown; lining of wings rather light fulvous. Bill brownish black; "iris brown," feet dusky. Wing, 2.70; tail, 2.70; culmen, .70; depth of bill at base, .60; tarsus, .70; middle toe, .65. (Type 91198, Los Sábalos, Nicaragua, May 10, 1883; C. C. NUTTING.)

Young ♀: Similar to the adult ♀, but tertials bordered with light rusty, and lower parts much less reddish. Bill uniform black. Wing, 2.60; tail, 2.60; culmen, .65; depth of bill at base, .60; tarsus, .70; middle toe, .60. (Type 91,197, same locality, etc., as the above specimens.)

This fine *Oryzoborus* is very distinct not only from *O. funereus*, but also from all other species of which I have been able to find descriptions. The adult male is characterized by its entirely black plumage, with no white whatever on wings or tail, the inner webs of the primaries grayish black, becoming paler grayish basally. It is one of the largest species of the genus, and has the bill remarkably robust, the base of the culmen much arched, and dividing the frontal feathers for .25 of an inch.—R. R.

25. **Cassicus prevosti** (Less.).

Abundant. Apparently gregarious. Iris yellow. Bill light green. Four specimens.

26. **Icterus mesomelas** Wagl.

Common. Feeds largely on plantains. An exceedingly brilliant songster, and altogether one of the most attractive birds in the region. Three specimens.

27. **Quiscalus macrurus** (Sw.)

Apparently not common. One specimen.

FAM. TYRANNIDÆ.

28. **Copurus leuconotus** Lafr.

Rather common. Breeding. This pretty little Flycatcher builds its nest in a hole in a dry tree, after the manner of woodpeckers—perhaps the abandoned nests of the latter.

Note weak and rather "squeaky." Three specimens.

29. **Todirostrum cinereum** (Linn.).

Common. Habits somewhat wren-like.

* 30. **Todirostrum schistaceiceps** Scl.

Common. Habits similar to preceding species. Two specimens.

* 31. **Mionectes oleagineus** Cab.

One specimen, shot in deep woods.

32. **Myiozetetes granadensis** Lawr.

Abundant. There is a very remarkable fact in connection with this bird at Los Sābales.

Fully half the specimens seen, as well as those secured, have the tail feathers *cut off* at a point about one-half the distance from insertion to terminus. This is true of adult specimens. This is so noticeable that I thought the birds thus mutilated to be a wonderful new species of "bob-tailed" Flycatcher.

So far as I have been able to learn, this is a fact unique in ornithology.

In all other respects the specimens with the tails cut are exactly like those whose tails are entire. Four specimens.

* 32. **Myiozetetes texensis** (Giraud).

[NOTE.—The foregoing remarks refer to this species also, which had been overlooked until after the list had been written.—R. R.]

* 33. **Muscivora mexicana** Scl.

Not very common. Found always, so far as my experience goes, near running water. Two specimens.

34. **Myiobius sulphureipygius** Scl.

Apparently rare. One specimen.

***35. Myiobius capitalis** Salvin.*

Apparently rare; one specimen, shot in a dense forest.

***37. Contopus depressirostris** Ridgway, sp. nov.†

Not common. Two specimens shot in scrub timber and edge of forest.

FAM. PIPRIDÆ.

***38. Chiromachæris candæi** (Parz.).

Rare. Only one specimen secured in dense forest on the other side of the tributary river which enters the San Juan del Norte at Los Sábalos.

---

*This species seems to me to be quite as properly referable to *Mitrephanes* (*cf.* COUES, Bull. Nutt. Orn. Club, January, 1882, p. 55) as to *Myiobius*. In fact, I would prefer placing it in that genus. It is true that it differs from the type species (*M. phæocercus*) in certain details of structure, but at the same time it differs more from the typical *Myiobii*. Of the two hitherto known species of the genus, *M. phæocercus* and *M. aurantiiventris*, it approaches most nearly to the latter, both in form and coloration. It differs from both, however, in the less developed crest and in the more rounded wing, the primaries exceeding the secondaries by only about .40 of an inch, instead of .60–.70, as in the above-named species. The bill is also longer in proportion to its breadth, but is otherwise of similar form; and the tail, instead of being decidedly emarginate, is distinctly, though slightly, rounded.

Its coloration at once suggests that of *M. aurantiiventris*, the back, breast, and crissum being almost exactly the same color; but *M. aurantiiventris* has the throat fulvous, instead of white; the pileum dark olive, instead of slate, and the posterior lower parts much duller yellow, and also much less abruptly of this color; besides, the white supraloral line and orbital ring of *M. capitalis* are totally absent.

Mr. Nutting's specimen, which appears to be the second on record, may be described as follows:

SP. CH.—*Adult* ♂ (No. 91,233, Los Sábalos, Nicaragua, May 4, 1883; C. C. Nutting). Entire pileum uniform brownish slate, this color extending over the auriculars, which, however, have whitish shaft-streaks; lores slate-gray, bordered above by a distinct white line extending back to and involving the eyelids; back, scapulars, and rump bright greenish-olive, in abrupt and very marked contrast with the slate-color of the head; lesser wing-coverts olive, but rest of wings dusky, the middle and greater coverts tipped with bright ochraceous (forming two distinct bands), and tertials broadly edged with the same; other remiges narrowly and rather indistinctly edged with light brownish. Tail light grayish-brown, the feathers edged with a more fulvous tint. Chin and throat dull white; jugulum and breast bright ochraceous, tinged with olive laterally; abdomen and sides bright primrose yellow; crissum buff; axillars and lining of wing yellowish ochraceous. Inner webs of remiges broadly edged with buffy ochraceous. Bill black, the base of the mandible pale colored; feet dark brownish.

Wing, 2.40; tail, 2.30; culmen, .50; width of bill at base, .30; tarsus, .60; middle toe, .32.

†CONTOPUS DEPRESSIROSTRIS Ridgw. MS.

SP. CH.—*Adult:* Above grayish hair-brown, the pileum decidedly darker; middle and greater wing-coverts tipped with pale brownish-gray, forming two rather distinct bands across the wing; tertials edged with the same. Tail slightly but decidedly emarginate, uniform grayish hair-brown. Chin and throat grayish-white; sides of head, jugulum, breast, and sides, brownish-gray; middle of belly, anal region, and

FAM. COTINGIDÆ.

***39. Lathria unirufa** (Scl.).

Rare. One specimen.

40. Attila sclateri Lawr.

Rare. One specimen.

FAM. DENDROCOLAPTIDÆ.

41. Synallaxis pudica Scl.

Abundant. This bird has habits remarkably similar to those of wrens. It is generally found hopping about in thick bushes or brush heaps.

Its song also is like that of a wren, being loud, varied, and melodious, while the other members of its family, so far as I have been able to ascertain, are very silent birds, having no musical notes at all.

Iris reddish.

***42. Automolus pallidigularis** Lawr.

Not common. One specimen shot in thick forest.

43. Glyphorhynchus cuneatus (Licht.).

Common. A silent bird, always found in the deepest parts of the woods, where it climbs on the tree trunks like a woodpecker. Four specimens.

***44. Dendrocincla anabatina** Scl.

One specimen killed in dense forest.

FAM. FORMICARIIDÆ.

***45. Cymbilanius lineatus fasciatus** Ridgway, subsp. nov.*

Not common. Iris red. Note clear, but with little variation. Two specimens.

---

crissum, dull yellowish white. Maxilla brownish-black, mandible dull pale yellowish, with dusky tip; feet dusty brown.

♂ (No. 91235, Los Sábalos, Nicaragua, May 8, 1883; C. C. Nutting). Wing, 2.85, tail, 2.55, culmen, .70, width of bill at base, .35, depth, .17; tarsus, .55; middle toe, .30.

♀ (No. 91234, same locality and collector, May 2, 1883). Wing, 2.80; tail, 2.45; culmen, .67; width of bill, .35; depth, .17; tarsus, .50; middle toe, .30.

In coloration this species comes nearest to *C. schotti*, but has the throat and ventral region much more nearly white and the pectoral region less olivaceous. The dimensions are nearly the same, except that the bill is larger and more depressed. In the character of the bill there is a close resemblance to the several West Indian forms of this species, especially *C. bahamensis*, and to *C. punensis* of Western Ecuador, but the species is clearly distinct.

* Judging from the material in the National Museum collection, there is a very marked difference between specimens of *Cymbilanius* from Central America, as far south, at least, as Panama, and those from Eastern South America. The Museum unfortunately possesses but a single skin from South America, an adult ♀ (No. 32823) from Cayenne; but this is decidedly different from four northern females. The chief difference consists in the much narrower light bars on the upper parts, these being also much paler in color, or fulvous-white (nearly pure white on the tail), in-

46. Thamnophilus melanocrissus Scl.

Rather common. Found in a portion of forest which had been burned through by Mr. Lange for the purpose of clearing. Here *T. melanocrissus* was feasting on the various insects which had been scorched by the fire and were lying ready cooked upon the ground. Did not hear its note.

Two specimens. Iris red.

47. Thamnophilus doliatus (Linn.).

Abundant. Iris white. One specimen.

48. Formicivora boucardi Scl.

This diminutive ant-thrush seems to be truly gregarious, and is usually seen in flocks of ten or a dozen. In marked contrast to all the others of its family which I have been able to observe in their natural state these birds seem to keep in the trees at a considerable distance from the ground, while the *Formicariidæ* in general are almost never seen at any considerable distance from mother earth. Only one specimen secured.

49. Rhamphocænus rufiventris Bp.

Not common. One specimen killed in dense forest near a running stream.

***50. Cercomacra tyrannina** Scl.

Apparently rare. One specimen.

***51. Myrmeciza immaculata** Scl.

Common. Lives almost entirely on the ground in the dense forest. Rather shy and silent.

***52. Formicarius hoffmani** (Cab.).

Rather common. Exceedingly shy. I have frequently watched with astonishment the curious maneuvers of this bird when suddenly approached. Instead of at once resorting to flight like most birds, it spreads its wings, lowers its head, and sneaks silently and quickly along, taking advantage of every inequality of the ground and bunch of dried leaves, until at a safe distance from the intruder, when it takes flight. There is something inexpressibly cunning and knowing in the whole pose and action of the bird on such occasions that is quite laughable.

The note is a loud, clear whistle, followed at a considerable interval by two or more lower and less accentuated ones, and has a very remarkable ventriloquial quality. So pronounced is this latter quality

---

stead of deep ochreous or fulvous. The dark bars on the lower parts are likewise much more distinct, as well as closer together, and the size considerably less. The measurements, however, are not smaller than those of a specimen from Panama, which, nevertheless, agrees strictly in coloration with examples from Cesta Rica, Veragua, and Nicaragua.

It being probable that the South American bird is the true *Thamnophilus lineatus* of Vieillot, I propose to separate the Central American form as *C. lineatus fasciatus*.—R. R.

that, when the bird is quite near, the note seems to issue from the trees instead of from the ground, whence it really proceeds.

The note is easily imitated, and I found that the bird could be secured by calling it. But it is necessary for the collector to be well concealed, as the bird has remarkably keen eyes and will not approach a suspicious object.

Two specimens.

53. Grallaria dives Salv.*

Apparently rare. Only one specimen secured, and that was shot while running along the ground in the thick woods.

FAM. TROCHILIDÆ.

***54. Phæochroa roberti** Salvin.

Abundant. Two specimens.

55. Chalybura melanorrhoa Salvin.

Rather common. One specimen.

56. Amazilia fuscicaudata (Fraser).

Common. One specimen.

FAM. CAPRIMULGIDÆ.

***57. Nyctidromus albicollis** (Gm.).

Very abundant. One specimen.

FAM. PICIDÆ.

***58. Campephilus guatemalensis** (Hartl.).

Not common. One specimen.

59. Melanerpes pulcherani (Malh.).

Rather common. Two specimens.

---

* Costa Rican specimens in the National Museum collection, labeled *G. dives*, are evidently distinct and apparently unnamed. They clearly represent a distinct form, somewhat intermediate between *G. dives* and *G. perspicillata;* but since it possesses some peculiar features, I propose to characterize it as a distinct species, for which the name *intermedia* is proposed.

The three allied species may be distinguished as follows:

a. Wing-coverts very distinctly spotted with ochraceous; breast pale buff, or buffy white, very broadly and distinctly streaked with black; a very distinct black rictal stripe, or "bridle."

1. G. PERSPICILLATA. Flanks white, narrowly striped with black or dusky; back olive-brown, marked with distinct guttate streaks of buff. *Hab.* Panama and Veragua (specimens from the former locality only examined by me.)

2. G. INTERMEDIA. Flanks bright ochraceous, wholly unstreaked; back slaty (but slightly tinged with olive), with few or no streaks. *Hab.* Costa Rica (Angostura and Talamanca; Tucurrique specimens not seen).

b. Wing-coverts without trace of ochraceous spots; breast bright "foxy" ochraceous, narrowly and indistinctly streaked with black; no trace of black rictal stripe.

3. G. DIVES. Flanks bright "foxy" ochraceous, immaculate; back dusky brownish slate, the feathers with fulvous shafts. *Hab.* Nicaragua (Greytown and Los Sábalos).—R. R.

FAM. ALCEDINIDÆ.

60. Ceryle americana cabanisi (Tsch.).

Common. One specimen.

FAM. TROGONIDÆ.

61. Trogon massena Gould.

Common. Usually seen in small flocks of six or eight. Bare circumorbital space sky blue. Two specimens.

FAM. GALBULIDÆ.

62. Galbula melanogenia Scl.

Not common. One specimen.

FAM. RHAMPHASTIDÆ.

63. Rhamphastos carinatus Sw.

Not common. Only two specimens seen, and one secured. Entire terminal portion of upper mandible dark cherry red; remaining portions of the same, with the exception of a large light red space near lower edge, "Nile" green. Lower mandible, with the exception of the light blue point, "Nile" green. Band at junction of bill and head black. Iris brown. Feet light blue.

64. Ramphastos tocard Vieill.

Common. Nests in trunks of trees. Note a loud clear whistle, followed by two or more softer and lower ones. While flying it utters a harsh cry. Upper mandible above a line drawn from base of culmen to lower edge of same, ending at a point about one-fifth the distance from terminus to base, corn yellow. Remaining part of upper mandible, black. Lower mandible very dark maroon. Iris green. Feet bronze blue.

Three specimens secured.

65. Pteroglossus torquatus (Gm.).

Abundant. One specimen killed had a large beetle in its bill. Secured a whole family— ♂, ♀ and *juv.*

Four specimens. Iris orange-yellow.

FAM. PSITTACIDÆ.

***66. Ara militaris** (Linn.).

Abundant. One specimen.

***67. Ara macao** (Linn.).

68. Conurus aztec (Souancé).

Abundant. Three specimens. Iris yellow. Cere and orbital region white.

***69 Chrysotis diademata** (Spix).

Common. Iris orange. One specimen.

FAM. FALCONIDÆ.

70. **Urubitinga anthracina** (Nitzsch).

Apparently not common. One specimen. Iris brown. Legs and cere yellow.

* 71. **Spizaëtus ornatus** (Daud.).

Mr. Lange described a hawk which evidently belonged to this genus, and, from his description, I judge that it was *S. ornatus*.

* 72. **Rostrhamus sociabilis** (Vieill.).

Common. Always found near the water. Two specimens. Iris red. Cere and legs yellow.

* 73. **Ibycter americanus** (Bodd.).

Not common. One specimen. Iris red. Bill in front of cere greenish yellow; basal half, clear light blue. Bare parts of head deep red. Feet coral red.

FAM. COLUMBIDÆ.

* 74. **Peristera cinerea** (Temm.).

Apparently not common. Two specimens. Iris yellow. Feet flesh color.

FAM. CRACIDÆ.

* 75. **Crax globicera** (Linn.).

Native name, "Pavo Real." This magnificent bird is the largest game bird of the region. The flesh is excellent eating, fully equal, in my opinion, to that of the domestic turkey. It is often domesticated, and thrives under domestication. Two specimens. Iris red. Tumid portion of cere bright yellow.

* 76. **Penelope cristata** (Linn.).

Abundant. A hunter brought me one, but I could not save the skin. Excellent eating. Iris orange yellow. Bare place on neck; front and back scutellæ on legs red. Bill black.

* 77. **Ortalida cinereiceps** Gray.

Native name, "Chachalaca." Common. Its cry is exceedingly harsh, and the din it occasionally raises is surprising, and sometimes alarming. Two specimens.

FAM. RALLIDÆ.

* 78. **Porzana leucogastra** sp. nov. *

---

* PORZANA LEUCOGASTRA Ridgw., MS.

SP. CH.—*Adult* ♂ (No. 91302, Los Sábalos, Nicaragua, May 10, 1883; C. C. NUTTING): Forehead, with fore part and sides of crown, dull gray; occiput and extreme upper part of back umber-brown, separated by an indistinct chestnut-rufous nuchal collar; remaining upper parts uniform dark sepia-brown, darkest (inclining to brownish-black) on tertials, rump, and tail. Side of head light brownish-gray; chin and throat white; jugulum and upper part of breast light cinnamon-rufous, deepening on sides of neck and breast into rich chestnut-rufous, but fading to pure white on lower breast; sides and flanks dull black, narrowly barred with white, these white bars averaging

The single specimen secured was knocked over by a stick in the hands of one of Mr. Lange's men.

79. Gallinula galeata (Licht.).

Seen, but not secured.

FAM. RHYNCHOPIDÆ.

***80. Rhynchops nigra** Linn.

I found the bill and portions of the skull of this bird near the river, and Mr. Lange informs me that they are common during part of the year.

In closing this list it is fitting that I acknowledge my deep sense of obligation to the following persons:

Sr. Don ADAN CARDENAS, president of Nicaragua, for a permit to take my effects from the custom-house free of all duties, and for other favors.

Sr. Don. JUSTO CARDENAS, for kind assistance in many matters.

Sr. Don ALIJANDRO CHAMBERLAIN, for his genuine hospitality and courteous aid.

M. GREEN, esq., for valuable aid and information.

Dr. EARL FLINT and DAVID MURRY, esq., for courtesies too numerous to mention.

Mrs. ELIZABETH WALSH, for oft-repeated hospitalities.

Don JOSÉ ANGEL LUNA and sister, and Donna CAROLINA CANTON, for valuable aid and information on the island of Ometepe.

Sr. N. MARTINEZ, for kind hospitality at San Carlos.

Mr. F. W. A. LANGE, for hospitality at Los Sabalos.

---

about .05 of an inch wide, and .10–.15 of an inch apart; crissum black, very narrowly barred with white, and tinged with light rufous. Lining of wing white, the basal half of the feathers abruptly grayish. Tibiæ, uniform, deep smoky-gray. Bill olive-greenish, more horn-gray terminally; "iris red," legs and feet dusky; wing, 2.80; tail, 1.10; culmen, .68; tarsus, 1.20; middle toe, 1.25.

This apparently new species is related to both *P. albigularis* Lawr. and *P. cinereiceps* Lawr., but is evidently distinct. It agrees with the former in the white throat, and with the latter in the grayish head; but it differs from both in a number of characters. The three are so nearly allied, however, that comparative diagnoses may best show the differences, which are as follows:

A. Head without any gray; wing-coverts with lighter bars.

1. P. ALBIGULARIS. Chin and throat distinctly white; pileum russet-brown, and side of head rufous. Wing, 3.05–3.10; tail, 1.25–1.30; culmen, .68; tarsus, 1.18–1.20; middle toe, 1.15–1.25. *Hab.* Panama.

B. Head mostly gray; wing-coverts without lighter bars.

2. P. LEUCOGASTRA. Chin and throat distinctly white; jugulum pale cinnamon, fading to white on lower breast; white bars on sides and flanks, very narrow. Wing, 2.80; tail, 1.10; culmen, .68; tarsus, 1.20; middle toe, 1.25. *Hab.* Eastern Nicaragua (Los Sábalos).

3. P. CINEREICEPS. Chin and throat pale cinnamon, the former inclining to whitish; jugulum and whole breast rich chestnut-rufous; white bars on sides and flanks, very broad. Wing, 2.90; tail, —; culmen, .60; tarsus, 1.15; middle toe, 1.20. *Hab*, Eastern Costa Rica (Talamanca).—R. R.

The agent of the Lake Nicaragua Steam Navigation Company, for many courtesies.

Any attempt on my part to express my gratitude to Capt. J. M. Dow, of the Pacific Mail Steamship Company, would fall pitifully short of the mark. He has both the ability and the will to render more aid to the naturalist in Central America than any one else in that part of the world.

C. C. N.

ON SOME COSTA RICAN BIRDS, WITH DESCRIPTIONS OF SEVERAL SUPPOSED NEW SPECIES.

By ROBERT RIDGWAY.

The following interesting species are included in a small collection of birds lately received by the National Museum from Sr. Don José C. Zeledon, of San José, Costa Rica.

1. Carpodectes antoniæ, Zeledon, MS., Ridg. Ibis, Jan. 1884, 27, pl. ii.

Sp. ch.—*Adult* ♂ (No. 91832, Pirris, May, 1883; Juan Zeledon, collector). Similar to *C. nitidus*, but rather smaller, the bill mostly bright yellow, the wings wholly pure white, and the pileum much paler pearl-blue. Plumage, pure white, except the forehead and crown, which are pale pearl-blue, or glaucous, and back, scapular, rump, upper tail-coverts, and tail, which are a more delicate shade of the same. Bill, clear lemon-yellow ("wax-yellow" in fresh specimen) with distinctly marked black stripe along the culmen; "iris, dark; feet, black." Wing 5.40, tail 2.60, culmen .70, tarsus .90, middle toe .80.

This lovely species much resembles *C. nitidus*, except as pointed out above, and is clearly distinct.

Mr. Zeledon's notes respecting this species are as follows:

"You will be agreeably surprised to learn that I have made a most unexpected discovery in the shape of a new *Carpodectes*. The bird is snowy white, except on the back and top of the head, where a faint wash of gray is to be seen, all the back of the neck being pure white, like the rest of the body. No traces of the gray tinge are present on any other part of the plumage. The bill is somewhat smaller, less swollen, and more curved than in *C. nitidus*, and of a yellow color, with a black line along the culmen to the very tip; the feet are black, not plumbeous, as in the latter species; the dimensions are pretty much the same, excepting that the tail is rather shorter than in *C. nitidus*.

"There is but one specimen in my possession, which was obtained by my brother Juan, at Pirris, southwestern side of Costa Rica. It is a fine adult male, and was obtained in May last.

"The *C. nitidus* has been obtained only on the eastern side of the country. I am inclined, therefore, to believe that the present species is the western representative of the genus.

"I have named this charming bird *Carpodectes antoniæ*, after the dear sister whose death I mourn."

2. Vireo carmioli Baird?

A single skin of a Vireo, from Pirris, much resembles the type of *V. carmioli*, but is larger and somewhat different in coloration, the colors being decidedly paler. It may be described as follows:

Adult (No. 91825, Pirris, 1882; J. Cooper): Above, dull olive-green, becoming slightly more brownish on the head; wings and tail, dusky; both rows of wing-coverts broadly tipped with pale sulphur-yellow, or yellowish white, and tertials broadly edged with the same; secondaries, primaries, and rectrices, narrowly edged with light olive-green. A broad and continuous superciliary stripe of dull sulphur-yellow, rendered more distinct anteriorly by contrast with a dusky spot immediately in front of the eye; lower eyelid whitish; sides of head otherwise olivaceous, like upper parts. Lower parts dull, light sulphur-yellow, much obscured laterally with olivaceous, the throat and crissum inclining to whitish. Maxilla, dusky; mandible pale, with brownish tip. Wing, 2.75; tail, 2.20; culmen, .45; tarsus, .70; middle toe, .40.

I am not able to make a satisfactory comparison of this bird with *V. carmioli*, for the reason that the National Museum possesses but a single adult example of the latter, the type, which, moreover, is a female. It measures, wing 2.50, tail 2, culmen .40, tarsus .70, middle toe .38, being thus smaller than the specimen described above.

3. Phœnicothraupis carmioli Lawr.

A second specimen of this rare species differs from the type in having the plumage of a duller or more sombre cast, and faintly tinted or stained here and there with dull red. These dull reddish stains occur on the pileum, back, rump, greater wing-coverts, breast, and sides. The specimen is, perhaps, a young male, since the bill is decidedly less arched than that of the type, and presents other evidences of imperfect development. Unfortunately, the sex and precise locality are not indicated. The two specimens compare in measurements as follows:

Museum No.	Locality.	Wing.	Tail.	Culmen.	Breadth of bill at base.	Depth of bill.	Tarsus.	Middle toe.
39039	Angostura	3.60	2.70	.90	.35	.37	.90	.55
91820		3.45	2.50	.80	.37	.37	.85	.55

This species seems wrongly placed in *Phœnicothraupis*, the proportions being quite different from those of all the species of that genus. Except in the form of the bill, which is much more compressed, it agrees better with *Pyranga*, while in many respects it comes very near to *Orthogonys*. Since it should probably constitute a new genus, some-

what intermediate between the last two, I propose the generic name *Chlorothraupis*.*

4. Tachyphonus nitidissimus Salv.

An adult male from Pirris (No. 91822, May, 1883; Juan Zeledon) agrees with a typical example from Veragua, except that the brownish orange crown-patch is more deeply colored.

5. Tachyphonus luctuosus Lafr. & D'Orb.

Two Costa Rican specimens (No. 68158, Talamanca, and 91821, Dos Novillos, December) agree exactly with specimens from Panama, Bogota, Guayaquil, Demerara and Brazil (Eng. do Gama); but No. 39044, ♂ ad., from Tuiz (Carmiol, coll.), has a small, though distinct, spot of straw-yellow on the crown, thus showing an approach to *T. nitidissimus*.

6. Chlorospingus pileatus Salvin.

A male, apparently immature, differs from an unquestionable adult in the following particulars: The dark color of the head is of a quite different shade, being dull slate-color instead of blackish fuliginous; the olive-green on the upper parts is paler, as is also the yellowish olive of the lower parts.

A young specimen in first plumage (No. 91824, Pirris, 1882; J. Cooper) has the head colored as in the preceding, but upper parts are a dull olive, with little green tinge, except on the wings and tail, while the lower parts are almost entirely dull light grayish, inclining to white on the abdomen, the sides and flanks, however, especially the latter, tinged with olive-green. The mandible is whitish, whereas in the adults it is deep black, like the maxilla.

7. Lanio melanopygius Ridgw.

Lanio leucothorax melanopygius RIDGW. Pr. U. S. Nat. Mus. 1883," SALV. & GODM. Biol. Centr. Am. Aves, Vol. I, Dec. 1883, 305.

A single adult male from Pirris differs from two others, apparently quite adult (Nos. 47445, Angostura, Jan. 10, 1867, J. Carmiol, and 39036, Payuriqui, March 14, 1865, same collector), in having the whole rump solid deep black instead of bright yellow, the crissum black instead of yellow, and the black of the wings and tail much more intense. The differences are in fact so great that a difference of race at least seems quite likely. The original description of the species (Proc. Zool. Soc. Lond., 1864, p. 581) does not mention the color of the rump; but the plate in *Exotic Ornithology* (plate 32) represents unmistakably the black-rumped form. It appears from the text, however, that the figure of the male may have been taken from a Veraguan example, from which we may infer that Veraguan specimens and those from the southern portion of Costa Rica agree in having the whole rump deep black. Should the

*In their *Biologia Centrali-Americana, Aves*, Vol. I., p. 297 (December, 188.), Messrs. SALVIN & GODMAN have already adopted this name from my MS., quoting "Pr. U. S. Nat. Mus., 1883," the quotation in question having reference to the present article which was submitted for publication early in August, 1883. Messrs. SALVIN & GODMAN include along with *C. carmioli* the *Orthogonys olivaceus* of Cassin; but my type of the genus *Chlorothraupis* is *Phœnicothraupis carmioli* Lawr.

difference prove constant, one of the forms requires a new name; and *L. leucothorax* having been based upon specimens from Tucurrique, the central part of Costa Rica, it follows that the black-rumped one is the one to be named. Accordingly, in view of its probable distinctness, I propose for it the name *L. melanopygius*.

There appears to be little difference in dimensions, the three specimens measuring as follows:

Specimen.	Wing.	Tail.	Culmen.	Bill from nostril.	Tarsus.	Middle toe.
No. 91818, Pirris	4.00	3.70	.95	.60	.70	.50
No. 47445, Angostura	4.15	3.70	.90	.59	.75	.55
No. 39036, Payuriqui	4.00	3.70	.85	.52	.70	.50

8. Empidonax atriceps Salvin.

The single specimen of this species may be described as follows:

SP. CH.—*Adult* (No. 91829, Pirris, Costa Rica, 1882; J. Cooper): Pileum and nape uniform sooty black, somewhat paler on the forehead; back and scapulars dark sooty olive, or olive-sepia, the rump similar, but paler; tail uniform dull black; wings black, the middle coverts broadly tipped with the color of the back, the greater coverts broadly tipped with lighter brown, and tertials edged with the same. Orbital ring, chin, and throat, light grayish yellow; sides of head dull olivaceous, much the same tint as the rump; jugulum and breast raw-umber brown, becoming more ochraceous posteriorly, the abdomen and crissum, also axillars and lining of wing, pale dull yellowish buff; maxilla black, mandible whitish; legs and feet black. Wing 2.45; tail 2.25, deeply emarginated; culmen .45, width of bill at base .22, tarsus .65, middle toe .35.

It seems to me that this species has been wrongly placed in the genus *Empidonax;* at any rate, the specimen under examination seems strictly congeneric with *Mitrephanes aurantiiventris*, with which it agrees very minutely in details of structure, although of smaller dimensions.

9. Empidonax viridescens sp. nov.

SP. CH.—*Adult* (No. 91826, U. S. Nat. Mus., Cervantes, Costa Rica, 1882; J. Cooper): Above uniform bright yellowish olive-green or oil-green, becoming less yellowish on rump; tail dull grayish, feathers edged with olive-green; wings grayish dusky, except lesser coverts, which are rich oil-green, like back, &c.; middle coverts broadly tipped with deep olive-buff, greater coverts broadly tipped with paler, more yellowish buff; tertials edged with pale greenish; orbital ring (apparently interrupted at and above anterior angle of the eye) yellowish white or pale sulphur-yellow; anterior lower parts light yellowish olive, becoming pure yellow on the abdomen, the crissum similar but paler; middle of throat tinged with or inclining to yellow; edge of wing tinged with saffron-yellow. Maxilla deep black, mandible wholly whitish, in-

clining to orange along tomia; legs and feet black. Wing 2.75; tail 2.35, culmen .62 (from extreme base), bill from nostril .35, width at base .32, tarsus .68, middle toe .40.

In coloration this species presents a remarkably close resemblance to *E. flavescens* Lawr. The breast, however, is paler and decidedly less fulvous, the yellow of the abdomen paler, the upper parts have less of a russet cast, and the wing bands are paler. Besides, it is considerably larger, the measurements of an adult male of *E. flavescens* being as follows: Wing 2.40, tail 2.05, culmen (from extreme base) .62, bill from nostril .35, width at base .28, tarsus .62, middle toe .35.

10. Pittasoma michleri zeledoni, subsp. nov.

SUBSP. CH.—*Adult ♂:* Similar to *P. michleri*, but much larger, and with the head entirely black, except a few touches of chestnut on the auriculars. Wing, 4.35; tail, 1.60; culmen, 1.25; tarsus, 2; middle toe, 1.25.

Type, No. 91841, Rio Sucio, Costa Rica, 1881; J. Cooper, collector.

The measurements of an adult male of *P. michleri* (No. 53778, Panama; McLeannan), are as follows: Wing, 4.05; tail, 1.35; culmen, 1.05; tarsus, 1.85; middle toe, 1.10. In *P. michleri* only the pileum is uniform black, the entire cheeks and auriculars being chestnut, while the black of the chin, throat, and malar region is spotted with the same.

11. Acanthidops bairdi Zeledon, MS.

In the original description of this species (Proc. U. S. Nat. Mus., vol. 4, p. 336) the writer accidentally omitted to credit the specific name to Mr. Zeledon. The oversight is much regretted, and the present opportunity is taken to make amends.

Besides the foregoing species, the following were contained in the collection received from Mr. Zeledon, all of which are included in that gentleman's excellent list* of Costa Rican birds.

1. *Dacnis venusta.* Cervantes, 1882. J. Cooper.
2. *Euphonia (undetermined).* Pacaca, November, 1875. J. C. Zeledon.
3. *Euphonia (undetermined).* San José, November, 1881. J. C. Zeledon.
4. *Euphonia (undetermined).* Pirris, May, 1883. Juan Zeledon.
5. *Phœnicothraupis fuscicauda.* Pacuare, 1876. J. Cooper.
6. *Mitrephanes aurantiiventris.* Cervantes, 1882. J. Cooper.
7. *Mionectes olivaceus.* (Locality not given.)
8. *Myiobius erythrurus.* Dos Novillos, December, 1882. J. Cooper.
9. *Tyranniscus parvus.* Pirris, 1882. Juan Zeledon.
10. *Dendrornis erythropygia.* Rio Sucio, 1881. J. Cooper.
11. *Dendrocincla homochroa.* Navarro, October 30, 1882. J. Cooper.
12. *Automolus rufescens.* Cervantes, 1882. J. Cooper.
13. *Anabazenops variegaticeps.* Rio Sucio, 1881. J. Cooper.

* Cataloga | de las | Aves de Costa-Rica, | por | José C. Zeledon. | San José, Costa Rica, | Junio 1882. | —— | Imprenta Nacional. | 8 vo., pp. 39. [701 species, 388 genera; 315 of the former represented in the author's collection.

14. *Margarornis brunnescens.* Rio Sucio, 1881. J. Cooper.
15. *Cymbilanius lineatus* (*fasciatus*). Rio Sucio, August 15, 1882. J. Cooper.
16. *Grallaricula costaricensis.* Navarro, October 30, 1882. J. Cooper.
17. *Phlogopsis macleanneni.* Rio Sucio, 1882. J. Cooper.
18. *Microchera parvirostris.* Rio Sucio, 1882. J. Cooper.

A larger collection of Costa Rican birds lately presented to the National Museum by Dr. Van Patten, for many years resident at San José, included, among others, the following interesting species, those marked with an * being additional to Mr. Zeledon's catalogue.

* 1. *Selasphorus ardens.* ♂.
* 2. *Selasphorus torridus.* ♂ and ♀.
* 3. *Chætura gaumeri* Lawr. (Compared with types!)
* 4. *Glaucidium jardinei* (in rufous plumage;= "*lansbergi*, Ridgw.").
5. *Leucopternis princeps.* 3 adults.

Unfortunately no labels were attached to Dr. Van Patten's specimens, and we are therefore ignorant of the precise localities in which they were obtained.

ON AN ANTIQUE ROMAN MOSAIC FROM CARTHAGE, NOW IN THE UNITED STATES NATIONAL MUSEUM.

Communicated by G. H. HEAP, Esq., United States Consul-General at Tunis.

Many who visited the Centennial Exhibition will remember seeing in the Tunisian section the large and beautifully executed mosaic, representing a Numidian lion seizing an antelope. This admirable work, which probably dates from 100 to 50 years before the Christian era, is of Roman workmanship, and was discovered at Carthage in 1873. It formed a very small part of the vault floor of a temple dedicated to Astarte (Aphrodite), the tutelary deity of the Carthaginians. The Romans, who assimilated the gods of the people they conquered as easily as they absorbed their territories, erected a temple to the goddess of Carthage and adorned it with great splendor. It was situated on a commanding hill facing the sea, near the citadel and other public buildings.*

The Tunisian Government a short time since enacted a law prohibiting private search for antiquities, but granted this privilege to the son of the prime minister at that time in power. The finder of treasures or antique works of art was required, under severe penalties, to give immediate information to this official. The Arabs, however, in spite of imprisonment, bastinado, or fire, not unfrequently appropriated what-

* The remains of some of these edifices are still visible, although now the most conspicuous object is the chapel, erected in 1835, by Louis Philippe, King of the French, and dedicated to the memory of his ancestor, Louis IX, surnamed "the Saint," on the spot where tradition says he died of the plague in 1270 while besieging Tunis.

ever fragments of sculpture, inscriptions, or mosaics, and especially funeral lamps and vases and coins they might find, and sold them secretly to travelers and strangers.

Thus it came to pass, one day, that an old Arab sheik informed the British agent and consul-general, with a great show of secrecy and mystery, that he had discovered a wonderful mosaic floor, a portion of which he offered to take up and deliver for a consideration. He described the floor, which, even with due allowance for the imagination of the Bedouin, was evidently one of the most beautiful and complete works of the kind that had ever been discovered at Carthage. The sheik refused to tell where it was, but promised to bring the piece he had taken up to Sir Richard Wood's country seat, at Carthage, at night. He had recently "eaten stick", or received the bastinado, for having sold some antiquities to a tourist, and had reason to be cautious. A few nights later, however, he came with some eight or ten Arabs who bore the mosaic on their shoulders. A bargain was made, and the precious fragment was deposited in a magazine, where it remained until shipped to Philadelphia in 1875.

The floor of the temple from which it was taken has since been examined. It is of vast extent and the designs were all life-size. From the Arab's description it appears that the center figure represented a female, probably the goddess Astarte, driving a chariot drawn by stags, and around this central design were grouped animals of various kinds—lions, tigers, leopards, stags, antelopes, giraffes, boars, hares, even hippopotami, crocodiles, snakes, and fishes. The only part of the floor that the Arabs succeeded in removing besides the "mosaic lion" was the principal design, representing Astarte in the chariot. This was on its way to Sir Richard Wood's, when unfortunately one of the bearers slipped and fell, and the others fearing to be crushed under it—for it was even larger and more ponderous than the lion—allowed it to fall to the ground, where it was broken into fragments. The only portion, therefore, of this magnificent pavement that now exists is that in the National Museum; the rest was broken in the hasty and clumsy efforts of the Arabs to detach it in sections from its bed.

The "mosaic lion," as it came to be named at the Philadelphia Exhibition, is the largest and most perfect ancient mosaic in America, and it is quite unlikely that anything equal to it will ever find its way to the United States hereafter.

When the Vandals invaded Africa they destroyed all works of art, and to them are due the many headless, armless, and noseless statues found in Barbary. In destroying the temple of Astarte their iconoclastic frenzy was probably more immediately directed against the statuary and other sculptures and in overthrowing them, together with the walls of the edifice. The floor was covered with *débris*, upon which, in the course of centuries, a deep layer of dust was deposited, which protected the mosaic from the corroding effects of wind and rain, and to this we may attribute its perfect state of preservation.

Vol. VI, No. 27. Washington, D. C. April 11, 1884.

When the Tunisian Government was about sending its collection to Philadelphia in 1875, Sir Richard Wood very liberally offered to send this mosaic, which he had originally intended to present to the British Museum. It was packed with great care, and the steamship companies were earnestly begged to give directions to have it handled with every precaution. It was, however, a trying moment when the heavily iron-bound case was opened, for it was feared that it would be found to contain nothing but a mass of small parti-colored stones. It was, therefore a surprise as well as gratification to find the mosaic intact.

Its dangers, however, were not yet over, for after it was put in its place in the exhibition it was subject to the attacks of greedy visitors, who made determined, and occasionally successful, attacks upon it for the purpose of obtaining mementos.

After the close of the Centennial Exhibition it remained on deposit in the "Permanent Exhibition" until Sir Richard Wood, with graceful courtesy and liberality, presented it to the National Museum at Washington, where it is to be hoped it will long remain, a unique and valuable relic of the most ancient and renowned republic in the world's history.

PISA, *February* 19, 1883.

ON THE SKELETON OF PHOCA (HISTRIOPHOCA) FASCIATA, ZIMMERMAN.

By FREDERICK W. TRUE, M. S.,

Curator of the Department of Mammals.

The National Museum is at present in possession of an interesting series of specimens of the Ribbon Seal, consisting of four skins, three skulls, and a single skeleton. The two finest skins—that of a female of advanced age (13285) and that of an adult male (13284)—were obtained by Mr. William H. Dall in 1880, in Plover Bay, East Siberia. The skeleton of the female was preserved, and forms the principal basis of this paper.

In addition to this material there are also in the Museum a skin and two much broken skulls of young males, one of which (13364) was obtained by Mr. E. W. Nelson at Cape Romanzoff, Alaska, in May, 1880; the other (13363) at Cape Prince of Wales in the autumn of 1879. There is, besides, in the Ethnological Department of the Museum, a skin of the species under consideration, in the form of an Eskimo bag.

The external characteristics of the Ribbon Seal are quite well known. The sexes differ widely in color, the male being black, with a yellowish white band surrounding the fore limbs, and passing over the back, while

the female, although having the same markings, is of a light, almost silvery, hue. The whiskers are crenulate. The nails are of moderate size and of a brown tint.

The Ribbon Seal has been imperfectly known since 1781, but the first description of any considerable fullness is that of Von Schrenck, published in 1859.* This observer, however, was unable to obtain the skeleton and the characters of the latter, except so far as the teeth were concerned, have until recently remained undescribed. In a paper upon the mammals collected during the "Vega" expedition, published some months ago by Nordquist,† the skull is described somewhat at length and three imperfect figures are given.

The genus *Histriophoca* was established by Dr. Gill in 1873, upon the basis of Von Schrenck's observations of the exterior and teeth.‡ His diagnosis is as follows: "The structural (and especially dental) characters of this species, according to Von Schrenck, indicate a generic distinction from all the familiar forms of the subfamily *Phocinæ*. The molars (except the first) are two-rooted as in the typical *Phocinæ*, but in external form are simply conic or have rudimentary cusps, thus resembling *Halichœrus*. The genus may be named *Histriophoca*."

In July of the present year, at which time the cleaned and mounted skeleton was received from Rochester, I published a fuller and somewhat different diagnosis of the genus.§

After more prolonged study of the skeleton, and comparison with those of other species, I am somewhat in doubt as to the relationships of this seal. The skull presents remarkably close affinities to that of *Phoca fœtida*, the representative of the subgenus *Pusa*, as defined by Professor Allen. The most absolute differences are in the shape of the alveolar border of the maxillary, which is curved ventrally and laterally in *Histriophoca*, but is practically straight in *Pusa*, and in the number of sacral vertebræ, there being four in *Pusa* and three in *Histriophoca*. There are also a number of relative differences, of which the most salient are as follows: The accessory cusps of the molars are less developed in *Histriophoca* than in *Pusa*. The tibia is less curved in the former than in the latter, the crest of the ileum is more everted and the sexes vary more in color. The rooting of the molars in *Histriophoca* is different from that which obtains in any of the subgenera of *Phoca*, in being variable. The first two, and possibly the third, would seem to be single-rooted in the majority of cases.

If the taxonomy of the Phocids proposed by Professor Allen in his recent admirable work is accepted, none of the characters which have been enumerated are sufficient to raise *Histriophoca* to generic rank. In

* Von Schrenck. Reise in Amur-Lande, I, 1859, p. 182, Pl. IX, Figs. 1–3 (Animal).

† Vega-Expeditionens Vetenskaplica Iakttagelser. Andra Bandet, 1883, pp. 107–111, Figs. 16–18.

‡ American Naturalist, vii, 1873, p. 179.

§ American Naturalist, xvii, 1883, p. 798.

Pagophilus there is a less number of sacral vertebræ than in the other subgenera, and the sexes are widely different in color, yet it is included by Professor Allen within the genus *Phoca*. *Histriophoca fasciata* cannot then be debarred on account of its possession of these same characters. It seems most logical to include the last-named species as a subgenus in *Phoca*, between *Pusa* and *Pagophilus*. To raise *Pagophilus* to the rank of a genus (as proposed by Dr. Gill), and to combine with it *Histriophoca*, would, in my estimation, make an isolation between them and *Pusa* which does not exist, while to make of each of the first mentioned a distinct genus would make the classification still more artificial.

DESCRIPTION OF THE CRANIUM.

The muzzle.—The muzzle,* and indeed all of that portion of the skull which is anterior to the auditory bullæ, is remarkably short. The breadth at the canines is about the same relatively as in *P. fatida* and *P. grœnlandica*. The "palate" is rudely triangular, shortened in the anteroposterior direction, but little compressed laterally, and not deeply emarginate behind. The alveolar border is convex laterally and ventrally, much as in *Erignathus barbatus*. The distance from the distal end of the intermaxillaries to the pterygoid hamuli is less than one-half the length of the skull, and from the same point to the anterior edge of the auditory bullæ is only 66 per cent. of the same length. The anterior nasal opening is elliptical, and corresponds closely to that of *P. fœtida*, but is higher in proportion to the breadth. The posterior nasal opening is about one-half broader than deep. The narial septum is nearly complete, the length of the whole "palate" being to the portion unoccupied as 66 to 10. The septum is, therefore, less developed than in *P. grœnlandica*, and more than in *P. fœtida*. The nasal bones are quite small, in length measuring less than one-fifth that of the skull; their breadth anteriorly is approximately one-half their length. The anterior border has the shape of the letter W with equal limbs.

Orbital region.—The zygomatic processes of the maxillary are broad, long, and very thin. The fossa beneath the infraorbital foramen is unusually deep, but does not involve the zygomatic process so much as in *P. fœtida*. The temporal fossæ are wide laterally. The zygomatic processes of the temporal bone are not so high as in *P. fœtida*, but resemble more closely those of *P. grœnlandica*. The interorbital "bridge" is intermediate in width between that of *P. vitulina* and *P. fœtida*. In the last-named species it is very narrow. The superorbital processes are rudimentary, but rather more developed than in other representatives of *Phoca*.

Brain-case, superior and posterior surfaces.—The brain-case is large, its length almost exactly equaling one-half that of the skull. Its lon-

* That portion of the skull anterior to the base of the zygomatic processes of the maxillary. This term is used with such looseness that I regard it necessary to define it.

gitudinal and transverse horizontal diameters are approximately equal. The convexity along the lines of the sagittal and coronal sutures is slight. The medial angle of the lambdoid suture is obtuse. The occipital makes an angle of about 45° with the base of the skull. The foramen magnum is an oblate ellipse.

Brain-case, inferior surface.—The paroccipital processes are wide apart, more so than in any other species of the subfamily, the distance between them being about the same as that between the meati auditorii. They are more strongly developed than in *P. fœtida*, and less than in *P. grœnlandica*. The auditory bullæ are larger than those of any other seal with which I am acquainted. The anterior face is approximately at right angles to the main axis of the skull, and descends less perpendicularly than in other forms of the genus. The anterior extremity is obtuse, making the general outline rather more quadrilateral than triangular. The portion forming the inferior border of the meatus auditorius is small, short, and convex, and is separated from the main portion of the bulla by a constriction, somewhat as in *P. grœnlandica* and *P. fœtida*.

Mandible.—The lower jaw is short and small. The rami are narrow vertically, and in the aged female are flattened internally. The coronoid process is styloid, as in *P. fœtida* and *grœnlandica*.

The teeth.—The dental formula was correctly given by Von Schrenck, as follows:

$$\text{I. } \frac{3-3}{2-2};\ \text{C. } \frac{1-1}{1-1};\ \text{M. } \frac{5-5}{5-5}.$$

The internal incisor is the smallest, the outer the largest. The canines are small. The molars, also, are small, and approximately equal in size, although the fifth, and especially the first, are a little smaller than the others. The form of the roots is subject to variation, as will appear from the subjoined table:

ROOTS OF THE UPPER MOLARS.

	First.	Second.	Third.	Fourth.	Fifth.
Von Schrenck's Seal	Single ..	Double .	Double	Double	Double.
No. 13285. Plover Bay	Single ..	.....	Double .	Double .	Double.
No. 13364	Single ..	Single ..	Double .	Double .	Double.
No. 13363	Single ..	Single ..	Single ..	Double	Double.

ROOTS OF THE LOWER MOLARS.

	First.	Second.	Third.	Fourth.	Fifth.
Von Schrenck's Seal	Single ..	Double .	Double .	Double .	Double.
No. 13285. Plover Bay	.....	Single ..	.....	Single ..	
No. 13364	Single ..	Single ..	Single ..	Single ..	Double.
No. 13363	Single ..	Single ..	Single ..	Double .	Double.

A fourth molar, single-rooted, is present in sides of the lower jaw in this specimen.

As I have not seen Von Schrenck's original account, I do not feel satisfied that he positively intended to affirm that the roots of the second premolars are bifurcate, although he is so interpreted by Allen.*

From my examination of the skulls at hand I should be inclined to doubt that they are ever so. The form of the roots of the first true molar is such as to afford strong ground for a difference of opinion. There is invariably a longitudinal groove along the root, but the tip of the latter may or may not be sufficiently cleft to admit of the use of the term bifurcate. The posterior accessory cusps are apparent in the superior true molars, but almost or quite disappear from the premolars. The anterior accessory cusps are wanting superiorly. In the lower jaw both accessory cusps are traceable in all the grinding teeth, but are strongest in the true molars. The crowns of the premolars are considerably directed backward; the true molars less so or not at all, although they bear that appearance when worn. The molars are so placed in the majority of specimens of both *Histriophoca fasciata* and *Phoca vitulina* that they rub against each other. This results in the obliteration of the anterior accessory cusps of the superior molars when the teeth are worn.

The skeleton; vertebral characters.—The vertebral formula is as follows: C. 7; D. 15; L. 5; S. 3; Ca. 14 = 44. The atlas is low and broad, with wide transverse processes. The axis is high, with a large and long odontoid process. The superior border of its neural spine is parallel with the long axis of the centrum. In *Pusa* it forms an angle of about 45° with that axis. All the processes of the remaining cervical vertebræ are short and stout. The low neural spines of the dorsal and lumbar vertebræ are subequal in height, but increase in breadth (in the anteroposterior direction) from the first backward. They are lowest at about the middle of the series. They do not bend backward so strongly as in *Pusa*. The hypapophysis becomes apparent in the thirteenth dorsal, and increases in size posteriorly, becoming strongest in the second lumbar. The transverse processes of the lumbar vertebræ increase slightly in length posteriorly and are subequal in breadth. Only the first two caudals have complete neural arches. The last twelve decrease in size very gradually posteriorly.

The ribs and sternum.—The first rib is very broad and short, but less so than in *Pusa*. The first thirteen have articular facets, but that of the twelfth is rudimentary, and does not reach the centrum. Nine are connected with the sternum, the first at the base of the first of the sternebræ. In *Pusa* ten ribs reach the sternum. The sternum consists of nine sternebræ, the posterior, or ninth, nearly two and a half times the length of any of the others. The first is the smallest, somewhat conical, with the apex directed forward and compressed laterally; the others, except the ninth, are subequal.

The scapula and pelvis.—The scapula is falciform, being prolonged

*Allen, North American Pinnipeds, 1880, p. 675.

posteriorly, and is broader than high. The length is to the breadth as 1 to 1.37. The pre-spinous region is broad inferiorly. The spine is prominent and thin, and is abruptly truncated inferiorly.*

The coronoid process is rudimentary.

The pelvis is long and narrow, being about three times as long as broad at the widest part. The crest of the ileum is turned abruptly outward, forming a deep and large cup-shaped fossa. This is considerably larger than in *Pusa*. The obturator foramen is elliptical and small, while the region of the pubic symphysis is long and broad.

Pelvis of *Histriophoca fasciata* No. 13285.

The fore and hind legs.—Both great and lesser tuberosities of the humerus are very strongly developed. The olecranon of the ulna is large, hamular, and broad in the anteroposterior direction, with a large mammiform process externally. It is entirely distinct from the radius. The latter is remarkably broad and flat at the inferior extremity. The bones of the carpus are very unequal in size; the magnum is very small; the cuneiform is large, and so placed as to exclude articulation between the unciform and pisiform, while it articulates with the fifth metacarpal. The digits decrease in size gradually from the first to the fifth. The femur is short and broad, the great trochanter well developed and quadrate. The tibia and fibula are anchylosed at the proximal extremity. The proportion of the length of the femur to that of the tibia is as 1 to 2.28. All the fossæ are large and deep.

In the tarsus the meso-cuneiform is the smallest bone. The cuboid articulates about equally with the calcis and the astragalus. The digits are of unequal size; they decrease in length in the following order: First, fifth, second, fourth, third. The proportion of the length of the femur to that of the pes is as 1 to 3.06. The proportion of the length of the femur to that of the whole limb is as 1 to 6.38. The proportion of the length of the pes to that of the whole limb is as 1 to 1.92. It thus appears that the feet are large. The pelvis and tibia are of exactly equal length.

* Since the division of the inferior portions of the scapular spine into acromion and metacromion, by Mivart and other anatomists, it becomes somewhat difficult to ascertain whether one or both of the parts so called are present or absent. If the inferior termination of the scapular spine, however formed, is to be termed the acromion, then no scapulæ can be said to lack the latter except those in which its entire upper margin describes a more or less uniform curve. In my preliminary diagnosis (Amer. Nat., xvii, 1883, 798) I stated that the scapular spine is without acromion. I still believe that this is a true statement, but not as generally understood.

Measurements of representative species of the subfamily Phocinæ.

Parts measured.	*Phoca (Histriophoca) fasciata.** Millimeters.	*Phoca (Histriophoca) fasciata.** 100ths of total length.	*Phoca (Phoca) vitulina,*† 100ths of length.	*Phoca (Pusa) fœtida,*‡ 100ths of length.	*Phoca (Pagophilus) groenlandica,*‖ 100ths of length.	*Erignathus barbatus,*§ 100ths of length.	*Halichœrus gryphus,*¶ 100ths of length.
Total length	203	100.0	100.0	100.0	100.0	100.0	100.0
Breadth at mastoid process	118	59.0	57.6	62.7	55.0	59.1	49.0
Greatest breadth at zygomatic arches	131	65.0	64.0	61.5	54.0	57.8	61.0
Distance from anterior edge of intermaxillæ to end of pterygoid hamuli	93	46.0	54.7	50.0	53.3	54.6	61.0
Distance from anterior edge of intermaxillæ to hinder edge of last molar	70	34.0	35.0	31.0	31.7	34.2	.....
Distance from anterior edge of intermaxillæ to meatus auditorius	135	66.5	75.0	70.0	70.0	73.3	78.5
Distance from anterior edge of intermaxillæ to glenoid process	125	62.0	70.6	63.3	65.3	66.9	74.0
Distance from palato-maxillary suture to end of pterygoid hamuli	40	20.0	24.8	21.5	20.5	21.5	24.5
Length of alveolar border of maxillæ	61	30.0	40.3	36.8	38.7	39.3	47.5
Width of palatal region at posterior end of maxillæ	53	26.0	27.9	27.7	25.2	28.1	24.5
Nasal bones, length	37	18.0	29.0	21.2	19.7	24.5	.....
Nasal bones, breadth anteriorly	15	7.5	9.2	9.0	7.0	10.0	.....
Nasal bones, breadth at fronto-maxillary suture	10	5.0	6.8	4.3	4.1	6.7	.....
Breadth of skull at canines	30	15.0	20.0	15.0	14.7	20.9	28.0
Least breadth of skull interorbitally	15	7.5	6.1	3.2	5.5	11.2	11.0
Breadth of posterior nares, vertically	22	11.5	9.3	7.1	6.0	10.3	12.0
Breadth of posterior nares, transversely	36	18.0	11.9	14.8	17.0	15.0	11.5
Breadth of anterior nares, vertically	30	15.0	13.3	12.8	14.5	16.1	.....
Breadth of anterior nares, transversely	27	13.5	14.0	13.8	12.7	14.0	.....
Greatest height of skull at auditory bullæ	86	42.5	36.6	41.1	37.3	38.5	30.0
Length of brain-case	100	49.0	38.0	40.3	39.3	41.5	30.5
Greatest width of brain-case	96	47.5	44.2	51.0	46.0	49.2	31.5
Length of lower jaw	127	63.0	63.8	62.0	61.3	65.0	67.0
Front edge of ramus to last molar	54	26.5	.....	27.0	25.3	27.7	.....

* No. 13285 ♀, old.
† No. 4713, very old. Sable Island, Nova Scotia (Allen, p. 574).
‡ Average of { No. 16138 ♀, middle age. Cumberland Gulf. / No. 6295 ♀. Cumberland Gulf. / No. 6297 ♀. Cumberland Gulf (Allen, p. 606).
‖ Average of { No. 3514, old. Greenland. / No. 3515, old. Greenland (Allen, p. 638).
§ Average of { No. 16116 ♀, old. Cumberland Gulf. / No. 6229 ♀, adult. Cumberland Gulf (Allen, p. 694).
¶ No. 4717, very old. Sable Island, Nova Scotia (Allen, p. 694).

Actual measurements in millimeters of a mounted skeleton of Phoca (Histriophoca) fasciata (No. 13285).

	Millimeters.
Length of skull	203
Length of cervical vertebræ	247.5
Length of dorsal vertebræ	547
Length of lumbar vertebræ	240
Length of sacral vertebræ	91
Length of caudal vertebræ	353
Length of scapula	141
Length of humerus	121
Length of radius	125
Length of manus	180
Length of pelvis	241
Length of femur	95
Length of tibia	240
Length of pes	345
Length of whole skeleton	1681.5
Length of fore-limb (exclusive of scapula)	430
Length of hind-limbs	666

Actual measurements of the vertebræ of Histriophoca fasciata (No. 13285) in millimeters.

Vertebræ.	Greatest width between extremo points of transverse processes.	Greatest height of body and neural spine.	Greatest width of body.	Greatest height of body (in median line).	Greatest length of body (antero-posterior).	Breadth of transverse processes near tip (antero-posterior).	Breadth of neural spine near tip (antero-posterior).	Greatest width across posterior zygapophyses.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
Cervicals:								
First	89	.....	.....	.....	.....	24	.....	.....
Second	41	55	30	21.5	*51	.....	39.5	47
Third	58	42.5	24	22	31	7	.....	53
Fourth	62.5	45	24	22	33	12	.....	54
Fifth	64.5	48	27	23	34	12	.....	55
Sixth	67	52	24	23	36	16	.....	57
Seventh	78	55	31	26	33	19	13	65
Dorsals:								
First	90	66	29	29	30	24	12	59
Second	86	72	44	32	28	20	12	45
Third	81	77	43	31	27	21	12.5	38
Fourth	78	74	44	40	22	20	15	36
Fifth	76	73	44	30	29	17	18	34.5
Sixth	74	62	44	25	26	18	20	34
Seventh	71	62	46	21	27	17	21	34
Tenth	65	64	46	25	30	16	17	40
Thirteenth	51	68	39	25	37	.....	18	42
Fifteenth	52	80	35	36	41	.....	22	45
Lumbars:								
First	85	80	37	36	42	16	18	46
Third	89	83	35	41	43	23	19	55
Fifth	81	72	39	31	38	17	18	62
Sacrals:								
First	99	67	.....	28	86	46	.....	.....
Second								
Third								
Caudals:								
First	48	37	24	21	29	.....	19	17
Fourth	.....	.....	22	19	30	.....	.....	.....
Sixth	25	.....	19	16	30	.....	.....	.....
Eighth	18	.....	17	13	24	.....	.....	.....
Tenth	.....	.....	.....	9	21	.....	.....	.....
Twelfth	.....	.....	.....	5	12	.....	.....	.....
Fourteenth	.....	.....	.....	3	7	.....	.....	.....

* With odontoid process.

Measurements of the sternum of Histriophoca fasciata, No. 13285, in millimeters.

	Greatest length.	Greatest width.	Greatest depth.
	mm.	*mm.*	*mm.*
First segment (manubrium)	25	20	20
Second segment	26	22	20
Third segment	29	23	20
Fourth segment	29	26	23
Fifth segment	30	30	22
Sixth segment	30	29	23
Seventh segment	32	28	24
Eighth segment	35	27	23
Ninth segment	75	23	19

Actual measurements of the ribs of Histriophoca fasciata, No. 13285, in millimeters.

	Length straight.	Angle to head.	Greatest width inferiorly.
	mm.	*mm.*	*mm.*
First rib	66	35	13
Second rib	83	36	11
Third rib	110	35	12
Fourth rib	147	35	15
Fifth rib	170	38	18
Sixth rib	192	35	18
Seventh rib	200	35	21
Eighth rib	205	35	22
Ninth rib	212	35	24
Tenth rib	215	37	25
Eleventh rib	230	34	21.5
Twelfth rib	220	30	18
Thirteenth rib	212	.....	16
Fourteenth rib	205	.....	14
Fifteenth rib	288	.....	9

Actual measurements of the limbs of Histriophoca fasciata (No. 13285) in millimeters.

	Millimeters.
Scapula	
Greatest width	181
Greatest depth	137
Diameter of articular fossa	40
Length of spine	111
Greatest height of spine	20
Humerus:	
Length in a straight line between articular facets	121
Radius:	
Greatest length	125
Width at the head	23
Width at the epiphysis	41
Ulna:	
Greatest length	166
Width of olecranon	63
Width at the epiphysis	20
Metacarpals:	
Greatest length	
First	58
Second	51
Third	40
Fourth	31
Fifth	34
Manus:	
Greatest length of first phalange (proximal) of first digit	71
Greatest length of second phalange of first digit	36
Greatest length of first phalange of second digit	45
Greatest length of second phalange of second digit	30
Greatest length of third phalange of second digit	30
Greatest length of first phalange of third digit	38
Greatest length of second phalange of third digit	31
Greatest length of third phalange of third digit	30
Greatest length of first phalange of fourth digit	33
Greatest length of second phalange of fourth digit	28
Greatest length of third phalange of fourth digit	26
Greatest length of first phalange of fifth digit	34
Greatest length of second phalange of fifth digit	24
Greatest length of third phalange of fifth digit	21

PELVIS:	
Greatest length	241
Depth of the crest	74
FEMUR:	
Length in straight line between articular facets	95
Greatest width inferiorly	61
FIBULA:	
Greatest length	240
TIBIA:	
Greatest length	240
FIBULA AND TIBIA:	
Greatest width	68
METATARSALS:	
Greatest length of first metatarsal	107
Greatest length of second metatarsal	79
Greatest length of third metatarsal	63
Greatest length of fourth metatarsal	69
Greatest length of fifth metatarsal	90
PES:	
Greatest length of first phalange of first digit	98
Greatest length of second phalange of first digit	62
Greatest length of first phalange of second digit	72
Greatest length of second phalange of second digit	53
Greatest length of third phalange of second digit	25
Greatest length of first phalange of third digit	67
Greatest length of second phalange of third digit	49
Greatest length of third phalange of third digit	19
Greatest length of first phalange of fourth digit	70
Greatest length of second phalange of fourth digit	49
Greatest length of third phalange of fourth digit	26
Greatest length of first phalange of fifth digit	78
Greatest length of second phalange of fifth digit	56
Greatest length of third phalange of fifth digit	36

EXPLANATION OF PLATES.

PLATE XI.—Skull of *Phoca* (*Histriophoca*) *fasciata*. Side view. Museum No. 13285.
PLATE XII.—Same. View from below.
PLATE XIII.—Same. View from above.
PLATE XIV.—Skeleton of *Phoca* (*Histriophoca*) *fasciata*. Side view.

ON THE SOURCE OF THE JADEITE IMPLEMENTS OF THE ALASKAN INNUITS.

By E. W. NELSON.

[Letter to Prof. Spencer F. Baird.]

The numerous specimens of jade or jadeite implements obtained by myself and others from the Alaskan Innuits have been secured mainly between the head of Norton Sound, in Bering Sea, and Point Barrow, on the Arctic coast. They are found most abundantly among the people inhabiting the lower courses of the large streams flowing into Kotzebue Sound. Owing to the hostile character of the natives and for other reasons I never penetrated this region, but met and interrogated num-

erous intelligent Innuits who lived in that district, and from whom I bought various jade articles. These people all agreed in the statement that the jade occurs on the side of a steep hill or mountain slope descending to one of the rivers, and each described its occurrence only along what appeared from their descriptions to be a well-marked vein, or perhaps a dike, extending from the water to the crest of the hill.

Jade celts also occur among the Indians of the Yukon about Nulato. They claim that the rough material is found upon the side of a mountain about 25 miles from Nulato. This is the same range in which the previous locality is situated. The Point Barrow Innuits hunt reindeer and mountain sheep along the northern border of these mountains, and undoubtedly obtain their crude material there. The same material is found in the mountains on the western part of the Kaviak Peninsula near Bering Strait. The Innuits of that district know it well and have many implements made from it. All I questioned as to the locality of this stone pointed to the mountains in the immediate vicinity. From Norton Sound south along the Alaskan coast to the vicinity of Bristol Bay this stone is almost or quite unknown among the Innuits, as I found when traveling among them; but the fine specimens recently received from Mr. McKay, at Bristol Bay, show conclusively that there must be another locality in that district where jade occurs in place.

That small water-worn fragments are very frequently used by the natives for celts, &c., is undoubtedly true, but that these fragments come from some point where the stone occurs as a part or whole of a vein is at least very probable, as shown by the Innuit description of the Kotzebue Sound locality. The Innuits call it a "fire-stone," and say it was made in a very hot fire when some of the volcanic cones of their mountains were in a state of eruption. On the Siberian shore of Bering Strait only a very few jade fragments were seen by me, and their owners all claimed to have obtained them on the American side.

GLORIETA, NEW MEXICO, *July* 29, 1883.

ON THE ORIGIN OF THE FOSSIL BONES DISCOVERED IN THE VICINITY OF TISE'S FORD, FLORIDA.

By S. T. WALKER.

[Letter to Prof. Spencer F. Baird.]

The day after I wrote to you from Fort Ogden, on Peace Creek, I procured a small skiff, and the services of two strong negroes to row it, and proceeded up the river in search of Tise's Ford, which I was informed was 17 miles by the river and 8 miles by land. The rainy season having set in, the river was slightly swollen, and rising, which produced a considerable current increasing in strength as we ascended until rowing became quite a labor. The shores of the river were bold for

this region, and were clothed with a magnificent growth of cypress, oak, and hickory trees, though at all points examined by me the high shores sloped rapidly away to low, wet swamps. About 7 miles (by the river) above Fort Ogden I met the first indications of fossil bones. On a low point, where the river makes a sudden bend, lay a small bed of gravel interspersed with innumerable fragments of bones, bits of turtle shell, &c., still retaining their bony structure, and in no way changed or petrified. From this point onward every sand-bar had its bed of gravel with similar fragments of bone, bits of deer's horns, and turtle shell. Each successive sand-bar held large pieces, and I vainly examined bluffs for some indication of the fossils *in situ*. Shark's teeth (quite small) with the enamel unbroken were quite plentiful. The bluffs were composed of white or yellow sand, overlying patches of grayish clay, soft sandstone rocks, or very soft limestone. The sand only was continuous, the clay and soft rocks cropping out here and there. As we ascended the stream narrowed and the cur ent was so swift that we could not make more than a mile and a half an hour. There being no houses on the river, excepting at the ferries, we could make no inquiries. At the first ferry, 3 miles above Fort Ogden, they had never heard of Tise's Ford. At the second, the ferryman informed us that there are two fords of that name, one 8 miles above and the other 4 miles below; that bones could be found on all the bars and along the shores almost anywhere, but that they were more plentiful at Gardner's Bluffs, 5 miles above, and at Tise's Ford, 4 miles below, than any where else. The river seeming to have very little current above this ferry, I determined to push on to the upper ford. It was now 5 o'clock in the afternoon and my crew showed signs of rebellion, but finally agreed to pull to Gardner's Bluffs, which we reached about sundown. Here I found a bed of gravel 10 inches thick, which seemed to extend under the bluff. The gravel and fragments of bone seemed to be very slightly waterworn, their angles in many instances appearing quite sharp. At this place a small stream emptied into the river. Between the river and the brook the banks were 10 feet high, and I had the satisfaction of finding that the stratum of gravel extended quite through to the little brook. Here my men positively refused to proceed, so I determined to leave them and proceed alone, as the mosquitoes gave little to be hoped for in the way of sleep during the night. I ordered them to dig in the bluff the next day, and to save all objects of interest they might find, and taking the boat I began the ascent alone. I pulled steadily until 2 o'clock, when, overcome with fatigue, I lay down in the boat and fought the mosquitoes until day. The next morning I dropped down the river leisurely, examining every sand-bar and bluff, and following several small streams half a mile up on foot, without finding the mysterious source of this bone supply. When I got back I found my men digging like heroes, each of them having his pockets stuffed with lumps of iron pyrites, which they fondly imagined to be gold. I kept my counsel for the present, and suffered the rebels

to dig until I found there was no prospect of unearthing a complete bone, much less a skeleton, when I stopped them and began the return, which was rapid and easy. On reaching Tise's Ford I made a thorough examination of that locality. In a cut-off or old river-bed I found a vast number of fragments of huge bones, but none entire except one small vertebra, which I send you. My opinion is that the bones are washed up from the bottom of the river during high water, as I failed to find the slightest evidence of any fossils in the clays. The bed of gravel at Gardner's Bluffs I think was deposited in ancient times by the river. I am induced to think thus because at Fort Meade and other places above they dig up sharks' teeth, turtles, and bones in wells at the depth of 18 and 20 feet.

MILTON, FLORIDA, *August* 10, 1883.

[Proceedings United States National Museum, 1883. Appendix.]

SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

No. 19.

CLASSIFICATION OF THE MATERIA MEDICA COLLECTION OF THE U. S. NATIONAL MUSEUM, AND CATALOGUE OF SPECIMENS.

By JAMES M. FLINT,

Surgeon U. S. Navy, Curator of the Department of Materia Medica.

CLASSIFICATION.

I.—ANIMAL PRODUCTS.
II.—VEGETABLE PRODUCTS.
III.—PRODUCTS OF FERMENTATION AND DISTILLATION.
IV.—INORGANIC PRODUCTS.

I.—ANIMAL PRODUCTS.

VERTEBRATA.

A.—MAMMALIA:
I.—Carnivora.
II.—Cetacea.
III.—Ungulata.
IV.—Rodentia.
B.—AVES.
C.—REPTILIA.
D.—AMPHIBIA.
E.—PISCES.

MOLLUSCA.

F.—CEPHALOPODA.
G.—GASTROPODA.
H.—LAMELLIBRANCHIATA.

ARTHROPODA.

I.—INSECTA:
I.—Coleoptera.
II.—Hemiptera.
III.—Hymenoptera.
K.—CRUSTACEA.

VERMES.

L.—ANNELIDA.

CŒLENTERATA.

M.—ACTINOZOA.
N.—SPONGIA.

II.—VEGETABLE PRODUCTS.

[From Bentham and Hooker: GENERA PLANTARUM.]

DICOTYLEDONES.

POLYPETALÆ.

SERIES I.—THALAMIFLORÆ.

COHORT I.—RANALES.

1. Ranunculaceæ.
2. Dilleniaceæ.
3. Calycanthaceæ.
4. Magnoliaceæ.
5. Anonaceæ.
6. Menispermaceæ.
7. Berberideæ.
8. Nymphæaceæ.

COHORT II.—PARIETALES.

9. Sarraceniaceæ.
10. Papaveraceæ.
11. Cruciferæ.
12. Capparideæ.
13. Resedaceæ.
14. Cistineæ.
15. Violarieæ.
16. Canellaceæ.
17. Bixineæ.

COHORT III.—POLYGALINÆ.

18. Pittasporeæ.
19. Tremandreæ.
20. Polygaleæ.

20*a*. Vochysiaceæ.

COHORT IV.—CARYOPHYLLINÆ.

21. Frankeniaceæ.
22. Caryophylleæ.
23. Portulaceæ.
24. Tamariscineæ.

COHORT V.—GUTTIFERALES.

25. Elatineæ.
26. Hypericineæ.
27. Guttiferæ.
28. Ternstrœmiaceæ.
29. Dipterocarpeæ.
30. Chlamaceæ.

COHORT VI.—MALVALES.

31. Malvaceæ.
32. Sterculiaceæ.
33. Tiliaceæ.

SERIES II.—DISCIFLORÆ.

COHORT VII.—GERANIALES.

34. Lineæ.
35. Humeriaceæ.
36. Malpighiaceæ.
37. Zygophylleæ.
38. Geraniaceæ.
39. Rutaceæ.
40. Simarubeæ.
41. Ochnaceæ.
42. Burseraceæ.
43. Meliaceæ.
44. Chailletiaceæ.

COHORT VIII.—OLACALES.

45. Olacineæ.
46. Ilicineæ.

COHORT IX.—CELASTRALES.

47. Celastrineæ.
48. Stackhausieæ.
49. Rhamneæ.
50. Ampelideæ.

COHORT X.—SAPINDALES.

51. Sapindaceæ.
52. Sabiaceæ.
53. Anacardiaceæ.
54. Coriarieæ.
55. Moringeæ.

SERIES III.—CALYCIFLORÆ.

COHORT XI.—ROSALES.

56. Connaraceæ.
57. Leguminosæ.
58. Rosaceæ.
59. Saxifrageæ.
60. Crassulaceæ.
61. Droseraceæ,
62. Hamamelideæ.
63. Bruniaceæ.
64. Halorageæ.

COHORT XII.—MYRTALES.

65. Rhizophoreæ.
66. Combretaceæ.
67. Myrtaceæ.
68. Melastomaceæ.
69. Lythrarieæ.
70. Onagrarieæ.

COHORT XIII.—PASSIFLORALES.

71. Samydaceæ.
72. Loaseæ.
73. Turneraceæ.
74. Passifloreæ.
75. Cucurbitaceæ.
76. Begoniaceæ.
77. Datisceæ.

COHORT XIV.—FICOIDALES.

78. Cacteæ.
79. Ficoideæ.

COHORT XV.—UMBELLALES.

80. Umbelliferæ.
81. Araliaceæ.
82. Cornaceæ.

GAMOPETALÆ.

SERIES I.—INFERÆ.

COHORT I.—RUBIALES.

83. Caprifoliaceæ.
84. Rubiaceæ.

COHORT II.—ASTERALES.

85. Valerianeæ.
86. Dipsaceæ.
87. Calycereæ.
88. Compositæ.

COHORT III.—CAMPANALES.

89. Stylidieæ.
90. Goodenovieæ.
91. Campanulaceæ.

SERIES II.—HETEROMERÆ.

COHORT IV.—ERICALES.

92. Vacciniaceæ.
93. Ericaceæ.
94. Monotropeæ.
95. Epacrideæ.
96. Diapensiaceæ.
97. Lennoaceæ.

COHORT V.—PRIMULALES.

98. Plumbagineæ.
99. Primulaceæ.
100. Myrcineæ.

COHORT VI.—EBENALES.

101. Sapotaceæ.
102. Ebenaceæ.
103. Styraceæ.

SERIES III.—BICARPELLATÆ.

COHORT VII.—GENTIANALES.

104. Oleaceæ.
105. Salvadoraceæ.
106. Apocynaceæ.
107. Asclepiadeæ.
108. Loganiaceæ.
109. Gentianeæ.

COHORT VIII.—POLEMONIALES.

110. Polemoniaceæ.
111. Hydrophyllaceæ.
112. Borragineæ.
113. Convolvulaceæ.
114. Solanaceæ.

COHORT IX.—PERSONALES.

115. Scrophularineæ.
116. Orobranchaceæ.
117. Lentibularieæ.
118. Columelliaceæ.
119. Gesneraceæ.
120. Bignoniaceæ.
121. Pedalineæ.
122. Acanthaceæ.

COHORT X.—LAMIALES.

123. Myoporineæ.
124. Selagineæ.
125. Verbenaceæ.
126. Labiatæ.
127. Plantagineæ.

MONOCHLAMYDEÆ.

SERIES I.—CURVEMBRYEÆ.

128. Nyctagineæ.
129. Illecebraceæ.
130. Amarantaceæ.
131. Chenopodiaceæ.
132. Phytolaccaceæ.
133. Batideæ.
134. Polygonaceæ.

SERIES II.—MULTIOVULATÆ AQUATICÆ.

135. Podostomaceæ.

SERIES III.—MULTIOVULATÆ TERRESTRES.

136. Nepenthaceæ.
137. Cytinaceæ.
138. Aristolochiaceæ.

SERIES IV.—MICREMBRYEÆ.

139. Piperaceæ.
140. Chloranthaceæ.
141. Myristiceæ.
142. Monimiaceæ.

SERIES V.—DAPHNALES.

143. Laurineæ.
144. Protiaceæ.

SERIES V.—DAPHNALES.

145. Thymelæaceæ.
146. Penæaceæ.
147. Eleagnaceæ.

SERIES VI.—ACHLAMYDOSPOREÆ.

148. Loranthaceæ.
149. Santalaceæ.
150. Balanophoreæ.

SERIES VII.—UNISEXUALES.

151. Euphorbiaceæ.
152. Balanopseæ.
153. Urticaceæ.
154. Plantanaceæ.
155. Leitnerieæ.
156. Juglandeæ.
157. Myricaceæ.
158. Casuarineæ.
159. Cupuliferæ.

SERIES VIII.—ORDINES ANOMALI.

160. Salicineæ.
161. Lacistemaceæ.
162. Empetraceæ.
163. Ceratophylleæ.

GYMNOSPERMEÆ.

164. Gnetaceæ.
165. Coniferæ.
166. Cycadaceæ.

MONOCOTYLEDONES.

SERIES I.—MICROSPERMÆ.

167. Hydrocharideæ.
168. Burmanniaceæ.
169. Orchideæ.

SERIES II.—EPIGYNÆ.

170. Scitamineæ.
171. Bromeliaceæ.
172. Hæmadoraceæ.
173. Irideæ.
174. Amaryllideæ.
175. Taccaceæ.
176. Dioscoreaceæ.

SERIES III.—CORONARIEÆ.

177. Roxburghiaceæ.
178. Liliaceæ.
179. Pontederiaceæ.
180. Philydraceæ.
181. Xylideæ.
182. Mayaceæ.
183. Commelinaceæ.
184. Rapateaceæ.

SERIES IV.—CALYCINÆ.

185. Flagellarieæ.
186. Juncaceæ.
187. Palmæ.

SERIES V.—NUDIFLORÆ.

188. Pandaneæ.
189. Cyclanthaceæ.
190. Typhaceæ.
191. Aroideæ.
192. Lemnaceæ.

SERIES VI.—APOCARPÆ.

193. Triurideæ.
194. Alismaceæ.
195. Naiadaceæ.

SERIES VII.—GLUMACEÆ.

196. Eriocauleæ.
197. Centrolepideæ.
198. Restiaceæ.
199. Cyperaceæ.
200. Gramineæ.

CRYPTOGAMÆ.

[From Luerssen: MEDICINISCH-PHARMACEUTISCHE BOTANIK.]

CLASS I.—LYCOPODINÆ.

201. Selaginellæ.
202. Isoëtaceæ.
203. Lycopodiaceæ.

CLASS II.—EQUISETINÆ.

204. Equisetaceæ.

CLASS III.—FILICINÆ.

205. Rhizocarpeæ.
206. Ophioglossaceæ.
207. Marattiaceæ.
208. Filices.

CLASS IV.—MUSCI.

209. Stegocarpæ.
210. Cleistocarpæ.
211. Sphagna.
212. Schizocarpæ.

CLASS V.—HEPATICÆ.

213. Jungermanniaceæ.
214. Marchantiaceæ.
215. Anthoceroteæ.
216. Ricciaceæ.

CLASS VI.—CARPOSPOREÆ.

217. Basidiomycetes.
218. Ascomycetes.
219. Florideæ.
220. Coleochaeteæ.

CLASS VII.—OOSPOREÆ.

221. Fucoideæ.
222. Characeæ.
223. Œdogonieæ.
224. Coeloblasteæ.
225. Sphæropleeæ.
226. Coenobieæ.

CLASS VIII.—ZYGOSPOREÆ.

227. Zygomycetes.
228. Conjugatæ.
229. Myxomycetes.
230. Zoosporeæ.

CLASS IX.—PROTOPHYTA.

231. Saccharomycetes.
232. Schizomycetes.
233. Cyanophyceæ (Phycochromaceæ).
234. Chlorophyllophyceæ.

III.—PRODUCTS OF FERMENTATION AND DISTILLATION.

(Not subdivided.)

IV.—INORGANIC PRODUCTS.

[From Roscoe & Schorlemmer: TREATISE ON CHEMISTRY.]

NON-METALLIC ELEMENTS.

MONADS:

I.—Hydrogen	H.
II.—Chlorine	Cl.
III.—Bromine	Br.
IV.—Iodine	I.
V.—Fluorine	F.

DYADS:

VI.—Oxygen	O.
VII.—Sulphur	S.
VIII.—Selenium	Se.
IX.—Tellurium	Te.

TRIADS:

X.—Nitrogen	N.
XI.—Phosphorus	P.
XII.—Arsenic	As.

TETRADS:

XIII.—Carbon	C.
XIV.—Silicon	Si.
XV.—Boron	B.

METALLIC ELEMENTS.

METALS OF THE ALKALIES:

XVI.—Potassium	K.
XVII.—Sodium	Na.
XVIII.—Lithium	Li.
XIX.—Rubidium	Rb.
XX.—Cæsium	Cs.

METALS OF THE ALKALINE EARTHS:

XXI.—Calcium	Ca.
XXII.—Strontium	Sr.
XXIII.—Barium	Ba.

MAGNESIUM GROUP:

XXIV.—Beryllium	Be.
XXV.—Magnesium	Mg.
XXVI.—Zinc	Zn.
XXVII.—Cadmium	Cd.

LEAD GROUP:

XXVIII.—Lead	Pb.
XXIX.—Thallium	Tl.

COPPER GROUP:
XXX.—Copper ..... Cu.
XXXI.—Silver ..... Ag.
XXXII.—Mercury ..... Hg.
CERIUM GROUP:
XXXIII.—Yttrium ..... Y.
XXXIV.—Lanthanum ..... La.
XXXV.—Cerium ..... Ce.
XXXVI.—Didymium ..... Di.
XXXVII.—Erbium ..... Er.
ALUMINIUM GROUP:
XXXVIII.—Aluminium ..... Al.
XXXIX.—Indium ..... In.
XL.—Gallium ..... Ga.
IRON GROUP:
XLI.—Manganese ..... Mn.
XLII.—Iron ..... Fe.
XLIII.—Nickel ..... Ni.
XLIV.—Cobalt ..... Co.
CHROMIUM GROUP:
XLV.—Chromium ..... Cr.
XLVI.—Molybdenum ..... Mo.
XLVII.—Tungsten ..... W.
XLVIII.—Uranium ..... U.
TIN GROUP:
XLIX.—Tin ..... Sn.
L.—Zirconium ..... Zr.
LI.—Thorium ..... Th.
ANTIMONY GROUP:
LII.—Vanadium ..... V.
LIII.—Antimony ..... Sb.
LIV.—Bismuth ..... Bi.
LV.—Tantalum ..... Ta.
LVI.—Niobium ..... Nb.
GOLD GROUP:
LVII.—Gold ..... Au.
LVIII.—Platinum ..... Pt.
LIX.—Ruthenium ..... Ru.
LX.—Rhodium ..... Rh.
LXI.—Palladium ..... Pd.
LXII.—Iridium ..... Ir.
LXIII.—Osmium ..... Os.

ALPHABETICAL INDEX TO CLASSIFICATION.

Name.	Symbol.
Ericaceæ	93
Eriocauleæ	196
Euphorbiaceæ	151
Ficoideæ	79
Filices	208
Flagellarieæ	185
Florideæ	219
Fluorine	V
Frankiniaceæ	21
Fucoideæ	220
Gallium	XL
Gasteropoda	G.
Gentianeæ	109
Geraniaceæ	38
Gesneraceæ	119
Gnetaceæ	164
Gold	LVII
Goodenovieæ	90
Gramineæ	200
Guttiferæ	27
Hamamelideæ	62
Hæmodoraceæ	172
Haloragеæ	64
Hemiptera	Iii
Humeriaceæ	35
Hydrocharideæ	167
Hydrogen	I
Hydrophyllaceæ	111
Hymenoptera	Iiii
Hypericineæ	26
Ilicineæ	46
Illecebraceæ	129
Indium	XXXIX
Insecta	I.
Iodine	IV
Irideæ	173
Iridium	LXII
Iron	XLII
Isoëtaceæ	202
Juglandeæ	156
Juncaceæ	186
Jungermanniaceæ	213
Labiatæ	126
Lacistemaceæ	161
Lamellibranchiata	II.
Lanthanum	XXXIV
Laurineæ	143
Lead	XXVIII
Leguminosæ	57
Leitnerieæ	155
Lemnaceæ	192
Lennaceæ	97
Lentibularieæ	117
Liliaceæ	178
Lineæ	34
Lithium	XVIII
Loaseæ	72
Loganiaceæ	108
Loranthaceæ	148
Lycopodiaceæ	203
Lythrarieæ	69
Magnesium	XXV
Magnoliaceæ	4
Malpighiaceæ	36
Malvaceæ	31

Name.	Symbol.
Manganese	XLI
Marattiaceæ	207
Marchantiaceæ	214
Mayaceæ	182
Melastomaceæ	68
Meliaceæ	43
Menispermaceæ	6
Mercury	XXXII
Molybdenum	XLVI
Monimiaceæ	142
Monotropeæ	94
Moringeæ	55
Myoporineæ	123
Myrcineæ	100
Myricaceæ	157
Myristiceæ	141
Myrtaceæ	67
Myxomycetes	229
Naiadaceæ	195
Nepenthaceæ	136
Nickel	XLIII
Niobium	LVI
Nitrogen	X
Nyctagineæ	128
Nymphæaceæ	8
Ochnaceæ	41
Œdogonieæ	223
Olacineæ	45
Oleaceæ	104
Onagrarieæ	70
Ophioglossaceæ	206
Orchideæ	169
Orobranchaceæ	116
Osmium	LXIII
Oxygen	VI
Palladium	LXI
Palmæ	187
Pandaneæ	188
Papaveraceæ	10
Passifloreæ	74
Pedalineæ	121
Penæaceæ	146
Pentederiaceæ	179
Philydraceæ	180
Phosphorus	XI
Phytolaccaceæ	132
Piperaceæ	139
Pisces	E.
Pittosporeæ	18
Plantagineæ	127
Plantanaceæ	154
Platinum	LVIII
Plumbagineæ	98
Podostomaceæ	135
Polemoniaceæ	110
Polygaleæ	20
Polygonaceæ	134
Portulaceæ	23
Potassium	XVI
Primulaceæ	99
Protiaceæ	144
Ranunculaceæ	1
Rapateaceæ	184
Reptilia	C.
Resedaceæ	13

Name.	Symbol.
Restiaceæ	198
Rhamneæ	49
Rhizocarpeæ	205
Rhizophoreæ	65
Rhodium	LX
Ricciaceæ	216
Rodentia	A iv
Rosaceæ	58
Roxburghiaceæ	177
Rubiaceæ	84
Rubidium	XIX
Rutaceæ	39
Ruthenium	LIX
Sabiaceæ	52
Saccharomycetes	231
Salicineæ	160
Salvadoraceæ	105
Santalaceæ	149
Samydaceæ	71
Sapindaceæ	51
Sapotaceæ	101
Sarracenaceæ	9
Saxifrageæ	59
Schizocarpæ	212
Schizomycetes	232
Scitamineæ	170
Scrophularineæ	115
Selagineæ	124
Selaginellæ	201
Selenium	VIII
Silicon	XIV
Silver	XXXI
Simarubeæ	40
Sodium	XVII
Solanaceæ	114
Sphæropleeæ	225
Sphagna	211
Spongia	N.
Stackhousiaeæ	48
Stegocarpæ	209
Sterculiaceæ	32
Strontium	XXII
Stylidieæ	89
Styraceæ	103
Sulphur	VII
Taccaceæ	175
Tamariscineæ	24
Tantalum	LV
Tellurium	IX
Ternstromiaceæ	28
Thallium	XXIX
Thorium	LI
Thymelæaceæ	145
Tiliaceæ	33
Tin	XLIX
Tremendreæ	19
Triurideæ	193
Tungsten	XLVII
Turneraceæ	73
Typhaceæ	190
Umbelliferæ	80
Ungulata	A iii
Uranium	XLVIII
Urticaceæ	153
Vacciniaceæ	92
Valerianeæ	85
Vanadium	LII
Verbenaceæ	125
Violarieæ	15
Vochysiaceæ	20
Xrrideæ	181
Yttrium	XXXIII
Zinc	XXVI
Zingiberaceæ	169
Zirconium	L
Zoosporeæ	230
Zygomycetes	227
Zygophylleæ	37

CATALOGUE OF SPECIMENS IN THE MATERIA MEDICA COLLECTION OF THE UNITED STATES NATIONAL MUSEUM, MAY 1, 1883.

EXPLANATIONS.—Letters (A, B, &c.) refer to classes of animal products, according to the preceding classification.

Arabic numerals refer to botanical orders.

The star (*) indicates those specimens classed under "products of fermentation and distillation."

Roman numerals refer to the classification of chemical substances.

The abbreviation M. F. indicates that the specimen may be found in the section illustrative of medicinal forms.

(India) signifies that the specimen was a contribution from the Kurrachee Museum, India. In other instances the name of a country, in parentheses, indicates that the specimen to which it is attached formed part of the exhibit of that country at the International Exhibition at Philadelphia in the year 1876.

The specimens in the collection are arranged in the cases according to the preceding classification, beginning immediately after "medicinal forms", and continuing in regular order from left to right. The first specimen in each class is indicated by the appropriate symbol of the class, in large characters, on the case.

Abelmoschus moschatus. Seed. MUSK-SEED 31
Abies canadensis. HEMLOCK SPRUCE. Bark; fl. ext.; oil 165
Abies picea. Seeds (Chili) 165
Abrus precatorius. INDIAN LICORICE. Root; Seeds (India).. 57
Acacia, sp. var. Gum; (1st, 2d, 3d, 4th, 5th;) "sorts"; "Senegal," "Gedda;" "Babool;" granulated; pow'd (1st, 2d, 3d, 4th); "Sennari;" "Barbary" 57
Acacia leucophlœa. Bark 57
Acæna argentea. Herb (Chili) 58
Acæna pimpinela. Fruit (Chili) 58
Acæna splendens. Rhiz. (Chili) 58
Acanthus. Seeds (India) 122
Acer negundo. Bark 51
Achillea ageratum. Herb 88
Achillea millefolium. Herb; ground; fl. ext 88
Acidum arseniosum. Mass; pil. (gr. $\frac{1}{60}$) XII
Acidum citricum 39
Acidum oxalicum 38
Acidum phosphoricum glaciale XI
Acidum stearicum XII
Acidum sulphuricum ..... M. F.

Acidum tartaricum. Crystals; pow'd 50
Aconitum napellus. Root, German; ground; Japanese; English ground; powder; tinct. (Fleming's); fl. ext.; sol. pil. (gr. $\frac{1}{8}$); pil. tinc. ($\frac{1}{10}$ min.) 1
Aconitum napellus. Leaves; pow'd; fl. ext 1
Aconitum heterophyllum. ATIS. Root 1
Aconitum palmatum. BIKH or BISH. Root. 1
Acorus calamus. SWEET-FLAG. Rhiz.; do. (India); bleached; crushed; pow'd; oil 191
Adenanthera pavonina. WOOD (India) 57
Adiantum capillus-veneris. MAIDEN HAIR. Fronds (Chili); do. (India) 208
Adiantum venustum. Fronds (India) 208
Adonis vernalis. Herb 1
Ægle marmelos. BAEL FRUIT 39
Æther aceticus ..... M. F.
AGARIC (*Polyporus officinalis*) 217
Agati grandiflora. Bark (India) 57
Agave americana. AMERICAN ALOE. CENTURY PLANT. Root. 174
Ailanthus glandulosa. TREE OF HEAVEN. Seeds (Chili); bark; fl. ext 40
AJOWAN SEED (*Carum ajowan*) 80
Albumen ovi. EGG ALBUMEN ..... B.
Albumen sanguinis. BLOOD ALBUMEN ..... AIII
Alchemilla vulgaris. LADIES' MANTLE. Leaves 58
Alcohol ..... *
Alcohol, deodorized. COLOGNE SPIRIT ..... *
Alcohol amylicum. FUSEL OIL ..... *
Aletris farinosa. COLIC ROOT. STAR GRASS. Rhiz. 172
Algaroba (*Prosopis*) 57
Algarobilla (*Balsamocarpum brevifolium*). Pods (Chili) 57
Alkanna tinctoria. ALKANET. Root; pow'd 112
Allium cepa. ONION. Bulb 178
Allium sativum. GARLIC. Bulb (India) 178
Alnus serrulata. AMER. ALDER. Bark 157
Alnus rubra. TAG ALDER. Bark; fl. ext 157
Aloe, Barbadoes. Inspissated juice; pow'd 178
Aloe, Bonare. Inspissated juice; pow'd 178
Aloe, Cape. (3 spec.) Inspissated juice; pow'd 178
Aloe, lump. Inspissated juice 178
Aloe, Natal. Inspissated juice 178
Aloe, Socotrine. Inspissated juice; in monkey skin; hard; liquid; purified; lump; pow'd 178
Aloe, Zanzibar. Inspissated juice 178
Aloes tinctura 178
Aloes et Canellæ pulvis. HIERA PICRA 178

Andropogon nardus. CITRONELLE. Oil 200
Anemiopsis californicum. Root; fl. ext 139
Anemone cernua. HAK-TAN-AU 1
Anemone pratensis. PULSATILLA. Herb; fluid ext 1
Anethum graveolens. DILL. Fruit; oil 80
Anethum sowa. INDIAN DILL. Root; Fruit 80
Angelica archangelica. Seed; Leaf; Root; pow'd 80
ANGUSTURA (*Galipea cusparia*) 39
Anime. Gum; select 57
Anisum (*Pimpinella anisum*) 80
Anona Humboldtiana (*Chirimoya*). Seed (Arg. Rep.) 5
Anthemis nobilis. CHAMOMILE FLOWERS. Belgian; pow'd; fl. ext.; oil; Herb (India) 88
Antimonium. Metal LIII
Antimonium. Sulphuret. Ore; pow'd LIII
Antimonium. Sulphuret. (Crude antim.); pow'd LIII
Antimonium. Sulphuret. Co. pill (Plummer's) LIII
Antimonii sulphuretum aureum LIII
Antirrhinum glaucum. Tops crushed (India) 115
Apiol 80
Apium graveolens. CELERY. Fruit 80
Aplectrum hyemale. PUTTY ROOT 169
Aplotaxis auriculata. Root 88
Apocynum androsæmifolium. DOG'S BANE. Pow'd root; fl. ext. 106
Apocynum cannabinum. INDIAN HEMP. Root; pow'd 106
Aquilaria Agallocha. LIGN-ALOES. Wood 145
Arachis hypogea. PEANUT. Kernels (Peru); oil 57
Aralia hispida. DWARF ELDER. Fl. ext 81
Aralia nudicaulis. FALSE SARSAPARILLA. Rhizome; crushed; pow'd 81
Aralia spinosa. Bark 81
Araroba. GOA POWDER 57
Araucaria imbricata. Seeds (Chili) 165
Arctostaphylus glauca. MANZANITA. Leaves; fl. ext 93
Arctostaphylus Uva Ursi. Leaves; ground; pow'd; fl. ext 93
Areca catechu. BETEL NUT. Seed; pow'd; fl. ext 187
Argemone mexicana. CARDO SANTO. Seed; Root 10
Aristolochia appendiculata. MILHOME. Stems and leaves (Arg. Rep.); stems (Brazil) 138
Aristolochia bracteata. Herb (India) 138
Aristolochia maqui. Berries (Chili) 138
Aristolochia maxima. Stems (Venez.); do. (Br. Guiana) 138
Aristolochia rotunda. Root (India) 138
Aristolochia serpentaria. VIRGINIA SNAKE-ROOT. Rhiz.; crushed; pow'd; fl. ext.; Leaves (Dutch Agr. Soc.) 138

Celastrus montanus. Seed (India) 47
Centaurea Behen. WHITE BEHEN. Root..... 88
Centaurea cyanus. BLUE BOTTLE. Flowers..... 88
CENTAURY (*Erythræa Centaurium*) 109
Cera alba. WHITE WAX. "Star"; Philip's and Leonard's... I III
Cera flava. YELLOW WAX ..... I III
Cerasin 58
Ceratum simplex..... M. F.
Cercis canadensis. JUDAS TREE. Bark; fl. ext 75
Cercis siliquastrum. Seed (Chili)..... 57
Cerii oxalas. Pills..... XXXV
Cestrum parqui. Stem (Chili)..... 114
Cetaceum. SPERMACETI ..... A II
Cetraria islandica. ICELAND MOSS..... 218
Chamico (*Stramonium offic.*) 114
Charta cantharidis..... M. F.
Chaulmugra (*Gynocardia odorata*) 17
Chavica Roxburghii (*Piper longum*). Root (India); Fruit..... 139
Chelidonium majus. CELANDINE. Fl. ext 10
Chenopodium anthelminticum. WORM SEED. Leaves; Seed; ground; Oil 131
CHEWSTICK (*Gouania dominguensis*) 49
CHICLE (*Achras sapota*) 101
Chimaphila umbellata. PIPSISSEWA. Herb; ground; fl. ext. 93
Chionanthus virginica. FRINGE-TREE. Root-bark; fl. ext... 104
Chiretta (*Agathotes chirayta*). Herb; crushed 109
Chloroformum purificatum..... *
Chocolata ferruginosa..... M. F.
Chondodendron tomentosum. PAREIRA BRAVA. Root..... 6
Chondrus crispus. IRISH MOSS 219
Chorisia insignis. PALO BORRACHO. Seed (Arg. Rep.) 32
Cichorium intybus. CHICORY. Root; cut; Fruit (India); Herb (Chili) 88
Cicuta virosa. Herb (Dutch Agr. Soc.) 80
CIGARETTES, Espic's..... M. F.
Cimicifuga racemosa. Rhiz.; pow'd; fl. ext 1

Cinchona Barks.

CALISAYA Bark; crushed; elix.; elix. iron-strych.; elix. cal. iron & bismuth; wine..... 84
YELLOW CINCHONA. Bark; crushed..... 84
RED CINCHONA. Quills; ground; powd.; fl. ext.; tinct. co.. 84
RED CINCHONA. No. 2. "RUBINGOSA" 84
LOXA BARK. Bark; crushed; powd.; fl. ext..... 84
Cinchona cuyabenis. Brazil 84

Cinchona cordifolia var. *rotundifolia*. "ORITUCO." Venezuela 84
CINCHONA BARK. "BARQUISEMETO." Venezuela..... 84
CINCHONA BARK. "CARAYACA." Venezuela..... 84
Cinchona succirubra. Mexico, cultivated..... 84
Cinchona calisaya. Mexico, cultivated..... 84

Specimens from Howard and Sons, London, per W. H. Schieffelin & Co., New York.

Cinchona officinalis. South America..... 84
Cinchona officinalis var. *Uritusinga*. Madras..... 84
Cinchona officinalis. Renewed. Madras..... 84
Cinchona officinalis. Java..... 84
Cinchona officinalis. Ceylon, 2 sp..... 84
Cinchona officinalis var. *Jussieu*..... 84
Cinchona officinalis var. *crispa*..... 84
Cinchona succirubra. South America 2..... 84
Cinchona succirubra. Mossed. Madras..... 84
Cinchona succirubra. "DARJHEELING." Madras..... 84
Cinchona succirubra. Renewed. "PYKARRAH." Madras.... 84
Cinchona succirubra. Ceylon..... 84
Cinchona succirubra. Java..... 84
Cinchona javonica. Java 2..... 84
Cinchona Hasskarliana. Java..... 84
Cinchona Pahudiana. Java..... 84
Cinchona Pelletierana. South America..... 84
Cinchona Ledgeriana. Java..... 84
Cinchona Schuhkraft. Java..... 84

Specimens from government plantations, India.

Cinchona officinalis, uritusinga. Natural. Dodabetta, Nilgiris. 84
Cinchona officinalis, uritusinga. Mossed. Dodabetta, Nilgiris. 84
Cinchona officinalis, uritusinga. Renewed. Dodabetta, Nilgiris. 84
Cinchona officinalis, condaminea. Renewed. Dodabetta, Nilgiris..... 84
Cinchona officinalis. From coppice shoots. Dodabetta, Nilgiris..... 84
Cinchona officinalis. Renewed after shaving. Dodabetta, Nilgiris..... 84
Cinchona officinalis (?) CORKY BARK. Natural. Dodabetta, Nilgiris..... 84
Cinchona officinalis. Renewed. Dodabetta, Nilgiris..... 84
Cinchona officinalis, condaminea. Renewed. Naduvattam, Nilgiris..... 84
Cinchona officinalis, angustifolia. Natural. Dodabetta, Nilgiris..... 84

Cinchona officinalis, angustifolia (No. 1.) Mossed, renewed. Dodabetta, Nilgiris 84
Cinchona officinalis, angustifolia (No. 2.) Renewed. Dodabetta, Nilgiris 84
Cinchona officinalis. Natural. Naduvattam, Nilgiris 84
Cinchona officinalis. Mossed. Naduvattam, Nilgiris 84
Cinchona pitayensis. Natural. Dodabetta, Nilgiris 84
Cinchona Pahudiana. Natural. Dodabetta, Nilgiris 84
Cinchona Pahudiana. Mossed. Dodabetta, Nilgiris 84
Cinchona Pahudiana. Natural. Naduvattam, Nilgiris 84
Cinchona (?) CORKY BARK. Renewed. Dodabetta, Nilgiris .. 84
Cinchona (?) CORKY BARK. Natural. Dodabetta, Nilgiris ... 84
Cinchona micrantha. Natural. Naduvattam, Nilgiris 84
Cinchona calisaya. Natural. Naduvattam, Nilgiris 84
Cinchona calisaya, β. Josephiana. Natural. Naduvattam, Nilgiris 84
Cinchona anglica. Natural. Naduvattam, Nilgiris 84
Cinchona anglica. Renewed. Naduvattam, Nilgiris 84
Cinchona anglica. Mossed. Naduvattam, Nilgiris 84
Cinchona (*pubescens*). Natural. Dodabetta, Nilgiris 84
Cinchona (*pubescens*). Renewed. Dodabetta, Nilgiris 84
Cinchona (*pubescens*). Natural. Naduvattam, Nilgiris 84
Cinchona (*pubescens*). Renewed. Naduvattam, Nilgiris 84
Cinchona ? (*hybrid*). Natural. Dodabetta, Nilgiris 84
Cinchona (*pubescens*) (*hybrid*). Renewed. Dodabetta, Nilgiris. 84
Cinchona (*pubescens*) *Pata de gallinago.* Renewed. Dodabetta, Nilgiris 84
Cinchona (*pubescens*) *Pata de gallinago.* Mossed. Dodabetta, Nilgiris 84
Cinchona (*pubescens*) *Pata de gallinago.* Natural. Naduvattam, Nilgiris 84
Cinchona (*pubescens*) *Pata de gallinago.* Renewed. Naduvattam, Nilgiris 84
Cinchona succirubra. Natural. Naduvattam, Nilgiris 84
Cinchona succirubra. Mossed. Naduvattam, Nilgiris 84
Cinchona succirubra. Renewed. Naduvattam, Nilgiris 84
Cinchona Calisaya var. *Ledgeriana.* Royal Gardens, Calcutta. 84
Cinchona officinalis. Royal Gardens, Calcutta 84
Cinchona succirubra. Royal Gardens, Calcutta 84
Cinchona febrifuge. Cryst.; powd. Royal Gardens, Calcutta. 84
Cinchona sulph. Pills (gr. ii) 84
Cinchonidia. Elix., with iron and strych 84
Cinchonidiæ salicylas. Pills 84
Cinnamodendron corticosum. Bark 16
Cinnamomum aromaticum. Bark; ground; pow'd; oil 143
Cinnamomum Culilawan. Bark 143

Cinnamomum "Saïgon." Bark; pow'd 143
Cinnamomum Zeylanicum. Bark; pow'd; tinct.; oil; Leaves. 143
Cinnamomum, "with soapy taste" 143
Cinnamomum sp. Flower buds 143
Cipo sumo. (*Anchietea salutaris*) 15
Cissampelos Pareira. Root (Brazil); Pulp of the fruit (India). 6
Citrus limonum. LEMON. Rind; ground; oil 39
Citrus limetta. LIME. Oil (Bergamot) 39
CIVET HORN ..... A I
Clematis virginiana. Herb 1
Clitoria ternata. Pods 57
Coca. (*Erythroxylon coca*) 34
Coccoloba uvifera. GRAPE-TREE. Bark 134
Cocculus indicus. Fruit; pow'd 6
Coccus. COCHINEAL. Black; silver; pow'd ..... I II
Cochlospermum Gossypium. Gum. KUTERA GUM; do. (India). 28
Codeia. Pills (gr. ½) 10
Coix Lachryma. JOB'S TEARS. Fruit 200
Colchicum autumnale. Tuber. German cut; ground; pow'd; fl. ext 178
Colchicum autumnale. Seed; crushed; pow'd; fl. ext 178
Collinsonia canadensis. STONE-ROOT. Fl. ext 126
Collodium 31
Collodium cantharidale ..... I I
Collodium flexile 31
Colocynthis (*Citrullus colocynthis*). Fruit; decort.; pow'd; Stem; Pulp; pow'd; pil. co 75
Comptonia asplenifolia. SWEET-FERN. Fronds; fl. ext 157
CONDURANGO. Bark 106
CONFECTION OF ORANGE-PEEL ..... M. F.
CONFECTION OF ROSES ..... M. F.
Conium maculatum. Crushed leaves; ground; powd.; fl. ext.; Seed 80
Contrayerva (*Dorstenia contrayerva*). Root 153
Convallaria majalis. LILY OF THE VALLEY. Flowers; fl. ext. 178
Convallaria polygonatum. SOLOMON'S SEAL. Rhiz. cut; fl. ext. 178
Convolvulus Scammonium. SCAMMONY. Root (Turkey); Resin virgin; do. powd.; resin 30%; Aleppo powd 113
Copaiba. Oleoresin, Para; do. Maranham; oil 57
Copaifera officinalis. Bark 57
COPAL. Ord.; Zanzibar amber; do. white 57
COPALCHI BARK, (*Croton pseudo-quina*) 151
Coptis anemonifolia. On-ren 1
Coptis teeta. Rhiz 1
Coptis trifolia. GOLD THREAD. Herb; powd.; fl. ext 1
Corchorus humilis. Herb (India) 33

OPIUM. Akchehir; Balukesser; Borgadeck; Hyderabad; Karahissar; Karaghac; Sehirkend; Sparta; Tafshanly; Persian; do., ball; Chinese, smoking; Smyrna	10
Opoponax chironum. Gum-resin (India)	80
Orchella. (Venez.)	218
Origanum majoranum. SWEET MAJORAM. Herb	126
Origanum vulgare. Flowers (Chili); Herb; oil	126
Osmorrhiza longistylis. SWEET CICELY. Rhiz	80
Ostrya virginica. LEVER-WOOD. Wood; fl. ext	159
Oxymel scillæ	M. F.
Pæonia moutan. BOTAN	1
Pæonia officinalis. Root (India)	1
Palo negro (*Euxenia grata*)	88
Panax quinquefolium. GINSENG. Root; gr'd	81
Panicum italicum. Seed (India)	200
Panicum miliaceum. MILLET. Seed	200
Papaver somniferum. POPPY. Capsules (German); do. (Chili); do. (India); gr'd; fl. ext	10
Papaver somniferum. POPPY. Flowers, Purple; Leaves	10
Papaver somniferum. POPPY. Seeds, blue; do. white; do. Bombay; oil	10
Paratudo (*Gomphrena officinalis*)	130
PARAFFIN. Hard; soft; oil	*
Pareira brava. Stem; root; crushed; pow'd; fl. ext.; root (Brazil). (See also *Chondrodendron toment.* and *Cissampelos Pareira*)	6
Paronychia argentea	129
Parthenium integrifolium. Flowers	88
Passulæ minores. CURRANTS	50
Pasta althææ	M. F.
PASTILLES, FUMIGATING. Red, black	M. F.
Paullenia sorbilis. GUARANA. Drug; pow'd; fl. ext.; elix	51
PEARL BARLEY (*Hordeum distichon*)	200
PEARLS. Amyl nitrite	M. F.
Pedalium murex. BURRA GOKEROO. Seed	121
Peganum hamala. Seeds	39
Persea lingue. Seeds (Chili)	43
Pelargonium roseum. ROSE GERANIUM. Oil	138
PETROLEUM. Crude	*
Petroselinum sativum. PARSLEY. Root	80
Peumus boldus (*Boldoa fragrans*)	142
Phalaris canariensis. Seeds. CANARY SEED; Sicily; Smyrna; Mexico	200
Phaseolus max. Seed (India)	57
Phaseolus mungo. Seed (India)	57
Phellandrium aquaticum. WATER-FENNEL. Fruit	80

[Proceedings United States National Museum, 1883, Appendix.]

SMITHSONIAN INSTITUTION,

UNITED STATES NATIONAL MUSEUM.

No. 20.

REQUEST FOR SPECIMENS OF DRUGS AND INFORMATION CONCERNING THEM.

DEAR SIR:

The accompanying method of arrangement and list of specimens has been prepared to show the present condition of the materia medica section of the U. S. National Museum.

The deficiencies of the collection are made evident by this exhibition of its possessions.

The Museum will be pleased to receive specimens of drugs, and their natural and commercial varieties, which do not appear by name in the catalogue. Contributions will be properly accredited to the donors on the labels.

Information regarding the source, habitat, mode of production, physical peculiarities, and history of any specimen, will add much to its value.

For the collection, as at present constituted, the Museum is largely indebted to the generosity of a few of the principal wholesale druggists of the country, notably W. H. Schieffelin & Co , New York, McKesson & Robbins, New York, Parke, Davis & Co., Detroit, and Wallace Brothers, Statesville, N. C. It is hoped that other firms, and individuals as well, who may have or receive drugs or varieties not represented in our list, will feel sufficient interest in this national collection to contribute toward its completeness.

Very respectfully,

SPENCER F. BAIRD,
Director.

[Proceedings United States National Museum, 1883. Appendix.]

SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

No. 21.

CIRCULAR RELATIVE TO CONTRIBUTIONS OF ABORIGINAL ANTIQUITIES TO THE UNITED STATES NATIONAL MUSEUM.

By CHARLES RAU,

Curator of the Department of Antiquities, United States National Museum.

It happens very frequently that the National Museum receives aboriginal relics unaccompanied by exact statements as to the locality, or localities, where they were found, and by notices explaining under what circumstances they occurred. Such information, however, is very desirable, not only for the sake of accuracy, but also because in many cases a communication of the details of the discovery will either confirm former observations, or present new facts, and thus serve to increase archæological knowledge. For this reason it has been thought proper to prepare this circular as a guidance to those who contribute antiquities to the National Museum.

The relics in question occur either on or below the surface, as stray specimens unconnected with any other tokens of aboriginal occupancy, or in drift-beds, in open-air workshops, in quarries and mines, as caches or deposits, on the sites of camping-grounds, villages, and forts, in shell-heaps, caves (natural or artificial), graves, mounds and earthworks generally, and in or near ruined buildings of aboriginal origin.

In every instance the locality should be distinctly specified. County and State or Territory, of course, are to be mentioned, and, in addition, the distance and direction (north, south, northwest, &c.) from the next town, and, if the place is near a creek, river, lake, or the sea-coast, or a hill or mountain, it should be stated, and the distance and direction indicated. In uninhabited or sparsely-populated parts of the country, the topographic features will suffice to denote the locality.

As for the accompanying notices concerning the finding of specimens, the following brief suggestions are offered:

Surface-finds.—It is desirable to learn whether the objects were found on or below the surface, and, in the latter case, how deeply they were imbedded; also, whether specimens of the same kind or of different character have occurred in the neighborhood.

Drift-beds.—Rude stone implements and bones of animals have been taken in the United States from quaternary beds of gravel and sand. In view of the important bearing of such implements on the antiquity of man in this country, the locality should be thoroughly studied by a competent geologist, and all details of the discovery minutely noted.

Open-air Workshops.—There are innumerable places where the aborigines manufactured stone implements and weapons. They can easily be recognized by the accumulation of chips of stone, and by the presence of unfinished arrow and spear-heads, &c., which were thrown away on account of some defect in the stone or failure in working it. A collection from such a locality should embrace specimens of the raw material, chips, and implements in all stages of manufacture; also the tools used in breaking the stone.

Quarries and Mines.—Of late years places have been discovered in various parts of the United States, where the aborigines had quarried potstone, often called soapstone, a substance extensively used by them in the manufacture of vessels, pipes, and other articles. The vessels generally received their rudimentary form in the quarries, as numerous examples found in them testify. The rude tools used in detaching and fashioning the material also occur in these localities. The explorer should describe the situation, extent, and character of the diggings, and collect pieces of the raw material as well as specimens of the unfinished potstone ware and every implement he finds. A plan of the locality is desirable.

Similar rules hold good for the places to which the indigenes resorted for the purpose of digging for flint, mica, and other mineral substances. Their exploitation of native copper seems to have been confined to the Lake Superior district.

Caches or Deposits.—Underground deposits of stone implements are of frequent occurrence in the United States. These relics, usually chipped from flinty material, often present leaf-shaped or spear-head-like forms, and there is generally some symmetry in their arrangement. It is to be noted how deep the deposit was buried, how far it extended horizontally and downward, and in what manner the specimens composing it were placed. Their number should be stated. Deposits of stone objects not pertaining to the classes here mentioned have likewise been found.

Camping-grounds.—Usually situated near running water, and recognizable by scattered implements of stone and bone, fragments of earthen vessels, and the refuse of meals. The spots where the cooking was done can sometimes be identified by rude stone hearths. Flint imple-

ments were often manufactured in these places. Specimens of every description (animal remains included) should be collected, and the configuration of the ground described. The addition of a plan of the locality will prove useful in many cases.

Village-sites.—They have many features in common with the camping-grounds, and the preceding remarks are fully applicable to them. The places formerly occupied by habitations can often be distinguished by the so-called hut-rings, by excavations, &c., and, as many villages were fortified by embankments or pickets, or by both, their traces have to be sought for. The former existence of pickets is sometimes indicated by rows of holes in the ground. A collection from a village-site should be accompanied by a plan of the same.

Forts.—The aborigines often fortified places affording special facilities for defense by building walls of earth or stone. Such localities have frequently yielded numerous relics left by the occupants, and they deserve the attention of collectors. To the description of a fort should be added a plan showing its character and surroundings.

Shell-heaps.—These accumulations mark the places to which the aborigines resorted for catching and consuming mollusks, fish, &c. They occur on the sea-shore as well as on the banks of rivers, and are, therefore, chiefly composed either of marine or fluviatile shells. Among them are found, sometimes in great number, implements of stone and bone, fragments of pottery, and animal remains. Also sometimes rude stone hearths surrounded by charcoal and ashes. The manufacture of flint implements was often carried on in these places. A collection from a shell-heap should contain characteristic specimens of every kind of manufacture there found; a full series of the species of shells, and all obtainable remains of reptiles, fishes, birds, and quadrupeds (skulls, bones, teeth, shells of turtles, &c.). The explorer should refer in his account to the situation, extent, thickness, and composition of the heap, and also state whether it is of a homogeneous character throughout, or consists of various layers differing in the nature of their contents.

Caves.—Real caves, as well as recesses formed by overhanging rocks, were often used by the indigenes of North America as places of refuge or temporary habitations, and such retreats generally contain abundant tokens of their occupancy. It is advisable to collect all implements, sherds, bones, &c., exposed on the surface of the floor; and if the latter reaches downward, in consequence of accumulation, it should be entirely removed in sections, its stratification (if there is any) carefully noted, and the relative position of each discovered object recorded. A ground-plan and section will serve to render the description of such a locality more intelligible.

Some caves were used as burial-places. The human remains, together with the objects accompanying them, ought to be carefully preserved, and every fact calculated to throw light on the mode of burial carefully noted.*

Graves.—Various modes of interment were in use among the North American indigenes, and the graves are either isolated or grouped together, forming cemeteries. The so-called stone-graves—rude cists constructed of stone-slabs—usually occur as such. Other graves are mere pits, in which the dead were buried in a squatting posture, and there are ossuaries containing the bones of many individuals brought together for final burial.

The explorer will do well to note every circumstance relating to the situation, form, dimensions, and direction of the grave or graves. It is important to know whether the body was stretched out or doubled up, and in the former case it should be stated what point of the compass the head faced. It also has to be ascertained, if possible, whether the body (or bodies) or only the bones were buried. In some graves the latter are promiscuously mingled. If, as is often the case, manufactured objects—such as implements, ornaments, earthenware, &c.—were buried with the body, their position with regard to the latter ought to be ascertained before they are removed. The presence of manufactures derived from the whites (glass beads, objects of iron or brass, &c.) denotes, of course, that the interment took place after the colonization of the country.

The explorer, it hardly need be said, should collect the human remains and all articles found with them.

Mounds.—Many of the mounds scattered over a large portion of the United States are of a sepulchral character, and these differ much in form, size, and the disposition of their contents. The shape and dimensions of the mound to be explored have to be ascertained by careful measurement, and, if it belongs to a group, its relation to neighboring mounds, embankments, &c., shown in a plan, which should be made as correct as circumstances permit. In such a case a regular survey alone will satisfy the requirements of absolute accuracy. The ordinary method of opening a mound consists in sinking a square shaft of suitable dimensions from the apex to the bottom, as the human remains and their accompaniments are usually found in the centre on a level with the original surface of the soil, and sometimes even below it. They constitute the *primary* burial, which caused the erection of the mound; but many mounds, more especially large ones, served for later or *secondary* burials, the body usually being deposited a short distance below the apex or in the

*There have lately been discovered in New Mexico artificial caves or chambers scooped out in rows in mountain-sides. They served as dwellings. Details will soon be published by the Bureau of Ethnology.

side of the mound.* While sinking the shaft, the explorer has to notice the nature of the material composing the mound, and when he reaches the mortuary deposit, he will have to record all details which determine its character. The body was sometimes placed in a stone cist or a rude timber frame-work, which is now decayed, but has left its impression in the surrounding earth. In other instances the body was burned, and the mound contains only its calcined bones. Mounds have been opened which inclosed the remains of several or many individuals. Some show a stratification, being composed of alternating layers of pebbles, gravel, sand, earth, &c., which are not horizontal, but conform to the convex outline of the mound. Of such character are many of the so-called sacrificial mounds, which often inclose hearths of burned clay, serving as the receptacles of various articles more or less changed by the action of fire. This stratification has also been noticed in real burial mounds.

The diversity in the inner structure of mounds is very great, and the mode of proceeding in opening one must be left to the intelligence of the explorer. A vertical section should always accompany the description of a mound.—Whenever feasible, a mound should have its excavation filled up, in order to be restored to its original shape.

Earthworks.—A search for relics within earthworks, and in their neighborhood, has frequently proved successful. Nothing short of a geometrical survey will fully illustrate the character of such works.

Ruins.—The ruined buildings, cliff-dwellings, &c., in the southwestern part of this country, which have of late years attracted so much attention, are being carefully studied and surveyed under the auspices of the Bureau of Ethnology. Only the systematized efforts of exploring parties are adequate to the accomplishment of a work of such magnitude.

This circular, of course, is primarily designed for collectors in the United States; but, with proper modifications, it may prove serviceable to contributors north and south of this country.

SMITHSONIAN INSTITUTION,
Washington, D. C., November, 1883.

* There are sometimes sent to the National Museum specimens described as coming "from a mound" in Tennessee, or Missouri, or whatever the State may be. Such information is insufficient. It should be clearly stated whether the object pertained to a primary or secondary burial, and in either case its relation to human remains or other articles with which it was found associated has to be indicated.

[Proceedings United States National Museum, 1883. Appendix.]

SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

No. 22.

BRIEF DIRECTIONS FOR REMOVING AND PRESERVING THE SKINS OF MAMMALS.

By WM. T. HORNADAY,

Chief Taxidermist, National Museum.

GENERAL PRINCIPLES.

It is a simple matter to prepare the skin of an ordinary quadruped, provided the operator is not afraid of getting a little blood on his hands, and is not naturally indisposed to physical exertion. A few minutes' work suffices for the skin of a small mammal, and a few hours for a large one, up to the size of a buffalo. With a sharp knife, detailed instructions, some cheap preservatives, and a little patient labor the thing is done. One specimen properly prepared in the field is worth ten that have been slighted.

The great principle, which is the foundation of all valuable field work on mammal skins, is this: *A skin must be so taken off, cleaned of flesh, and preserved that the preservative powder or fluid can act directly upon the roots of the hair from the inner side of the skin and over every portion of its surface.* Neither alum, nor salt, nor alcohol (unless it be of great strength) can strike through a thick layer of flesh and penetrate through the skin to the epidermis quickly enough to save it from decomposition. The epidermis of most animals is of such a close and oily nature that preservatives cannot strike through it from without, and therefore when a skin is removed it must be cleaned of flesh and fat, so that the preservative liquid or dry powder can come immediately in contact with the cutis.

SELECTION OF SPECIMENS.

When specimens are sufficiently numerous to allow of a choice of individuals for preservation, select first the finest, largest, and most perfect old male and female. Young animals of every kind are very desirable, and specimens should be taken whenever possible. Of animals

that are known, or even supposed, to be rare, preserve the first specimen obtained, be it young or old, good, bad, or indifferent, for fear another of the same species is not obtained.

NOTES AND MEASUREMENTS.

The value of a specimen is greatly enhanced by a record of the following: 1. Length of head and body; 2. Length of tail; 3. Height at shoulders (if the animal be a large one) and girth; 4. Color of eyes; and 5. Color of other soft parts of the head, feet, and body which are in any way worthy of notice. Sketches and photographs of animals in the flesh, either dead or alive, are always highly prized by zoölogists and taxidermists, to whom they are of the utmost importance and value.

KNIVES AND MATERIALS.

For small quadrupeds a good sharp pocket-knife is enough for any one who does not make a business of collecting, and for large animals small butcher or hunting knives are amply sufficient. Alcohol in copper cans with large screw tops are supplied by the Institution by special arrangement, but salt and alum with which to make a better solution, can be procured anywhere within the pale of civilization, and also kegs or barrels to put it in. Any one who really wishes to preserve the skin of an animal need never be thwarted by an apparent lack of implements and preservatives.

SKINNING SMALL QUADRUPEDS (VARYING IN SIZE FROM A MOUSE TO A MASTIFF).

Lay the animal flat upon its back, and, beginning at the throat, make a straight, clean cut in the skin along the middle of the neck, breast, and abdomen, quite to the base of the tail. Except in very small animals the tail also must be slit open along the under side from about one inch above the root quite to the tip.

The bottom of the foot must be slit open lengthwise, from the base of the middle toe to the heel. All the opening cuts in the skin are now made.

Begin at the middle of the abdomen, and cut the skin neatly from the body, leaving no flesh, or at least but very little, adhering to it. We come very soon to where the fore leg joins the body at the shoulder, and the hind leg at the hip. Cut through the muscles at those points, disjoint the legs, and detach them entirely from the body.

Skin each leg by turning the skin wrong side out over the foot, quite down to the toes. When this has been done, cut the flesh away from the bones of the leg and foot, but be careful to leave the bones attached to each other by their natural ligaments, and to the skin itself at the toes. *Never throw away the leg bones of an animal if the skin is to be*

mounted, but leave them attached to the skin as shown by the left leg of the accompanying figure.*

SQUIRREL PARTLY SKINNED.

Detach the skin from the back, shoulders, and neck, and when you come to the ears cut them off close to the head. Turn the skin wrong side out over the head and proceed until you come to the eyes. Now work slowly with the knife, keeping close to the edge of the bony orbit, until you can see, through a thin membrane under your knife edge, the dark portion of the eye. You may now cut fearlessly through this membrane and expose the eyeball. It is a good plan with large mammals to hold one finger of the left hand in the eye and cut against it to avoid cutting the lid.

Skin down to the end of the nose, cut through the cartilage close to the bone, and cut on down to where the upper lip joins the gum. Cut both lips away from the skull close to the bone all the way around the mouth, except directly in front of the incisors.

The lips are thick and fleshy, and must be split open from the inside

*The figures accompanying this article are selections from plates provided by the author to illustrate a forthcoming work on taxidermy.

and flattened out so that the flesh in them can be pared off. Do not cut off the roots of the whiskers, or they will fall out. Pare away the membrane which adheres to the inside of the eyelids and turn the ear wrong side out at the base in order to cut away the flesh around it.

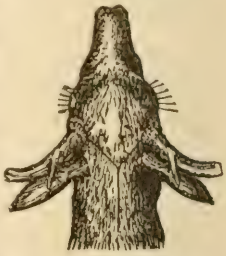
If the ears have hair upon them they must be skinned up from the inside and turned wrong side out quite to the tip, in order to separate the outside skin, which holds the hair, from the cartilage which supports the ear.

To clean the skull, cut the flesh all off the cranium, cut out the eyes and tongue, and with a bent wire, or a spoon-handle bent up at the end, draw out the brain through the occipital opening at the back of the skull.

By this time the skin will most surely have become bloody in several places, and before applying any preservative it must be washed *perfectly clean*. Blood left upon the hair imparts to it a lasting stain, and usually causes the hair to come off in mounting.

SKINNING LARGE MAMMALS.

The principal difference between the manner of skinning a small terrestrial quadruped and a large one, like a bear, deer, or buffalo, is that the skin of each leg is slit open from the bottom of the foot up the back of the leg nearly the first joint and from thence up the inside of the leg, following to the lines of the accompanying figure, until it meets the opening cut which has been made along the center of the body. In preparing a skin as large as that of a buffalo or large polar bear, it is best to cut off the leg bones at the first joint above the foot, tie them up in a bundle with theskull,and *forward them with the skin*, properly labeled.



In skinning the head of an animal having horns, it is necessary to make an opening at the back of the neck. Make the cuts as shown by the dotted lines of the accompanying figure, cut completely around each horn at the base, and skin the head by working downward over the forehead and the cheeks. The head skin of a large mammal is the most difficult part to remove and preserve successfully, and therefore the greatest care is necessary in its preparation.

PRESERVATION OF SKINS.

1. *In a temperate climate.* The old and familiar method is to rub the skins inside with powdered alum or dry arsenic, or alum and saltpeter. wrap tow around the leg bones (of small mammals), and dry the skins. Let me here call the attention of all collectors to the following fact:

A mammal skin which has never been dried and hardened can be mounted in one-third less time and with far greater accuracy than the best dry skin of the same kind.

This being the case, it is certainly worth while to preserve skins in a soft state. A skin may be removed very unskillfully, but if kept soft until it reaches the taxidermist, it can be mounted with gratifying success. On the other hand, the dry skins of the most experienced collector can be mounted well only with great difficulty.

The following methods are recommended:

Under ordinary circumstances, in a temperate climate a skin may be preserved in a soft state by rubbing salt very thoroughly on the inside, and then leaving the skin turned wrong side out, packing it in salt, and shipping it in that condition as soon as possible. A better method, or rather *the best of all methods for any climate, and all kinds of skins*, is to prepare a solution of salt and alum in water in the following proportions: For every gallon of water put in one pint of alum (three-fourths of a pound) and one quart of salt (one pound and three-fourths), stir it up, and heat it to the boiling point. Pour it into a wooden or earthen vessel, and when cool, or milk warm, it is ready for use. Plunge a skin into this bath and move it about until the solution reaches every part. Give a fresh skin plenty of room for the first day or two, and if it be a large one move it about every day for three days so that the solution can act with full force on every part.

Fresh skins of all kinds may be placed in this bath (leg bones and skull of small skins may also be left attached) and allowed to remain in it for months without deteriorating in any way; even after five years they are still as soft and pliable as when first taken off. Small skins may be shipped in glass jars, or wooden kegs, and large ones in barrels.

If you have alcohol sufficiently strong (30° *above* proof), skins may be immersed in it as fast as collected, instead of in the salt and alum solution. The objections to alcohol are that it loses strength very rapidly when receiving daily accessions of fresh skins, *bleaches hair*, and must be renewed from time to time until the collection is finally packed in fresh alcohol and shipped.

2. *In an arctic climate.* As before stated, the salt and alum solution is *the best preservative for skins in all climates*, and for all objects from the largest elephant, seal, walrus, or polar bear, down to the smallest bat of the tropics. If it is impossible or impracticable to employ it, the skins of all large arctic mammals may be successfully preserved by immersing them in *very strong* brine, but it should be renewed at least

once or twice. The skins of seals and small mammals may be simply packed in salt.

3. *In a tropical climate.* Skins cannot be preserved with salt in a tropical climate, but must be immersed either in the salt and alum solution, or alcohol, or else dried. Drying skins in the tropics is extremely difficult to accomplish *successfully*, and should be adopted only as a last resort. It may be accomplished as follows: After removing and cleaning a skin, apply arsenical soap to the inside; then rub on powdered alum, *very freely*, over every portion. The *safest* and surest plan is to leave the skin turned wrong side out, but skins so prepared are rather unsightly objects, and unfit even for study until relaxed and turned right side out. The *neatest* way is to wrap a little tow, oakum, rags, or even paper around the leg bones, turn the skin back over them, put a little loose filling in the head and body, and take a few stitches in the skin to hold it in shape. *Do not put the skull back in the skin*, but tie it to one of the fore legs. Comb the hair neatly, put arsenical soap and alum on the palms, face, and ears, and hang the skin up to dry *in the shade*, where the air will circulate freely around it.

SPECIMENS IN THE FLESH.

The most valuable of all specimens which come to us are those sent in the flesh. A rare animal so received is sometimes cast in plaster, skinned, dissected, skeletonized, and portions of the viscera preserved in spirits for pathological study. In this way a single subject is often made to yield a number of valuable scientific preparations. The institution will be very glad to receive the dead body of any foreign animal which may die in the Eastern United States, and also any rare or especially fine American species.

FORWARDING ANIMALS IN THE FLESH.

In cold weather, particularly from December 1 to March 1, a dead animal may safely be sent (frozen) from as far west as the Rocky Mountains. In the cool month of November and March specimens may safely be forwarded from points five hundred miles distant. From May to October animals should be disemboweled and packed in ice when sent from points more than twelve hours by rail from Washington.

Large animals with thick hair, such as deer, elk, moose, bear, &c., can be sent without boxing, but it will be well to sew them up in coarse sacking to protect the hair. Small animals and others with close hair, such as the zebra, lion, tiger, or giraffe should be boxed and packed in straw or shavings to protect the hair from being rubbed off. Animals of the largest size, such as rhinoceros, elephant, or hippopotamus must be skinned and skeletonized where they die by our own preparators, who hold themselves in readiness to start at once for any point on the receipt of telegraphic information.

The Smithsonian Institution will pay all charges for boxing and cartage upon presentation of vouchers in regular form, and all freight and express charges will be met here. As a rule, dead animals should always be sent by express, the exceptions being in the cases of large animals forwarded from a great distance in the middle of winter, when they could as safely come by freight.

All donations are promptly acknowledged by the director of the Museum, both by letter and in his annual report, and the names of donors also appear in the catalogues, and upon the large printed labels attached to their specimens in the exhibition cases.

TRANSPORTATION.

Specimens should be very securely packed previous to shipment, and plainly addressed as follows: "*Smithsonian Institution, Washington, D. C.: for the National Museum. Perishable.*" Shipments may be forwarded by Government vessels when available, or by the ordinary lines of transportation at the expense of the institution.

In case immediate information or instructions are required in relation to any dead animal of special importance, which is at the disposal of the institution, the donor or his representative may telegraph without paying charges.

Telegrams and correspondence should be addressed to "*Prof. Spencer F. Baird, Washington, D. C.*"

In all cases the *utmost dispatch* is necessary in order that specimens sent may reach us in good condition for anatomical study and dissection.

U. S. NATIONAL MUSEUM,
Washington, D. C., November 15, 1883.

[Proceedings United States National Museum, 1883. Appendix.]

SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

No. 23.

INSTRUCTIONS FOR TAKING PAPER MOLDS OF INSCRIPTIONS IN STONE, WOOD, BRONZE, ETC.

Prepared by Ensign A. P. NIBLACK, U. S. N.*

I.—MATERIALS.

Three grades of paper, cut in sheets convenient for handling, and rolled for packing or transportation; several pounds of starch; several ounces of alum; Cooper's white glue (one-fourth pound to one pound of starch); boiled linseed or fat oil; essence of turpentine; yellow wax; pieces of thick pasteboard, or wooden blocks. Boards, scantling, canvas, nails, hammer, sand, &c., as explained in Sections III and V, and depending on circumstances.

II.—TOOLS AND ACCESSORIES.

Paste brush, similar to white-wash brush; ordinary paint brush, for applying hardening mixture; large, flat, coir or grass brush with handle similar to that of an ordinary hair brush; small, stiff, paint brush (the two latter will be designated "large" and "small" brush, respectively; they are to be used in beating or "stippling" the paper in obtaining an impression); sponge; large pair of shears; spatula, or modeler's knife; pans, pots, &c., for holding water, boiling paste and hardening mixture, heating sand, &c.

III.—NOTES ON MATERIALS.

Paper, for this purpose, should be unsized, and what may be called malleable, that is, when wet and beaten or stippled with a hard brush it

*[Compiled from a pamphlet on "Lottino plastique," by M. Lottin de Laval, M. S., of the Anthropological Laboratory, Museum of Nat. Hist., Paris, notes furnished by Mr. King, stereotyper of *Evening Star*, Washington, D. C., and suggestions of Mr. Victor Mindeleff, U. S. Bureau of Ethnology.]

should yield or stretch locally and to a considerable depth without tearing. A coarse fibrous paper of this kind can be used in case nothing better is at hand, or coarse paper may be used as a backing or stiffener to paper of a finer quality. Coarse, thick, fibrous paper is apt to wrinkle and show the fibers in the surface of the plaster reproduction or cast. A quality of paper used by M. Désiré Charnay in Central America and Mexico, and which may answer for all American inscriptions (which are seldom carved in fine lines), may be obtained from the firm of Batalla and Blain, commission merchants, No. 7, Rue Joliette, Marseilles, France.

What may be specified as the first grade, of the three grades of paper spoken of under "Materials," is any of the thicker, coarser grades of paper for use on large, massive inscriptions, having coarse lines and a rugged surface. The paper must possess sufficient malleability to enable it to reach the deepest cuts or crevices. All paper should be tested before taking it into the field. Paper for the foregoing purposes is here designated, for convenience, No. 1.

The smooth, thin, American, stereotyping paper, used for the matrices of our daily newspapers, is here designated No. 2. It is best for smooth surfaces, finer lines, and deeper cuts.

For fine inscriptions in bronze, wood, or stone, or for plaster reproductions of hieroglyphics, &c., and for smooth unpolished surfaces and sharp relief figures with fine lines (without, of course, the refinement of hair or microscopic lines), American tissue paper may be used to form the inner surface of the mold. The more expensive French cream tissue paper, used in the best stereotyping, will of course give correspondingly better results. Tissue paper is here designated No. 3.

The paste here recommended is made as follows: Mix starch in hot water till the solution is thick; dissolve the white glue in hot water, one-fourth pound to one pound of starch; pour the glue in the starch, stir well; put on the fire and boil. As a preservative when large quantities are made, or in hot climates, stir in one teaspoonful of alum to the quart of paste. One minute after the mixture bubbles take it off.

Plain flour or starch paste might answer, but the glue prevents the blistering of the molds so likely to occur in transportation.

The hardening and water-proofing mixture is made as follows:

Boiled linseed oil or fat oil	3 parts.
Essence of turpentine	1 part.
Yellow wax	1 part.

Boil, stir well, and apply boiling hot, as described hereafter.

IV.—NOTES ON INSCRIPTIONS.

This process will not answer for statues or figures in bold relief. Before taking the mold it is well to make all notes which can possibly add to the anthropological value of the work. Locate the inscription

as accurately on a chart as the instruments at hand will admit; or latitude and longitude may be given, or bearings from prominent physical or geographical points may be taken. Give as accurately as possible the bearing of the planes of the inscriptions or different walls. Sketch each wall or inscription as a guide in putting the parts of the mold together. Make notes on the nature of the rock; whether the wall is natural or artificial, excavated or above ground; color of stone, &c. Procure a specimen of the rock, if possible. If an artistic reproduction is aimed at, notes and sketches of discolorations, fungus growth, vines, &c., should be made. Or a photograph of the inscription should be taken, if possible, with a scale of inches for reference, care being taken to have the plane of the scale and the plane of the negative parallel to that of the inscription. The scale should stand against the inscription. Preparatory to taking a mold, clean off the surface of the stone or inscription with a modeler's knife or scrapers.

Where the inscription can be covered with one sheet of paper, the sheets are laid simply one over the other to the thickness of four or five, the alternate sheets being crossed to cross the fibers in the paper. Where the surface is large, as supposed in what follows, the sheets are *shingled* on, so to speak, but commencing always at the top of the inscription. Where No. 3 paper is used it is best to paste three or four thicknesses of it on sheets of No. 2, being careful not to put it on wrinkled. Sheets thus prepared are used only for the first course or layer, with the tissue paper in contact with the inscription. The other courses are No. 1 or No. 2 paper, as desired.

The following process is suggested for large inscriptions and with the facilities assumed in this paper. Special variations must be made to suit the materials at hand, the climate, nature of inscription, &c.:

V.—TAKING THE MOLD.

Soak each sheet of paper in water for about three minutes or more, or until pliable, and put it unwrinkled on the face of the inscription; commencing at the top, stipple it firmly and methodically with the large brush until the paper reaches the bottom of the deepest cuts. Water should be applied with a sponge from time to time. For narrow or small circular cuts use the small brush. Apply a thin coat of paste to this sheet, being careful never to get any on the surface of the inscription. Now apply the second sheet, wet also, always in the same course, if there is room, or below the first sheet if there is only one sheet in the first course. This second sheet should in any case overlap or cover two-thirds of the first. Stipple it, apply paste, and a third sheet, overlapping two-thirds, and stippling as before. Proceed thus until the entire inscription is covered. This will give three thicknesses of paper over nearly all the inscription. Mend the torn places, where the paper has failed, by applying wet pieces and beating them in. In all deep cuts fill in with strips of pasteboard till solid, or cut out blocks of light wood to fit in flush. They should be glued in, and fur-

ther secured by strips of paper pasted across them, securing them to the mold. These filling pieces prevent the projecting portions of the mold from being crushed in transportation. Cut long strips of paper and paste them here and there in all directions over the mold. Give the entire surface a coat of paste, and apply the sheets, slightly wet, with the edges in contact. One or two coats may thus be laid, the outer coat breaking joints with the next inner one. Beat all in lightly with the large brush.

In a hot, dry climate, with the sun beating on the inscription, the mold will dry readily, the only precaution necessary being to paste the edges of the mold all around, here and there, to the edge of the inscription. This will prevent the mold from warping or the wind from detaching it.

In damp climates and under most circumstances it will probably be found best to apply hot sand to the mold to dry it. Sand is rarely difficult to obtain, but its application is laborious. A frame should be built to fit closely against the inscription. One face of this (the side *from* the mold) should be covered with a sheet of canvas, or with tongue and groove boards. In either case cross strips or braces should be nailed at close intervals from side to side to keep the frame stiff, or to keep the canvas from sagging under the weight and outward pressure of the sand. The frame should be braced or shoved against the inscription, and hot sand poured in the top between the frame and the mold until the space is full. The sand, besides drying the mold, will also keep it pressed closely against the inscription. As a general rule stone absorbs the heat so rapidly that several applications of sand are necessary. When the mold is finally dry remove the frame. Mark the mold with colored chalk, or with a pencil, into the number of divisions into which it is to be cut for packing. Give these each a number, and mark the edges so that there will be no difficulty in putting them together again. Remove the mold by prying it off gently with the modeler's knife. Lay it on the ground and pour the boiling, hardening mixture over it, using the brush to distribute it evenly. When dry turn the mold over and treat the other side in the same way; then cut it with the shears into the divisions previously marked, and pack for shipment.

(Copy of a letter from Dr. Hamy relative to paper molds.)

FEBRUARY 28, 1884.

DEAR SIR: I hasten to transmit to you the precise information that you have had the kindness to ask regarding our process of taking paper molds.

This process, invented previously by M. Lottin de Laval and slightly perfected since, consists in the application, on the object which one wishes to reproduce, of a certain thickness of paper (unsized). This paper is applied wet on the desired surface and pressed in the crevices

or cuts by the aid of a hard brush (dog-grass, for example) with or without a handle, with which the paper is then methodically beaten on to the surface to be reproduced.

When one is working on monuments or inscriptions of which the lines are very fine and elaborate, it is well to commence by first applying a sheet of white unsized paper of good quality to avoid the presence of vegetable fibers in the mold obtained.

American inscriptions rarely have such a degree of fineness, and our travelers (collectors) have taken them simply with brown paper, of which I send you a specimen with this letter.

This paper, remarkably elastic and fibrous, is sold by the firm of Batalla & Blain, merchants, commissioners, and armorers, No. 7 "Rue Joliette," Marseilles, who will furnish you as many bales as may be necessary. To mold Angkōr Thōm in Cambodia, M. Aymonier took 30 bales of this paper.

You commence by applying one coat of this paper wet, and when it is properly beaten in or onto the surface, apply a good coat of flour paste to the surface of the paper; apply a second wet sheet and use the brush, taking care in putting it on to cross the fiber of the paper—that is to say, to place the fibers crosswise if it is up and down in the first sheet, and *vice versa*. A new coat of paste; third thickness of paper pressed or beaten in as the first; paste; fourth paper crossed and beaten as second; paste, and then fifth sheet.

With the fifth thickness or layer the mold has sufficient resistance The mold being dry in place, take it off and harden it. To do this we employ the following mixture:

Boiled linseed oil, called fat oil	3 parts.
Essence of turpentine	1 part.
Yellow wax	1 part.

Which is boiled, well mixed, and applied boiling to the paper mold. You will find in the package here sent a fragment of a mold from Palenque thus hardened, and in which the proofs in plaster have already been cast.

Believe me, dear sir, &c.,

DR. E. HAMY,
40, *rue de Lubeck.*

ALPHABETICAL INDEX.

H.

Plate I.

(Drawing by Mr. J. H. Emerton.)

Munida valida Smith. (p. 42.) Dorsal view of male, from station 1112, natural size.

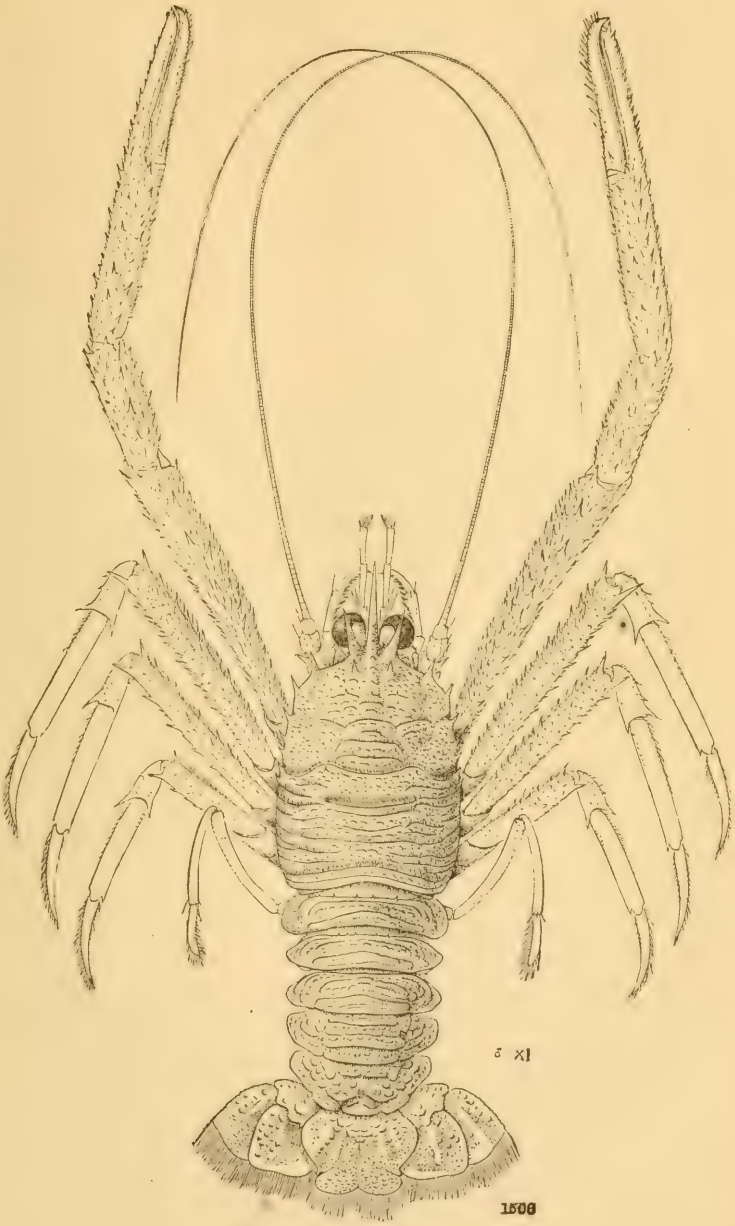

♂ XI
1508

Plate II.

(Drawings by Mr. J. H. Emerton.)

Fig. 1.—*Anoplonotus politus* Smith. (p. 50.) Dorsal view of a male, from station 941, enlarged two diameters.

Fig. 2.—*Eumunida picta* Smith. (p. 44.) Dorsal view of a male, from station 1043, natural size.

1

2

Plate III.

(Drawings by Prof. S. I. Smith.)

Fig. 1.—*Anoplonotus politus.* (p. 50.) First maxilla of the right side, seen from below, of a male from station 941, enlarged twelve diameters.

Fig. 2.—Second maxilla of the right side of the same specimen, enlarged twelve diameters.

Fig. 3.—First maxilliped of the right side of the same specimen, enlarged twelve diameters.

Fig. 4.—Second maxilliped of the right side of the same specimen, enlarged twelve diameters.

Fig. 5.—External maxilliped of the right side of the same specimen, enlarged eight diameters.

Fig. 5*a*.—Ischium and merus of the same appendage, seen from above, enlarged eight diameters.

Fig. 6.—*Eumunida picta.* (p. 44.) First maxilla of the right side of a male, from station 1098, seen from below, enlarged eight diameters.

Fig. 7.—Second maxilla of the right side of the same specimen, enlarged eight diameters.

Fig. 8.—First maxilliped of the right side of the same specimen, enlarged eight diameters.

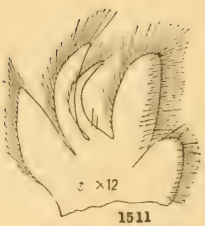
Fig. 9.—Posterior thoracic leg of the same specimen, enlarged eight diameters.

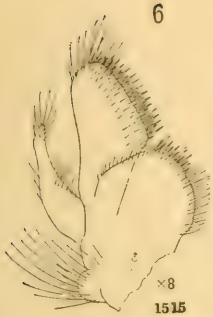
Fig. 10.—Appendage of the fifth somite of the abdomen of a young specimen, 15^{mm} long, from station 1152, enlarged twenty-four diameters.

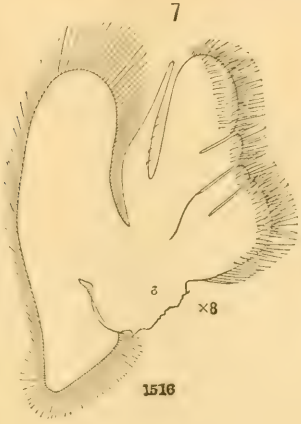
Fig. 11.—*Munida Caribœa* Smith. (p. 40.) First maxilliped of a male, from station 1043, enlarged eight diameters.

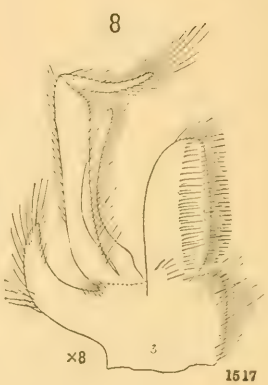

1
×12
1509

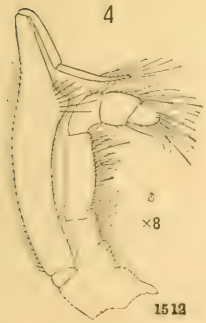

2
♂ ×12
1510


3
♂ ×12
1511

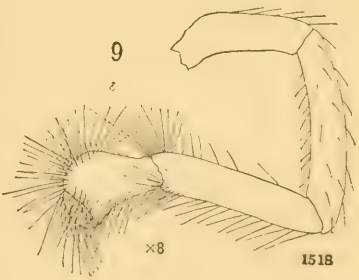

6
♂
×8
1515

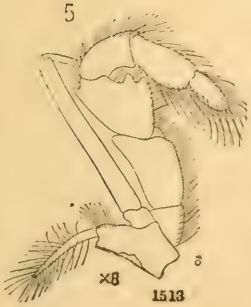

7
♂
×8
1516


8
×8
♂
1517


4
♂
×8
1512


10
×24
1519


9
♂
×8
1518


5
×8
♂
1513


5a
×8
1514

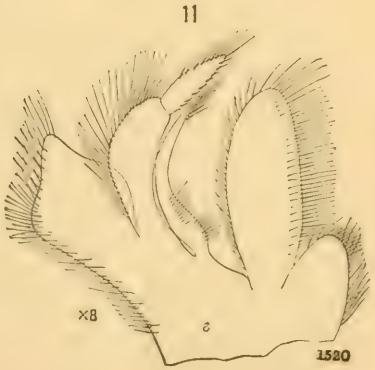

11
×8
♂
1520

Plate IV.

(Drawings of Figs. 4 and 5, by Mr. J. H. Emerton; the rest by Prof. S. I. Smith.)

Fig. 1.—*Eumunida picta.* (p. 44.) Extremity of the abdomen of a male, from station 1098, dorsal view, enlarged three and a half diameters.

Fig. 2.—Extremity of the abdomen of a young male, from station 1152, enlarged four diameters.

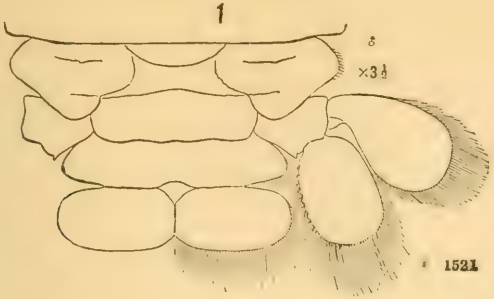
Fig. 3.—Peduncle of right antenna of a male, dorsal view, from station 1152, enlarged eight diameters; *a*, acicle, or articulated spine, of the second segment, representing the antennal scale-*b*, third segment, projecting anteriorly in a long spine.

Fig. 3*a*.—The same, side view; *a*, as in last figure.

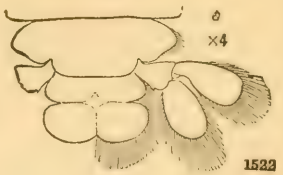
Fig. 4.—*Eupagurus politus* Smith. (p. 27.) Lateral view of left side of a male, from station 922, natural size.

Fig. 5.—*Catapagurus Sharreri* A. M.-Edwards. (p. 31.) Lateral view of left side of a male in a carcinœcium, formed by *Adamsia sociabilis* Verrill; from station 940, enlarged two diameters.

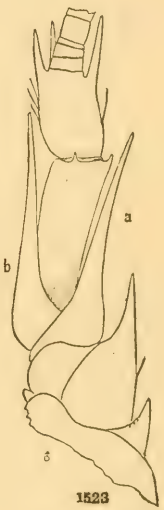
1



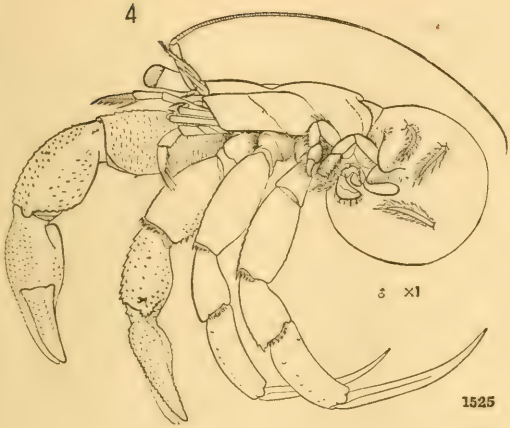
2



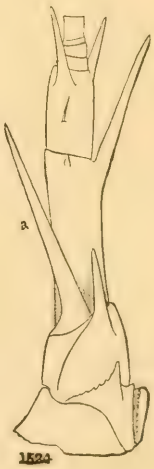
3



4



3a



5

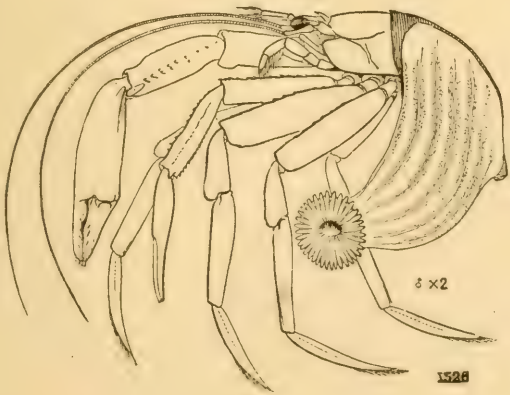


Plate V.

(Drawings of Figs. 4, 4*a*, 4*b*, and 5, by Mr. J. H. Emerton; the rest by Prof. S. I. Smith.)

Fig. 1.—*Eupagurus bernhardus* Brandt. (pp. 28, 29, *et seq.*) Outline of transverse section through the lower part of the anterior arthrobranchia of the thirteenth somite (penultimate thoracic), showing the form of the lamellæ; enlarged eight diameters; *a*, afferent, and *b*, efferent vessel.

Fig. 2.—*Sympagurus pictus* Smith. (p. 37.) Outline of similar section of the corresponding branchia of a female, from station 924, enlarged eight diameters, and lettered as in the last figure.

Fig. 2*a*.—Extremity of the same branchia, side view, enlarged eight diameters.

Fig. 3.—*Parapagurus pilosimanus* Smith. (p. 33.) Outline of similar section of the corresponding branchia of a male, from station 880, enlarged eight diameters, and lettered as in Figs. 1 and 2.

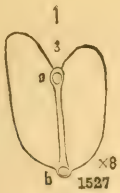
Fig. 3*a*.—Extremity of the same branchia, side view, enlarged eight diameters.

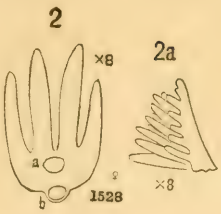
Fig. 4.—*Parapagurus pilosimanus.* (p. 33.) Lateral view of the left side of the originally described male specimen, taken on a trawl-line off Nova Scotia, half natural size.

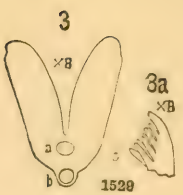
Fig. 4*a*.—Dorsal view of the carapax and anterior appendages of the same specimen, natural size.

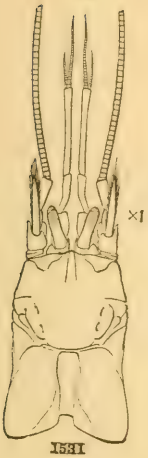
Fig. 4*b*.—Dorsal view of the chelipeds of the same specimen, half natural size.

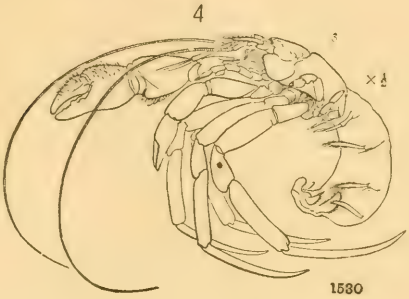
Fig. 5.—Dorsal view of a male in the carcinœcium (*Epizoanthus paguriphilus* Verrill), from station 947, natural size.


1
3
a
b
×8
1527


2
×8
2a
a
b
♀
1528
×8


3
×8
3a
×8
a
b
♂
1529


4a
×1
1531


4
♂
×½
1530


4b
×½
1532

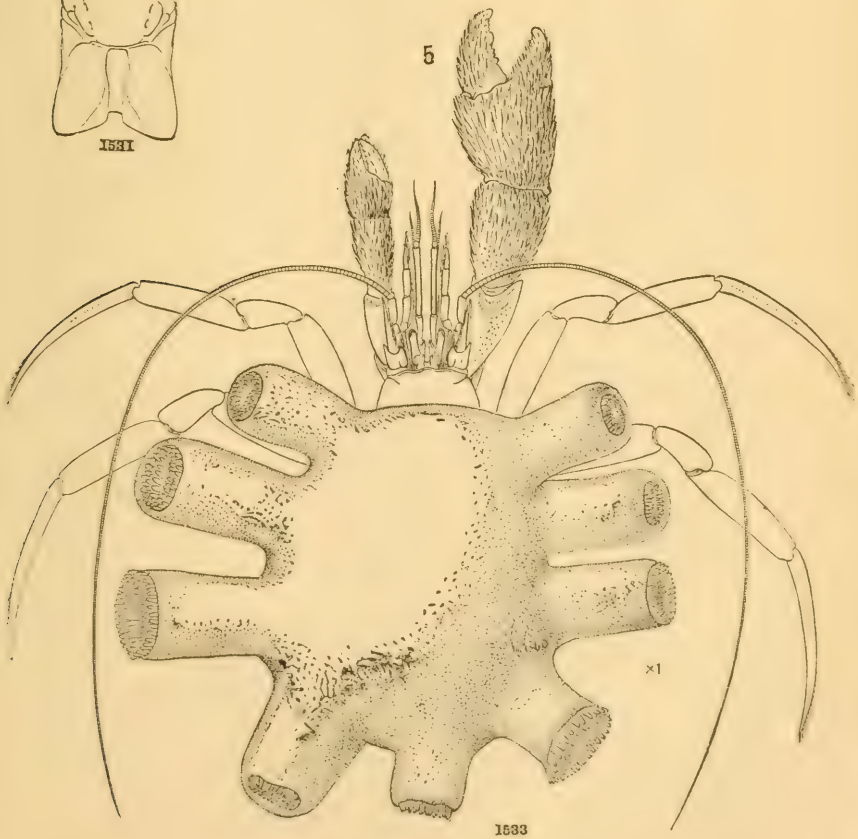

5
×1
1533

Plate VI.

(Drawing of Fig. 5, by Mr. J. H. Emerton; the rest by Prof. S. I. Smith.)

Fig. 1.—*Parapagurus pilosimanus.* (p. 33.) First maxilla of the right side, seen from below, of a male from station 880, enlarged six diameters.

Fig. 2.—Second maxilla of the right side of the same specimen, enlarged six diameters.

Fig. 3.—First maxilliped of the right side of the same specimen, enlarged six diameters.

Fig. 4.—Appendage of the right side of the first somite of the abdomen of the same specimen, seen from behind, enlarged four diameters.

Fig. 4*a*.—Appendage of the right side of the second somite of the abdomen of the same specimen, seen from behind, enlarged four diameters.

Fig. 5.—*Sympagurus pictus.* (p. 37.) Dorsal view, from life, of a male in the carcinœcium (*Urticina consors* Verrill), from station 924, one-half natural size.

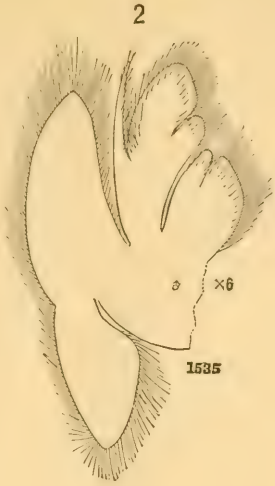
Fig. 6.—First maxilla of the right side of a female, from station 1114, enlarged six diameters.

Fig. 7.—Second maxilla of the right side of the same specimen, enlarged six diameters.

Fig. 8.—First maxilliped of the right side of the same specimen, enlarged six diameters.

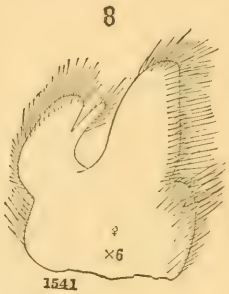
Fig. 9.—*Eupagurus bernhardus.* (pp. 28, 29, *et seq.*) First maxilliped of the right side of a male, from station 119 (Halifax, Nova Scotia), enlarged six diameters.


1
×6
1534


2
×6
1535

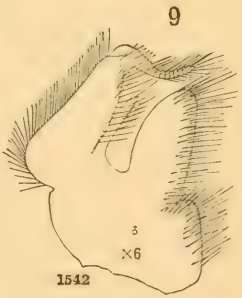

3
×6
1536


6
×6
1539


8
×6
1541


4a
4
×4
×4
1537


7
×6
1540


9
×6
1542

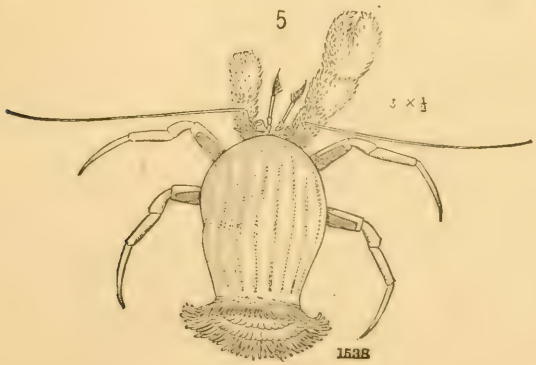

5
1538

Plate VII.

Radicipes pleurocristatus Stearns, n. g. & n. s. (description, page 97).
Fig. 1. Basal part of axial rod.
Fig. 2. Section of polypiferous part, showing arrangement of the polyps.

FIG. 2.

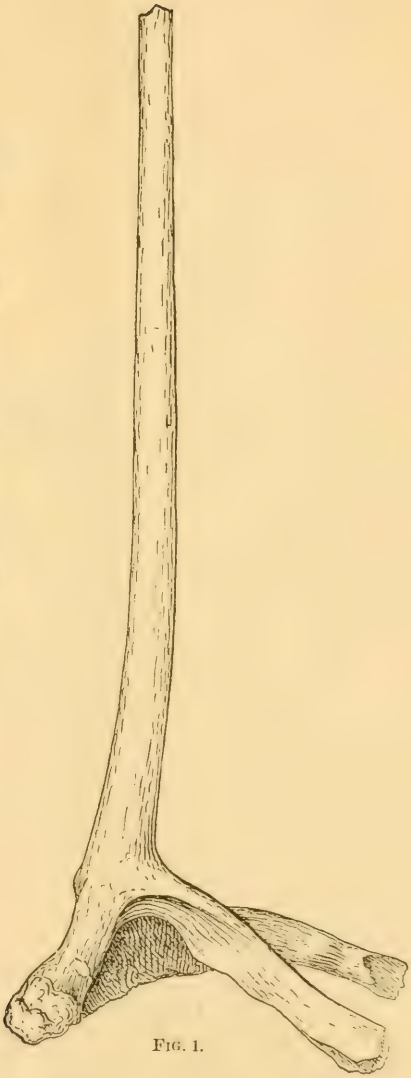


FIG. 1.

RADICIPES PLEUROCRISTATUS, Stearns.

Plate VIII.*

(For text see pages 184–187.)

Soleniscus? (Macrocheilus) ponderosus Swallow?

Figs. 1, 2.—Opposite views of a large example from Southern Iowa. The outer lip and a portion of the columella have been broken away so that the obtuse fold is not clearly shown. Professor Swallow's species was never figured; and this form is doubtfully identified by means of his description. (Museum No. 9142.)

Soleniscus? (Macrocheilus) primigenius Conrad.

Fig. 3.—Lateral view of a damaged example from Illinois, showing the thickened columella, but only a slight trace of a fold. (Museum No. 747.)

Soleniscus (Macrocheilus) fusiformis Hall.†

Figs. 4, 5, 6.—Different views of two examples from Illinois, showing some variation in the outward form of the shell, and also the character of the columella. Fig. 5 shows the character of the inner lip at mature growth; and Fig. 6 shows the columella with its fold and broad groove after a portion of the last volution has been removed.

Soleniscus (Macrocheilus) newberryi Hall.

Figs. 7, 8.—Opposite views of an example from Illinois, showing the outward form, the accumulation of callus upon the inner lip, and the columellar fold and broad groove.

Soleniscus planus White.

Figs. 9, 10.—Opposite views of an example from Illinois, showing the outward form, and the columella with its fold and groove. This form is possibly identical with the *Macrocheilus Newberryi* of Hall; but it seems to be different.

Soleniscus (Macrocheilus) ventricosus Hall.

Figs. 11, 12.—Lateral views of two Illinois examples. Fig. 11 represents an apertural view of a nearly perfect shell; and Fig. 12, another shell from which a large part of the last volution has been removed, to show the columella with fold and groove. (Museum Nos. 9372 and 12210.)

Soleniscus (Macrocheilus) texanus Shumard.

Figs. 13, 14.—Opposite views, showing the outward form of the shell, and the character of the columella with its fold and groove. Dr. Shumard's species was never figured, and this form from the Coal Measures of Illinois has been doubtfully identified by means of his description.

Soleniscus? (Macrocheilus) medialis Meek & Worthen.

Figs. 15, 16.—Opposite views of an example from Indiana, showing the outward form and the columella, which bears only a slight trace of a fold.

Soleniscus (Macrocheilus) paludinæformis Hall.

Fig. 17.—Lateral view of an example from Indiana, with a part of the last volution removed, showing the columellar fold and broad groove.

Soleniscus typicus Meek & Worthen.

Figs. 18, 19.—Copies of Meek & Worthen's figures of their type-specimen.

All figures on this plate are natural size.

---

* This plate is also to appear in the annual report of the Indiana State Geological Survey; and the use of a part of the examples here figured has been courteously loaned for the purpose by Prof. John Collett, State Geologist.

† The name *Macrocheilus fusiformis* was preoccupied by Sowerby. Professor Hall's species belongs to the group which I refer to *Soleniscus*. If this view is accepted, and Sowerby's species also belongs to that group, the name of the American species must be changed.

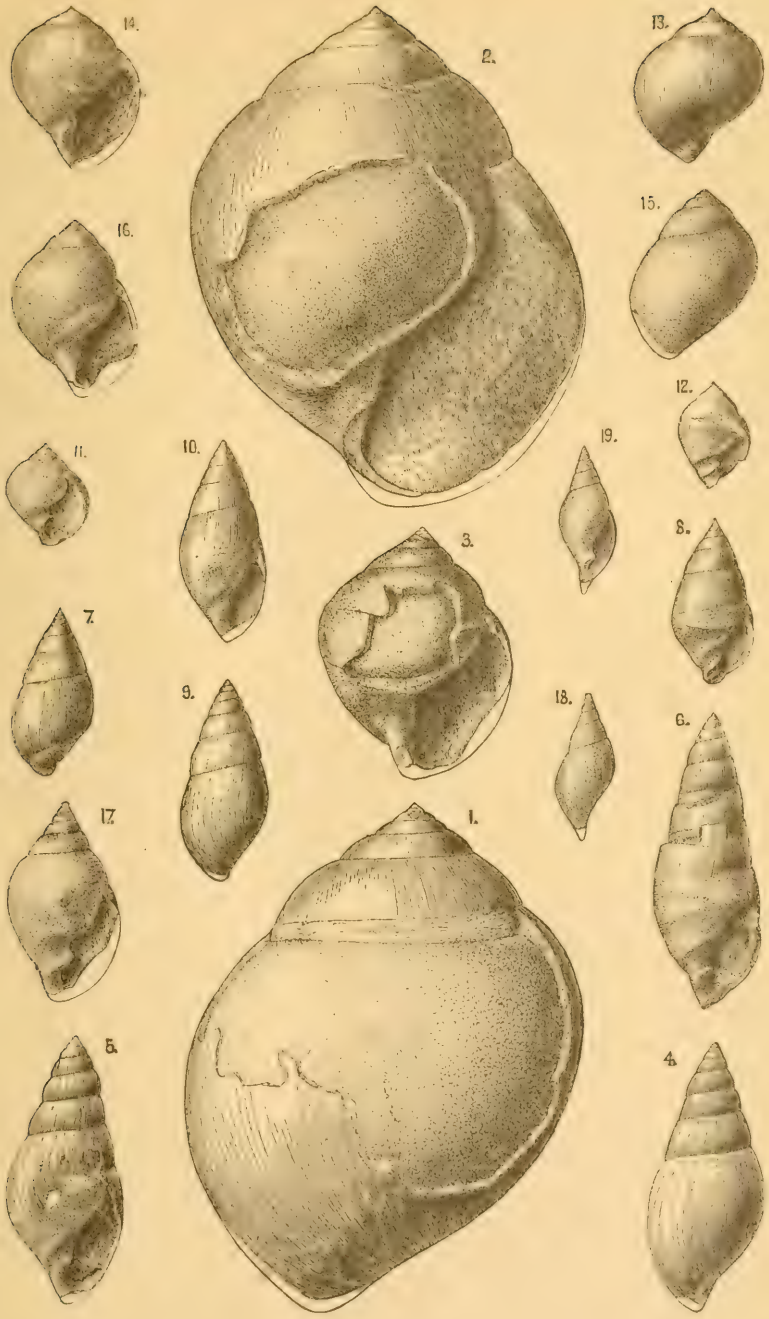

14.
2.
13.
16.
15.
12.
11.
10.
19.
3.
8.
7.
9.
18.
6.
17.
1.
5.
4.

Plate IX.

(For text see pages 236–247.)

Fig. 1.—*Kennerlia glacialis*, twice natural size. Specimen from Labrador, collected by Prof. A. S. Packard, jr., 1864.

Fig. 1*a*.—The same. Interior view of another specimen.

Fig. 2.—*Crenella decussata*, six times natural size. From Grand Manan, New Brunswick.

Fig. 3.—*Crenella faba*, four times natural size. From Labrador.

Fig. 4.—*Axinopsis orbiculata*, eight times natural size. From Labrador.

Fig. 5.—*Acmæa rubella*, four times natural size. From Labrador.

Fig. 5*a*.—The same specimen. Profile view.

Fig. 6.—*Astyris rosacea*, four times natural size. From Labrador.

Fig. 7.—*Bela pleurotomaria*, three times natural size. From off Cape Cod.

Fig. 8.—*Bela sarsii*, four times natural size. From Labrador.

Fig. 9.—*Cingula castanea*, eight times natural size. From Gulf of Saint Lawrence.

Fig. 10.—*Bela incisula*, twice natural size. From Eastport, Maine.

Fig. 11.—*Menestho albula*, eight times natural size. From Labrador.

Fig. 12.—*Sipho lividus*, natural size. From a specimen taken off Metis, Canada, by Principal J. W. Dawson.

Fig. 13.—*Buccinum Totteni*, natural size. Off Metis, Canada (J. W. Dawson).

Fig. 14.—*Buccinum ciliatum*, twice natural size. Rivière du Loup, Canada (J. W. Dawson).

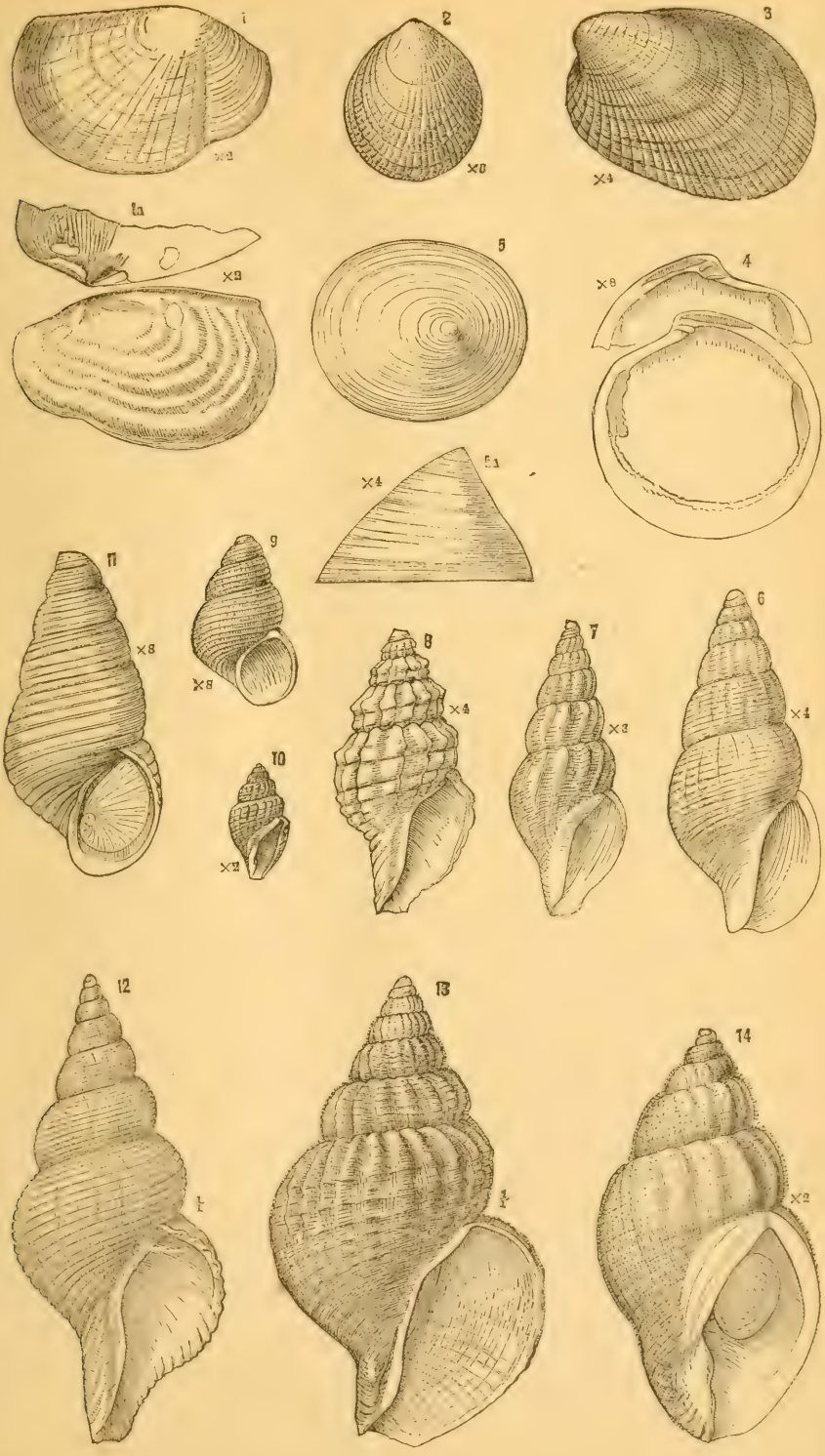

1
×2
2
×6
3
×4
1a
×3
5
4
×3
5a
×4
11
×8
9
×8
8
×4
7
×3
6
×4
10
×2
12
13
14
×2

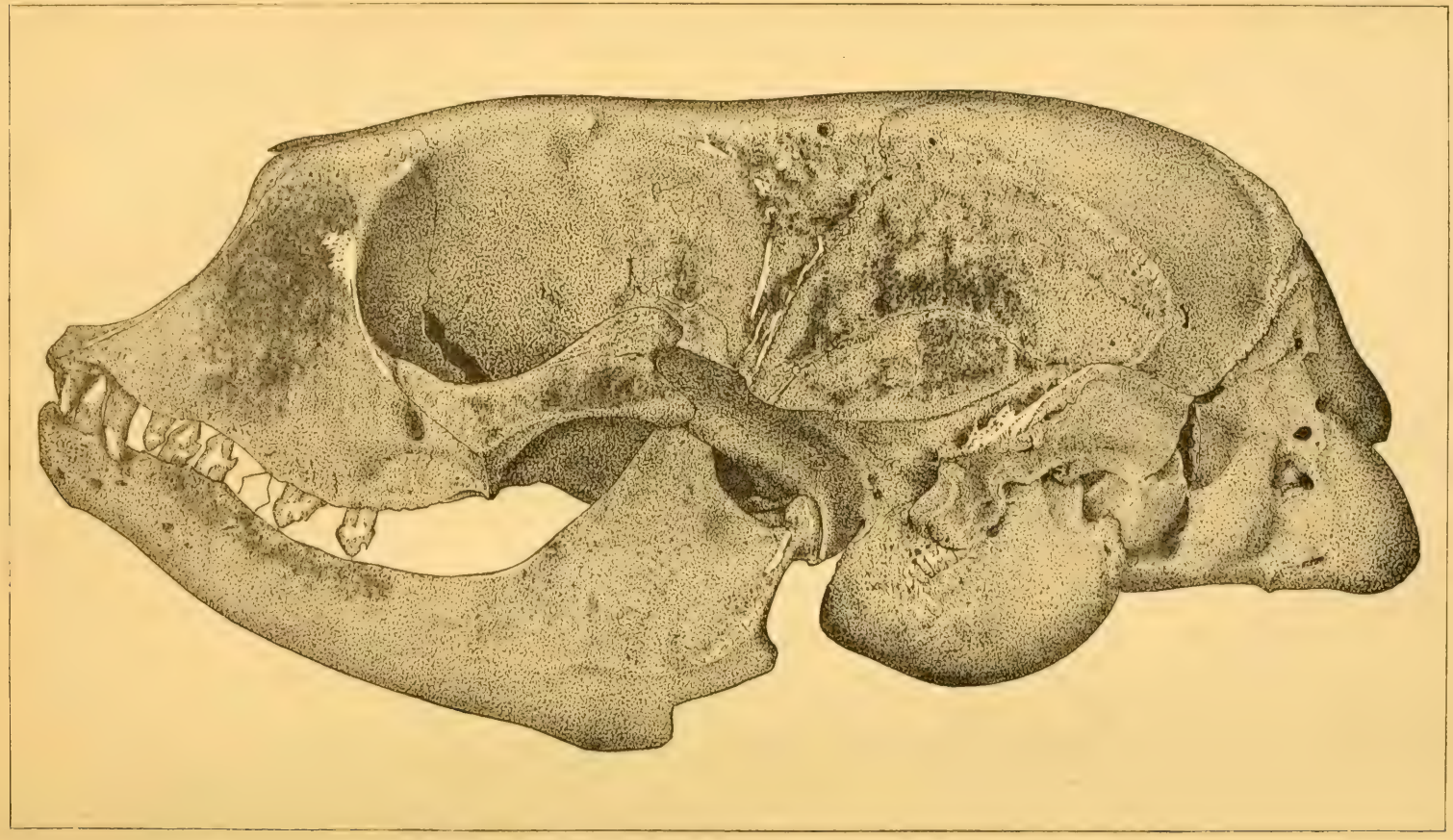
Plate X.

Figs. 1–3. *Parastarte triquetra* Conrad. (Description, pages 339–340.)
Fig. 4. *Eulima* (*Leiostraca?*) *hemphillii* Dall, n. s. (Description, page 330.)
Fig. 5. *Drillia thea* Dall, n. s. (Description, page 328.)
Fig. 6. *Leuconia hemphillii* Dall, n. s. (Description, page 323.)
Fig. 7. *Pyramidella? vincta* Dall, n. s. (Description, pages 330–331.)
Fig. 8. *Drillia leucocyma* Dall, n. s. (Description, pages 328–329.)
Fig. 9. *Phos intricatus* Dall, n. s. (Description page 325).
Fig. 10. *Drillia limonitella* Dall, n. s. (Description, page 329.)
Fig. 11. *Parthenia cedrosa* Dall, n. s. (Description pages 331–332.)
Fig. 12. *Mitra* (*Mitromorpha?*) *floridana* Dall, n. s. (Description, pages 327–328.)

NEW FLORIDA SHELLS.

Plate XI.

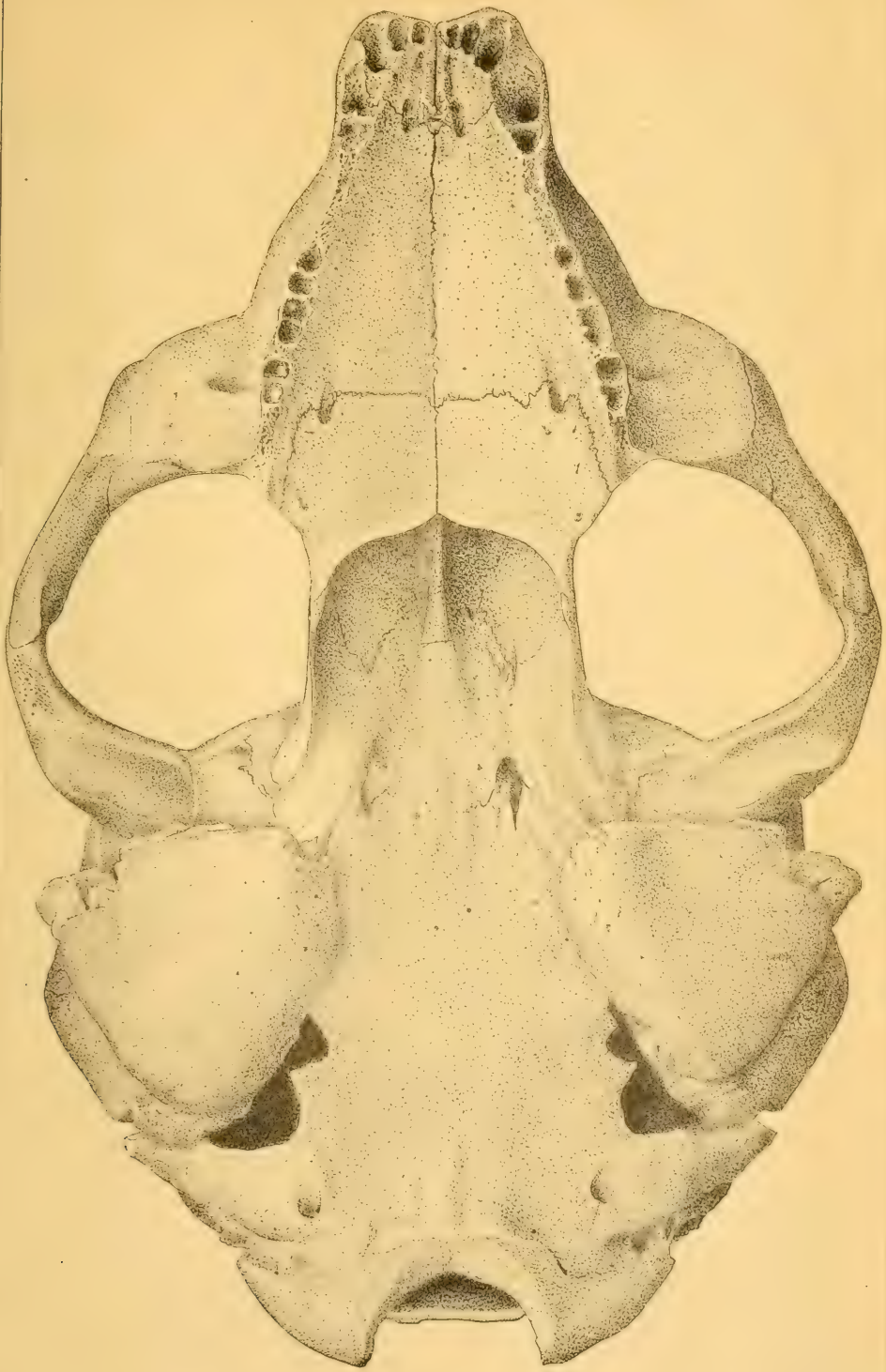
Skull of *Phoca* (*Histriophoca*) *fasciata*. Side view. (Text, 419–421.)



SKULL OF PHOCA (HISTRIOPHOCA) FASCIATA. Museum No. 13285. Natural size.

Plate XII.

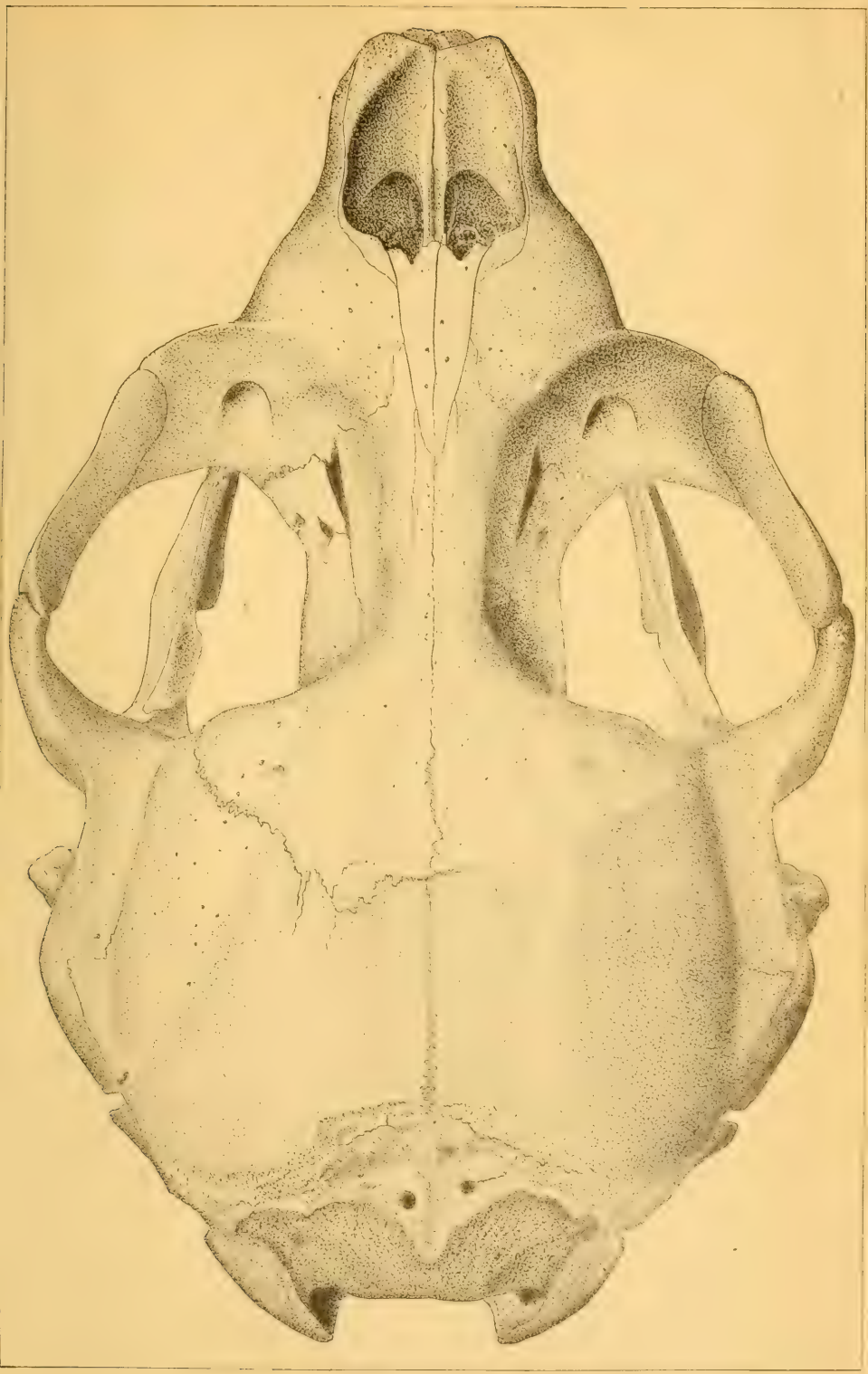
Skull of *Phoca* (*Histriophoca*) *fasciata*. View from below. (Text, 419–421.)



SKULL OF PHOCA (HISTRIOPHOCA) FASCIATA. No. 13285. From below.

Plate XIII.

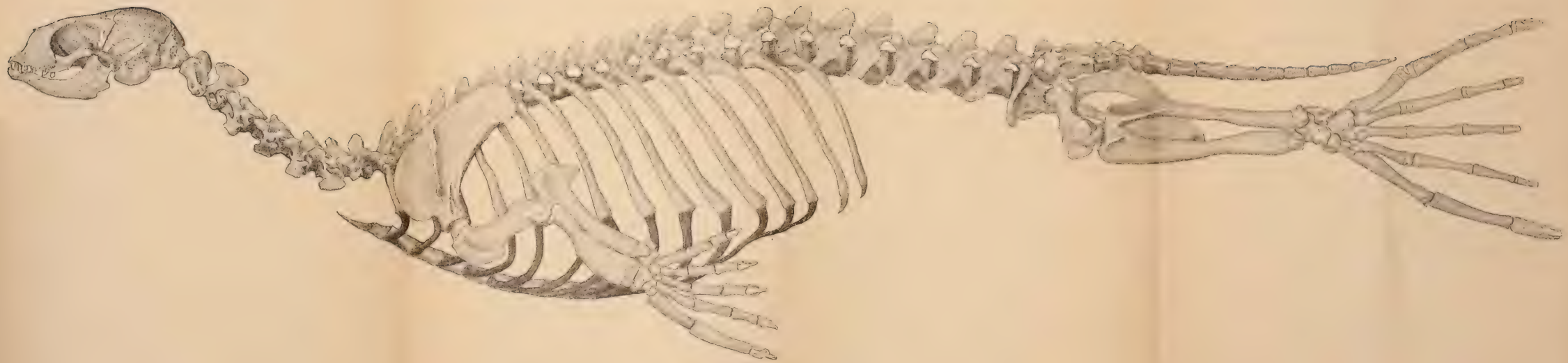
Skull of *Phoca* (*Histriophoca*) *fasciata*. View from above. (Text, 419–421.)



SKULL OF PHOCA (HISTRIOPHOCA) FASCIATA. No. 13285. From above.

Plate XIV.

Skeleton of *Phoca* (*Histriophoca*) *fasciata*. Side view. (Text, 421–422.)



PHOCA (HISTRIOPHOCA) FASCIATA. Museum No. $\frac{16484}{13285}$. About one-fourth natural size.