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ADVERTISEMENT.

This work is the fifteenth of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,

Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,

Washington, April 15, 1879.

CONTRIBUTIONS

TO THE

NATURAL HISTORY

OF

ARCTIC AMERICA,

MADE IN CONNECTION WITH

THE HOWGATE POLAR EXPEDITION, 1877-78,

BY

LUDWIG KUMLIEN,

NATURALIST OF THE EXPEDITION.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1879.

FISHES

COLLECTED IN CUMBERLAND GULF AND DISKO BAY.

BY TARLETON H. BEAN.

The collection of fishes made by Mr. Kumlien embraces ten species, as follows:

1. *Boreogadus saida*.
2. *Gadus ogac*.
3. *Gymnelis viridis*.
4. *Liparis vulgaris*.
5. *Cyclopterus lumpus*.
6. *Cottus scorpius*.
7. *Cottus scorpius* sub-species *grönlandicus*.
8. *Cottus scorpioides*.
9. *Gymnacanthus pistilliger*.
10. *Gasterosteus pungitius* sub-species *brachypoda*.

With these I have combined several species collected by Lieut. W. A. Mintzer, U. S. N., in Cumberland Gulf in 1876, the two following being additions to Mr. Kumlien's list:

11. *Lycodus mucosus*.
12. *Salvelinus Naresi*.

Besides giving a report upon these twelve species recently obtained by the United States National Museum, I have made a list of the species recorded from Northeastern North America, which is by no means complete, but is as nearly so as the limited time allowed me for searching would permit. Of course there are many Greenland species which we may be sure are found also on our northeastern coast, but we have as yet no positive evidence of their occurrence.

The additions to our collections and to our knowledge of the species made by Mr. Kumlien are by far the most important contributions from the region in question hitherto received by the museum, and that excellent naturalist deserves hearty acknowledgments for the valuable material which he has secured in the face of great obstacles. Two of the species taken by him have not before been recorded from the northeast

coast—*Cottus scorpius* and *Gasterosteus pungitius* sub-species *brachypoda*. Many of the others are extremely rare in collections.

Lieutenant Mintzer's collection also, though small in the number of species, is rich in interest, and has greatly extended our acquaintance with some of the rarest of northern forms.

Family, PLEURONECTIDÆ.

1. *Pleuronectes Franklinii* Günther.

Pleuronectes Franklinii GÜNTHER, Cat. Fish. Brit. Mus., iv, 1862, p. 442.

Pleuronectes (Rhombus) glacialis RICH., F. B. A., ii, 1836, p. 258.

Platessa glacialis RICH., Voy. Herald, Fishes, 1854, p. 166, pl. xxxii.

Richardson records the species from Bathurst's Inlet (67° 40' N., 109° W.); Dr. Günther has Arctic American specimens from Dr. Rae and the Haslar collection. Judging from the descriptions given by Richardson and Günther, *Pleuronectes Franklinii* is very closely related to *P. glaber* (Storer) Gill.

2. *Hippoglossus vulgaris* Fleming.

Halibut KUMLIEN, in lit. Feb. 16, 1879.

Mr. Kumlien writes me, that "in February a large halibut was caught in a seal breathing-hole by an Eskimo, but it was something entirely unknown to them."

It may be that this was not *Hippoglossus vulgaris*, but *Platysomatichthys hippoglossoides* (= *Reinhardtius hippoglossoides* (Walb.) Gill).

Family, GADIDÆ.

3. *Boreogadus saida* (Lepech.) Bean.

Gadus fabricii RICH., Faun. Bor. Amer., 1836, p. 245; GÜNTHER, Cat. Fishes Brit. Mus., iv, 1862, p. 336.

Boreogadus polaris GILL, Cat. Fishes E. Coast N. A., 1873, p. 17.

21746. (310.) Annanaetook, Cumberland Gulf, A. L. Kumlien. D. 14, 18, 18. A. 21, 19. P. 17. V. 6. Length 250 millimetres.

The inequality of the caudal lobes mentioned by Gill* is evident in this example; the length of the upper lobe, measured from the origin of the middle caudal rays, is 31 millimetres, of the lower lobe 27. The outline of the lower lobe is decidedly convex below. The middle caudal rays, instead of pursuing the horizontal of the median line of the body, are slightly raised, giving the fin a peculiar shape, which may perhaps be due to outside circumstances, or may be characteristic of the adult.

* Proc. Acad. Nat. Sci. Phila. 1863, p. 233.

The inequality of the lobes and the singular shape are not present in the smaller individuals referred to below.

Mr. Kumlien sent the following notes of color: "Brassy red; belly white; eye red. Fins dark purple brown." A sketch of this specimen by Mr. Kumlien has the caudal lobes equal.

21747. (481.) Kingwah Fjord, Cumberland Gulf, A. L. Kumlien. D. 13, —, 20. A. 16, 21. V. 6. Length 180 millimetres.

"Found on a seal-hole. Iris silvery white. Fins dark purple brown. Belly and lower parts silvery. Back brassy olive brown."—*Kumlien*.

21748. (857.) Head of Cumberland Gulf, A. L. Kumlien. D. 13, 16, 20. A. 19, 21. P. 19. V. 6. Length 160 millimetres.

"Dark brassy red, becoming blue-black on head. Silvery white on belly. Pectorals white. All the rest of the fins dark purple-blue."—*Kumlien*.

21753. (369.) Cumberland Gulf, Jan. 2, 1878, A. L. Kumlien. Length 112 millim.

"The principal food of *Pagomys fœtidus* at this season."—*Kumlien*.

I have followed the lead of Malmgren* and Collett† in employing the name *Gadus saida* Lepech. Professor Collett has made a direct comparison of examples of this form of cod from Archangel, Greenland, Spitzbergen, and Nova Zembla, and he believes the *polaris* of Sabine, 1824, *Fabricii* of Richardson, 1836, and *agilis* of Reinhardt, 1838, to be identical with *G. saida*. The only difference that he observed is that individuals from the White Sea have, as a rule, darker fins than the rest, which he justly attributes to a difference in the surroundings of the bottom in the different places. They agree in squamation, structure of the teeth, position of the anus, and in every particular of the structure of the body so completely that they cannot possibly be separated.‡

4. *Pollachius carbonarius* (Linn.) Bon.

Merlangus carbonarius RICH., Last of the Arctic Voyages, 1855, p. 375.

Richardson records the species from Davis Strait.

5. *Gadus morrhua* Linn.

Gadus morrhua RICH., F. B. A., iii, 1836, p. 243.

Richardson states that Davis observed many cod in the possession of the Eskimo who live between Cape Raleigh and Cumberland Strait.

* Öfv. Kgl. Vet. Akad. Förh. 1834, p. 531.

† Christiania Vid. Selsk. Förh. No. 14, 1878, (p. 80).

‡ Men iøvrigt stemme de i Skjælbeclædning, Tandbygning, Stillingen af Anus og i ethvert Punkt af deres Legemsbygning saa fuldkommen overens, at nogen Adskillelse mellem den ikke er mulig.—*Collett, l. c.*

6. *Gadus ogac* Rich.

Gadus ogac RICH., Faun. Bor. Amer., iii, 1836, p. 246.

Gadus ovak RHDT., Vid. Selsk. Naturvid. og Math. Afln., deel vii, 1838.

Gadus ogat KRÖYER, Voy. en Scand., &c., pl. xix.

21723. (1417.) ♂ Godthaab, Greenland, August 11, 1878. D. 13, 19, 22. A. 22, 21. V. 6. Length of specimen 330 millimetres.

A black spot on the second dorsal, $\frac{2}{3}$ as long as the eye, between the thirteenth and fifteenth rays.

21724. (1418.) ♀ Godthaab, Greenland, August 11, 1878. D. 14, 18, 20. A. 20, 18. V. 6. Length of specimen 359 millimetres.

The lateral line shows an interruption, measuring 22 millimetres on the left side, the right being normal. The first portion of the lateral line ends at the vertical through the interspace between the first and second dorsals; the second portion begins at the vertical let fall from the sixth ray of the second dorsal.

21725. (1419.) ♀ Godthaab, Greenland, August 11, 1878. D. 14, 17, 18. A. 19, 20. V. 6. Length of specimen 300 millimetres.

Richardson records this species at Cape Isabella, Peninsula of Boothia.

Gadus ogac Rich., may be only a variety of *G. morrhua* Linn., as claimed by Dr. Günther; but after examining many specimens of the latter species and comparing them with Mr. Kunlién's examples, I prefer to consider these distinct from *G. morrhua* and identical with Richardson's species. It may be that a larger series would lead me to the same conclusion reached by Dr. Günther. I have studied all the common cod in the United States National Museum, a very large series, recently increased by the addition of a monster weighing 100 pounds, and find that *Gadus ogac* is distinguished from *G. morrhua* by several important characters, among which are (1) a more slender caudal peduncle; (2) a longer barbel; (3) a larger eye; (4) a greater distance between the eyes; (5) a longer pectoral; and (6) the more advanced position of the ventrals. These differences may be seen in the tables of measurements, in which are given the proportions of parts of the body in hundredths of the total length without the caudal.

The general color of Mr. Kunlién's specimens is very dark brown, and the sides are marbled with white.

Table of Measurements.

Species, *Gadus ogac* Rich.

Current number of specimen	21,723.		21,724.		21,725.	
	Greenland.		Greenland.		Greenland.	
Locality	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length (without caudal)	305	.....	330	.....	275	.....
Length to end of middle caudal rays	330	.....	359	.....	300	.....
Body:						
Least height of tail		5		5		5½
Head:						
Greatest length		27½		30		30
Width of interorbital area		9		9		9
Length of snout		9		10		.....
Length of barbel		6		6½		6½
Length of maxillary		12		13		13
Length of mandible		15		15½		16
Diameter of orbit		6		6		6½
Dorsal (first):						
Length of longest ray		14½		16		14
Pectoral:						
Length		16		17		17½
Ventral:						
Distance from snout		25		25		25
Length		15		15		15
Dorsal	13, 19, 22	.....	14, 18, 20	.....	14, 17, 18	.....
Anal	22, 21	.....	20, 18	.....	19, 20	.....
Ventral	6	.....	6	.....	6	.....

Table of Measurements—Continued.

Species, *Gadus morrhua* Linn.

Current number of specimen	17,405.		17,406 a.		17,406 b.		17,406 c.	
	Lofoten, Nor- way.		Bergen.		Bergen.		Bergen.	
Locality	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length (without caudal) ..	312	.....	413	.....	296	.....	300	.....
Length to end of middle caudal rays.	341	.....	448	.....	324	.....	330	.....
Body:								
Least height of tail				5½		6		6
Head:								
Greatest length	29	.....	28½	.....	30	.....	28	.....
Width of interorbital area	7½	.....	7½	.....	7½	.....	7	.....
Length of snout			10	.....	10½	.....	9	.....
Length of barbel	5½	.....	4½	.....	5½	.....	5	.....
Length of maxillary	13	.....	12½	.....	13	.....	12	.....
Length of mandible	15	.....	15	.....	15	.....	14½	.....
Diameter of orbit	5½	.....	5	.....	6	.....	5½	.....
Dorsal (first):								
Length of longest ray				15		15		14
Pectoral:								
Length	11½	.....	12½	.....	14	.....	14½	.....
Ventral:								
Distance from snout	27	.....	26	.....	27	.....	27	.....
Length	14½	.....	14	.....	15½	.....	14	.....

Family, LYCODIDÆ.

7. *Gymnelis viridis* (Fabr.) Rhdt.

21739. (726.) Head of Cumberland Gulf, June 13, 1878. Length of longer 63 millim. Length of shorter 59 millim.

“Gravel beach, at low tide.”—*Kumlien*.

21749. (648.) Head of Cumberland Gulf, May 30, 1878. *a*, 109 millim. *b*, 103 millim. *c*, 65 millim. *d*, 60 millim.

“Coogjannernak of the Eskimo.”—*Kumlien*.

21757. (661.) Head of Cumberland Gulf, June 6, 1878. D. 95. A. 77. Length of specimen 104 millim.

“Gravel beach.”—*Kumlien*.

21758. (647.) Head of Cumberland Gulf, May 30, 1878. D. 105. Length of example 147 millimetres.

“Tide-rifts, among stones.”—*Kumlien*. Color-sketch accompanying.

21759. (646.) Head of Cumberland Gulf, May 30, 1878. D. 102. Length 142 millim.

“Tide-rifts, among stones.”—*Kumlien*.

21760. (645.) Head of Cumberland Gulf, May 30, 1878. D. 100. Length 142 millim.

“Tide-rifts, among stones.”—*Kumlien*.

21999. (86.) Niantilie, Cumberland Gulf, August, 1876. W. A. Mintzer, U. S. N. *a*, 210 millim. *b*, 176 millim.; D. ca. 95; A. 77; P. 13. *c*, 175 millim.; A. 75; P. 12. *d*, 124 millim.; A. 78; P. 13.

“Found between high and low water mark.”—*Mintzer*.

This species is recorded from Prince Regent's Inlet (Rich., F. B. A., iii, 1836, p. 271; stomach of kittiwake gull); Northumberland Sound, 76° 53' N. (Rich., Last Arc. Voy., 1855, p. 367, pl. xxix, and as var. *unimaculatus*, p. 371, pl. xxx); lat. 81° 52' N. (Günth., P. Z. S., 1877, p. 293), and Franklin Pierce Bay (Günth., op. cit., p. 476).

Krøyer has found in the stomachs of specimens examined by him, “crabs . . . once *Gammarus locusta* Linn.; another time *Entomostraca*.”* Prof. Robert Collett found in the mouth of a specimen secured in the summer of 1878 by the Scandinavian Expeditions, an example of *Modiolaria lavigata* Gray.†

8. *Lycodes mucosus* Rich.

Lycodes mucosus RICH., Last of Arctic Voyages, 1855, p. 326, pl. xxvi.

16930. Cumberland Gulf, W. A. Mintzer, U. S. N.

A single individual of this species, originally described from Northumberland Sound, was found by Lieutenant Mintzer, and presented by him to the United States National Museum. From the appearance of the specimen it must have been picked up dead; but it is in a good state

* Naturhistorisk Tidsskrift, 3 R., I. B. (author's extra), p. 34.

† Christiania Vid. Selsk. Forh. 1878, No. 14, (p. 78).

of preservation. As there is little on record concerning the species, and the example under consideration is much larger than the types, and, while it agrees in all important particulars with Richardson's description and figure of *L. muscosus*, still shows some differences in the measurements, I have drawn up a description and prepared an accompanying table of measurements. It will be observed that in Lieutenant Mintzer's specimen the head is longer and wider and the height and width of body slightly less than in the types, which variations may be accounted for by the difference in size.

Like all the other described species of *Lycodes*, except *L. paxillus* Goode & Bean, of which I have knowledge, the width of the body at the vent is very much less than just behind the pectorals, and the height of the body at the same point is also considerably less than it is in the anterior part of the body; in other words, the body tapers decidedly, and the tail is much compressed.

Description.—The length of the example is 430 millimetres (17 English inches). Scales are entirely wanting.

The greatest height of the body (at the pectorals) is contained 8 times and its greatest width (just behind the pectorals) 9 times in the total length. The width at the vent is contained 8 times in the length of the head, and twice in the length of the longest dorsal ray. The height at the ventrals about equals the height of the body at the pectorals. The height of the body at the vent equals half the greatest width of the head, and is contained $11\frac{1}{2}$ times in the total length.

The head is very large, its length being $\frac{7}{25}$ of the total, and its greatest width contained $5\frac{3}{4}$ times in the whole length. The distance from the tip of the snout to the nape is $\frac{1}{5}$ of total length, and $\frac{4}{5}$ of the length of the mandible. The distance between the eyes is contained 6 times in the length of the head. The length of the snout is $\frac{1}{3}$ of the length of the head. The nostrils are much farther from the eyes than from each other, their distance from the eyes being contained $4\frac{1}{3}$ times in the length of the head. The length of the upper jaw is contained $6\frac{1}{4}$ times in the total length; of the lower jaw, $6\frac{3}{8}$ times; the upper jaw slightly exceeding the mandible in length. The eyes are very small, close together, and high, their long diameter being equal to $\frac{1}{11}$ of the length of the head.

The distance from the tip of the snout to the beginning of the dorsal fin is contained $3\frac{1}{4}$ times in the total length. The first ray of the dorsal is contained $5\frac{3}{8}$ times in the length of the head, and the longest, 4 times.

The distance of the anal from the snout is $\frac{1}{10}$ of the total length and

almost equals twice the distance of the pectoral from the snout. The first anal ray is contained $9\frac{1}{3}$ times in the length of the head, the longest $4\frac{1}{3}$ times. The vent is nearly in the middle of the total length.

The distance from the tip of the snout to the base of the pectoral is contained $3\frac{1}{2}$ times, and the length of the pectoral $6\frac{2}{3}$ times in total length. The length of the pectoral equals that of the mandible, and only slightly exceeds one-half of the length of the head.

The distance of the ventral from the tip of the snout equals the length of the head. The length of the ventral equals the long diameter of the eye.

Radial formula.—D. (including half of caudal) 90; A. (including half of caudal) 71; P. 18; V. 3.

Colors.—These agree, in the main, so closely with Richardson's description of them, that it is unnecessary to say more than that the cross-markings are faint and narrow.

The gape of the mouth is very wide. The character and arrangement of the teeth agree perfectly with the original description.

Table of Measurements.

Current number of specimen.....	16,930.		
Locality.....	Cumberland Gulf.		
	Millime- tres.	100ths of length.	Times in total.
Extreme length	430		
Body:			
Greatest height (at pectorals)		$12\frac{1}{2}$	8
Greatest width (behind pectorals)		11	9
Width at vent		$3\frac{1}{2}$	In head 8
Height at ventrals		13	Nearly 8
Height at vent		8.7	$11\frac{1}{2}$
Head:			
Greatest length		28	$3\frac{1}{2}$
Distance from snout to nape		20	5
Greatest width		$17\frac{1}{2}$	$5\frac{1}{2}$
Distance between eyes		$4\frac{1}{2}$	In head 6
Length of snout		$9\frac{1}{2}$	In head 3
Distance of nostrils from eye		$6\frac{1}{2}$	In head $4\frac{1}{2}$
Length of upper jaw		16	7
Length of mandible		15	$6\frac{1}{2}$
Distance from snout to orbit		$9\frac{3}{8}$	$10\frac{1}{2}$
Long diameter of eye		$2\frac{3}{8}$	In head $10\frac{3}{8}$
Dorsal:			
Distance from snout		31	$3\frac{1}{2}$
Length of first ray		5	20
Length of longest ray		7	14
Anal:			
Distance from snout		55	$1\frac{9}{11}$
Length of first ray		3	33
Length of longest ray		$6\frac{1}{2}$	15
Distance of vent from snout		55	$1\frac{9}{11}$
Pectoral:			
Distance from snout		$28\frac{1}{2}$	$3\frac{1}{2}$
Length		15	$6\frac{1}{2}$
Ventral:			
Distance from snout		28	$3\frac{1}{2}$
Length		$2\frac{1}{2}$	40
Dorsal	90		
Anal	71		
Pectoral	18		
Ventral	3		
Scales	None		

9. *Lycodes polaris* (Sabine) Rich.

Blennius polaris SABINE, App. Parry's First Voy., p. cxxii.

Lycodes polaris RICH., Last Arc. Voy., 1855, p. 362.

Described from North Georgia, lat. 75° N., long. 110° W. Recorded, also, from the west side of the Peninsula of Boothia by Capt. J. C. Ross.

10. *Uronectes Parryi* (Ross) Günther.

Ophidium Parrii Ross, in Parry's Third Voy., App., p. 109; Polar Voyage, p. 199.—RICH., F. B. A., iii, 1836, p. 274.

Discovered in Baffin's Bay and Prince Regent's Inlet. Observed near Felix Harbor, ejected by a glaucous gull.—*Rich.*, l. c.

Family, STICHÆIDÆ.

11. *Centroblennius nubilus* (Rich.) Gill.

Lumpenus nubilus RICH., Last Arc. Voy., 1855, p. 359, pl. xxviii.

This species was described from Northumberland Sound, lat. 76° 53' N.

Family, ZIPHIDIONTIDÆ.

12. *Murænoides fasciatus* (Sehn.) Gill.

Gunnellus fasciatus RICH., Last Arc. Voy., 1855, p. 357, pl. xxvii.

Richardson records the species from Northumberland Sound.

Family, CYCLOPTERIDÆ.

13. *Eumicrotremus spinosus* (Fabr.) Gill.

Cyclopterus spinosus GÜNTHER, P. Z. S., 1877, pp. 293, 476.

Günther has examined specimens from Franklin Pierce Bay.

14. *Cyclopterus lumpus* Linn.

21726. (1411.) Godthaab, Disko Island, Greenland.

Mr. Kumlien brought down a single specimen 430 millimetres in length, and furnished the following notes of color: "Varying shades of dusky olive green. Dorsal light. Belly nearly white. Iris umber."

Family, LIPARIDIDÆ.

15. *Liparis vulgaris* Fleming.

Liparis lineata (LEP.) KRÖYER, Nat. Tidsskrift, ii, 2, p. 284; iii, 1, p. 244; Voy. en Scand., &c., pl. xiii, fig. 2.

Liparis lineatus COLLETT, Christiania Vid. Selsk. Forh. 1878, No. 14, (p. 32).

21762. (657.) Annanactook, Cumberland Gulf. D. 42. A. II, 34. P. 35. C. 11.

Taken in "7 fathoms. Nee-fitz-shak of the Eskimo."—*Kumlien*.

21763. (859.) Head of Cumberland Gulf, June 29, 1878. (a) D. 19, 23; A. 34. (b) D. 19, 21; A. 35.

"Fastened to kelp in 7 fathoms."—*Kumlien*.

21764. (860.) Annanactook, Cumberland Gulf, June 29, 1878.

"Fastened to kelp."—*Kumlien*.

21765. (858.) Head of Cumberland Gulf, June 29, 1878. D. 41. A. 34. P. 34. C. 10.
 "Fastened to kelp in 5 fathoms."—*Kumlien*.

21752. (573.) Ammanactook, Cumberland Gulf.

Referred doubtfully to *L. vulgaris*. The specimen is young and in bad condition. It was taken in 9 fathoms.

Richardson (F. B. A., iii, 1836, p. 263) mentions this species from the west side of Davis Strait in lat. 70°, and from Regent's Inlet.

Professor Collett found the alimentary canal of one of his specimens filled with small amphipods, one of them being *Caprella septentrionalis* Kr., together with many individuals of *Protomedea fasciata* Kr.*

16. *Liparis Fabricii* Kröyer.

Liparis Fabricii GÜNTHER, P. Z. S., 1877, pp. 294, 476.

Dr. Günther has examined specimens collected in Discovery Bay and Franklin Pierce Bay.

Family, AGONIDÆ.

17. *Aspidophoroides monopterygius* (Bloch) Storer.

Aspidophoroides monopterygius GÜNTHER, P. Z. S., 1877, p. 295.

A young individual was taken in 30 fathoms, lat. 65° N., long. 53° W.—*Günther, l. c.*

Family, COTTIDÆ.

18. *Cottus scorpius* Linn.

21989. (151.) ♀ Niantlic Harbor, Cumberland Gulf, A. L. Kumlien.

21742. (180.) ♂ Niantlic Harbor, Cumberland Gulf, A. L. Kumlien.

Mr. Kumlien collected this individual on the 25th of September, 1877, at which time its colors must have been exceedingly brilliant, judging from the traces which still remain. He states in his notes, that it lives "among the rocks at the bottom, feeding largely on crustacea and mollusks." *Cottus scorpius*, and the sub-species *grönlandicus*, but especially the latter, formed an important part of the food supply of the expedition.

These specimens of *Cottus scorpius* are clearly identical with Scandinavian examples of the same species, as may be seen from the tables of measurements which follow. In all the tables it must be remembered that the unit of length is the total length without caudal. So far as I know, the true *Cottus scorpius* has not previously been found on the east coast of America. A young individual, catalogue-number 10374, collected at Eastport, Me., by the United States Fish Commission, may be compared with one a trifle larger, catalogue-number 22060, which

* Collett, l. c.

was presented to the United States National Museum by Prof. Robert Collett. The agreement between these two in all essential particulars is very striking. We may safely record this species, then, at least as far south as Eastport. The true *Cottus scorpius* may be distinguished from the sub-species which follows by its narrower interorbital distance, and the lesser length of the dorsal spines, particularly the anterior ones.

Table of Measurements.

Species, *Cottus scorpius* Linn.

Current number of specimen	21,742 <i>a</i> , ♂.		21,989, ♀.		10,374, juv.	
	Cumberland Gulf.		Cumberland Gulf.		Eastport, Me.	
Locality	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length	169		180		88	
Length to origin of middle caudal rays	140		150		72	
Body:						
Greatest height		23		24		24
Greatest width (at pectoral base)		21		21		20
Height at ventrals		23		24		24
Least height of tail		6		6		6½
Head:						
Greatest length		38		38		39
Distance from snout to nape		26		27		28
Greatest width at base of præop. spines		23		23		23
Width of interorbital area		5½		4½		5
Length of snout		9		9		8
Length of upper jaw		18½		18		17
Length of mandible		20		20		19
Distance from snout to orbit		10		10		
Diameter of orbit		8		8		10
Dorsal (spinous):						
Distance from snout		34		36		35
Length of base		23		25		22
Length from end of dorsal to origin of middle caudal rays		10		10		
Length of first spine		10		9		11
Length of second spine		11		10		12
Length of third spine		12		11		13
Length of fourth spine		12		12		12
Length of fifth spine		12		12		11
Length of sixth spine		12		12		10
Length of seventh spine		10		11		8
Length of eighth spine		9		9		5½
Length of ninth spine		6		7		3
Length of tenth spine		3½		2		
Length of longest ray		16		17		16
Length of last ray		5		6		
Anal:						
Distance from snout		64		64		63
Length of base		25		24		26
Length of first ray		5		7		6
Length of longest ray		13		14		12
Length of last ray		6		6½		7
Caudal:						
Length of middle rays		20		20		22
Pectoral:						
Distance from snout (upper axil)		35		34		36
Length		26		27		26
Ventral:						
Distance from snout		32		32		34
Length		20		20		21
Branchiostegals						
Dorsal	{	Right VI } Left VII }		VI		VI
Anal		X, 16		X, 16		IX, 15
Pectoral		14		13		14
Ventral	{	Right 19 } Left 18 }		17		17
		I, 3		I, 3		I, 3

Table of Measurements—Continued.

Current number of specimen	17,433 a, ♂.		17,433 b, ♀.		3,285, ♀.		22,060, juv.	
Locality	Bergen, Norway.		Bergen, Norway.		Sweden.		Christiania, Norway.	
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length
Extreme length.....	190		230				104	
Length to origin of middle caudal rays	154		190		200		85	
Body:								
Greatest height.....		24		25		28		24
Greatest width (at pectoral base).....		22		22		25		21
Height at ventrals.....		24		23½		25½		23
Least height of tail.....		7		7½		7½		7
Head:								
Greatest length.....		40		41½		40		39
Distance from snout to nape.....		31		30		29		27
Greatest width at base of pre-op. spines.....		28		27		27		25
Width of interorbital area.....		5		5		5½		5
Length of snout.....		9		9		8		8
Length of upper jaw.....		20		20		19		18
Length of mandible.....		21		22		21		20
Distance from snout to orbit.....		11		10½		10		9½
Diameter of orbit.....		9		9		8½		9
Dorsal (spinous):								
Distance from snout.....		36		38		37½		34
Length of base.....		27		25		25½		25
Greatest height.....		12		10				12
Length of first spine.....		11		11		9½		10
Length of second spine.....		12½		13		11		11
Length of third spine.....		15		14		12		11
Length of fourth spine.....		15		14		13		12
Length of fifth spine.....		14		13		13		12
Length of sixth spine.....		13		11		12		11½
Length of seventh spine.....		11		9		10		10
Length of eighth spine.....		9		6		8		8
Length of ninth spine.....		6		3		5		5
Length of tenth spine.....		4						3
Length of longest ray.....		21		18		19		17
Length from end of dorsal to origin of middle caudal rays.....		10		10½		8		9
Anal:								
Distance from snout.....		64		65		64		64
Length of base.....		24		22		27		26
Length of first ray.....		10		6		6		7
Length of longest ray.....		16		14		14½		13
Length of last ray.....		9½		8		7		8
Caudal:								
Length of middle rays.....		23		21				22
Length of external rays.....		15		15				
Pectoral:								
Distance from snout (upper axil).....		37		37		36		34
Length.....		32		27		28		26
Ventral:								
Distance from snout.....		34		33		32		31
Length.....		25		19		18		18
Dorsal.....	X, 1, 15		IX, 1, 14		IX, 1, 15		X, 15	
Anal.....	12		12		13		12	
Pectoral.....	16		17		16		Right 16 Left 15	
Ventral.....	I, 3		I, 3		I, 3		I, 3	

19. *Cottus scorpius* L., sub-species *grönlandicus* C. & V.*Cottus grönlandicus* CUV. & VAL., Hist. Nat. Poiss., iv, p. 185: GILL, Cat. Fishes

E. Coast N. A., 1873, p. 22.

Cottus scorpius var. *grönlandica* LÜTKEN, Aftryk af Videnskabelige Meddelelser fra den naturhistoriske Forening Kjöbenhavn, 1876, p. 16.

21728. Godthaab, Greenland, A. L. Kumlien.

21729 Godthaab, Greenland, A. L. Kumlien.

21730. Godthaab, Greenland, A. L. Kumlien.
 21731. Godthaab, Greenland, A. L. Kumlien.
 21740. (151.) ♂. Niantilic Harbor, Cumberland Gulf, A. L. Kumlien.
 21751. (67.) Young. Arctic Id., Cumberland Gulf, A. L. Kumlien.
 16931. Many young. Cumberland Gulf, Lieut. W. A. Mintzer.

I have reached practically the same conclusion concerning the relations of *C. scorpius* and *C. grönlandicus* as Dr. Lütken, Malmgren, and Collett, since it is probable that they use the term "variety" in the same sense in which I use "sub-species." Dr. Lütken, however, supposes the *Cottus variabilis* of Ayres to be a synonym of *C. scorpius* sub-species *grönlandicus*; but it is identical with *Cottus aneus* Mitchill. The *Cottus Mitchilli* of Cuvier and Valenciennes, which was a mere name based on the *Cottus scorpius* of Mitchill, is evidently a synonym of *C. scorpius* sub-species *grönlandicus*; but the name *Cottus Mitchilli*, as used by Dr. DeKay and Professor Gill and understood in the museum catalogues, was associated with the species which should be called *C. aneus* of Mitchill. DeKay's *Cottus aneus* as described and figured is a compound of *aneus* and *octodecimspinosus*. His *C. Mitchilli* is the true *aneus* of Mitchill.

C. aneus Mitchill is the smallest of the marine sculpins of the east coast so far as known, and appears to be the least widely distributed. Its limits may be stated as Long Island on the south and Maine on the north. It has the narrowest interorbital space of our five known species. It is not uncommon to find individuals of 2½ inches in length full of spawn. The base of the anal is almost invariably shorter than that of the first dorsal. It is highly probable that DeKay's figure* of *Cottus aneus* Mitchill was drawn from a specimen of *Cottus octodecimspinosus* Mitchill, the only known Eastern American sculpin with so long a spine on the præoperculum. The number of anal rays (13) in this figure has never been recorded in *Cottus aneus*, but is common in *C. octodecimspinosus*. DeKay's figure of *Cottus Mitchilli* is a fair representation of the *aneus* of Mitchill.

Cottus scorpius sub-species *grönlandicus* has about the same southern limit as *C. aneus*, but it ranges northward to Greenland. It is abundant at Wood's Holl, Massachusetts, in winter. The United States Fish Commission has found it common in summer at different points along the coast between Cape Cod and Halifax, Nova Scotia. At Salem and Gloucester it was caught from the wharves. The stomach of an adult of medium size, taken at Wood's Holl, Mass., by the United States Fish Commission, contained three crabs, *Cancer irroratus*.

* New York Fauna, Fishes, 1842, p. 52, pl. vi, fig. 19.

Cottus octodecimspinosus Mitchill is known from Halifax on the north to Beesley's Point, New Jersey, on the south, where it was collected by Prof. S. F. Baird in 1854. It is considered a shallow-water species; but the United States Fish Commission has a specimen from 68 fathoms in the Gulf of Maine, where the temperature was about 42° Fahr. The greater portion of the examples were from 10 fathoms or less.

Add to these *Cottus scorpioides* of Fabricius, and it will complete the list of Eastern North American species of the genus *Cottus* so far as known.

As already intimated, *Cottus scorpius* sub-species *grönlandicus* is quite readily separated from the typical *C. scorpius* by its wider interorbital distance and its higher spinous dorsal, which differences are best exemplified in the specimens from Greenland, and appear, along with others, in the measurement tables.

Table of Measurements.

Species, *Cottus scorpius* sub-species *grönlandicus*.

Current number of specimen.....	21,731.		21,730.	
	Godthaab, Greenland, Aug. 8, 1878.			
Locality.....	Millime- tres.	100ths of length.	Millime- tres.	100ths of length.
Extreme length.....			226	
Length to origin of middle caudal rays.....	185		186	
Body:				
Greatest height.....		24		23
Greatest width at pectoral base.....		22		23
Height at ventrals.....		24		23
Least height of tail.....		5½		5½
Length of caudal peduncle.....		11		12
Head:				
Greatest length.....		39		38
Distance from snout to nape.....		28		27
Width of interorbital area.....		7½		6
Length of snout.....		9		9
Length of upper jaw.....		19		19
Length of mandible.....		20½		20½
Distance from snout to orbit.....		10		10
Diameter of orbit.....		9		9
Dorsal (spinous):				
Distance from snout.....		35		33
Length of base.....		27		26
Length of first spine.....		16½		15
Length of second spine.....		18		16½
Length of third spine.....				16½
Length of fourth spine.....		18		16½
Length of fifth spine.....		19		15½
Length of sixth spine.....		16½		14½
Length of seventh spine.....		14		13½
Length of eighth spine.....		11		12
Length of ninth spine.....		8		7½
Length of tenth spine.....		5		5
Length of eleventh spine.....				3
Length of longest ray.....		17		19
Length of last ray.....		6½		8
Anal:				
Distance from snout.....		62		62
Length of base.....		25		25
Length of first ray.....		7		7
Length of longest ray.....		14		15
Length of last ray.....		6½		8

Table of Measurements—Continued.

Current number of specimen	21,731.		21,730.	
Locality	Godthaab, Greenland, Aug. 8, 1878.			
	Millime- tres.	100ths of length.	Millime- tres.	100ths of length.
Caudal:				
Length of middle rays				21½
Pectoral:				
Distance from snout (upper axil)		35		34
Length		28		29
Ventral:				
Distance from snout		29½		31
Length		21		24
Branchiostegals	Right VI		VII	
	Left VI		VII	
Dorsal	X, 16		XI, 17	
Anal	14		14	
Pectoral	Right 17		17	
	Left 17		17	
Ventral	I, 3		I, 3	
Current number of specimen	21,729.		21,728.	
Locality	Godthaab, Greenland, Aug. 8, 1878.			
	Millime- tres.	100ths of length.	Millime- tres.	100ths of length.
Extreme length	235		218	
Length to origin of middle caudal rays	195		178	
Body:				
Least height of tail		5½		6
Length of caudal peduncle		10		
Head:				
Width of interorbital area		6		6
Length of snout		9		
Length of upper jaw		19		
Length of mandible		20		
Dorsal (spinous):				
Length of first spine		20		18
Length of second spine		21		19
Length of third spine		21		18½
Length of fourth spine		21		18
Length of fifth spine		21		19
Length of sixth spine		21		18½
Length of seventh spine		19		14
Length of eighth spine		16		14
Length of ninth spine		13		9
Length of tenth spine		10		6
Length of eleventh spine		6		
Length of longest ray		20		20
Anal:				
Distance from snout		62		62
Pectoral:				
Length		31		
Ventral:				
Distance from snout		33		32
Length		25		23
Branchiostegals	Right VI		VI	
	Left VI		VI	
Dorsal	XI, I, 16		X, I, 16	
Anal	14		13	
Pectoral	Right 17		17	
	Left 17		18	
Ventral	I, 3		I, 3	

Table of Measurements—Continued.

Current number of specimen	21,025 a, ♀.		13,879.	
	Halifax, N. S.		Eastport, Me.	
Locality	Millime- tres.	100ths of length.	Millime- tres.	100ths of length.
Extreme length	240	.....	129	.....
Length to origin of middle caudal rays.....	198	.....	106	.....
Body:				
Greatest height		26		25
Greatest width		24		.....
Height at ventrals		26		25
Least height of tail		7		7
Head:				
Greatest length		42		40
Distance from snout to nape		30		28
Width of interorbital area		6½		6
Length of snout		9		9
Length of maxillary		20		18
Length of mandible		22		19
Long diameter of orbit		9		9½
Dorsal (spinous):				
Distance from snout		38		35
Length of base		23		25
Length of first spine		12		12
Length of second spine		13½		13
Length of third spine		14		14
Length of fourth spine		15		14
Length of fifth spine		14		14
Length of sixth spine		12½		13
Length of seventh spine		11		12
Length of eighth spine		8½		10
Length of ninth spine		6		7
Length of tenth spine .....		.....		5
Length of longest ray		18		16½
Length of last ray		8		.....
Anal:				
Distance from snout		64		63
Length of base		30		25
Length of first ray		9		9
Length of longest ray		14½		12½
Length of last ray		8		7
Caudal:				
Length of middle rays		20½		21
Pectoral:				
Distance from snout		37		36
Length		28		27
Ventral:				
Distance from snout		32		30
Length		20		21
Branchiostegals	VI	.....	VI	.....
Dorsal	IX, 18	.....	X, 17	.....
Anal	15	.....	14	.....
Caudal	+, 12, +	.....		.....
Pectoral	17	.....	{Right 18	.....
Ventral	I, 3	.....	{Left 17	.....
			I, 3	.....

20. *Cottus scorpioides* Fabr.

Cottus scorpioides FABR., Faun. Grönl.: LÜTKEN, Aftryk af Videnskabelige Meddelelser fra den naturhistoriske Forening Kjöbenhavn, 1876, p. 12.

21744. 7 specimens. Cumberland Gulf, A. L. Kumlien.

21745. 4 specimens. Lat. 66° 24' N., long. 68° 49' W. A. L. Kumlien.

21750. (670.) Young. Head of Cumberland Gulf. A. L. Kumlien.

22327. (180.) ♀ adult. Cumberland Gulf. A. L. Kumlien.

22330. (151.) Young. Niantilie, Cumberland Gulf. A. L. Kumlien.

22331. Young. Cumberland Gulf. Lieut. W. A. Mintzer.

Mr. Kumlien brought down many examples of a species of *Cottus* which closely resembles *scorpius* and *grönlandicus*, and yet agrees with

neither of them. It is a species characterized by a very short head and short jaws, the head constituting only one-third of the total length without the caudal, and the upper jaw equalling less than one-seventh of the same length. The length of the upper jaw of *C. grönlandicus* equals slightly more than one-sixth of the total length without caudal, and in *C. scorpius* it is contained only $5\frac{1}{3}$ times in the length exclusive of the caudal. The species agrees with Fabricius's description and with Dr. Lütken's diagnosis of *Cottus scorpioides*. For the sake of comparison, I have prepared a table of measurements of the head and jaws of 9 additional specimens of *C. grönlandicus* to follow the measurements of *C. scorpioides*. The unit of length in the tables is the total length to the origin of the middle caudal rays.

Description.—The shape of the body resembles that of *Cottus scorpius* L., but the caudal peduncle is longer and more slender.

The greatest height of the body, which is at the ventrals, equals the distance from the tip of the snout to the nape, and is contained $4\frac{1}{3}$ times in the length without caudal. The caudal peduncle is slender and long; its least height is less than the long diameter of the orbit, and its length to the origin of the middle caudal rays equals the length of the longest anal ray.

The length of the head, measured to the end of the opercular flap, is contained 3 times in the unit of length. The width of the head at the base of the præopercular spines equals the distance from the snout to the nape, and nearly equals the length of the anal base. The long diameter of the eye equals half the length of the upper jaw, and is very little less than the length of the snout. The distance between the eyes equals $\frac{1}{3}$ of the length of the mandible, and is contained 20 times in the unit of length. The length of the snout equals $\frac{1}{2}$ the length of the mandible, and is contained 14 times in the unit of length.

The distance of the spinous dorsal from the snout equals twice the length of the longest ray of the second dorsal and is nearly or quite equal to the length of the head. The first spine is contained 11 times, the second $9\frac{1}{2}$ times, and the third, fourth, and fifth 9 times in the unit of length. From this point the spines diminish gradually in length to the last, which is $\frac{1}{3}$ as long as the first. The longest ray of the second dorsal is contained $6\frac{1}{4}$ times in the unit of length.

The distance of the anal from the snout equals twice the length of the pectoral. The anus is directly under the origin of the second dorsal.

The length of the anal base is about equal to the distance from the

snout to the nape. The first and last rays are usually equal in length, and equal the length of the snout. The longest anal ray equals in length the caudal peduncle.

The length of the middle caudal rays is contained from 5 to 6 times in the unit of length.

The distance of the pectoral from the snout is contained $3\frac{1}{3}$ times, and its length $3\frac{1}{3}$ to 4 times in the unit of length.

The distance of the ventral from the snout equals twice the length of the upper jaw. The length of the ventral in females is contained 5 times (in one nearly 6 times) in the unit of length; in males, about $4\frac{1}{3}$ times.

Radial formula.—B. VI; D. IX–X, 15–16; A. 11–13; P. 15–16; V. I, 3.

Dr. Lütken is of the opinion that "*Cottus pachypus* Günther (from Port Leopold) is the genuine *C. scorpioides*," in which opinion I fully coincide after a comparison of Mr. Kumlien's specimens with Fabricius's description of *C. scorpioides* and the description of *C. pachypus*.

Cottus scorpioides appears in Professor Gill's List of East Coast Fishes with a doubt as to its reference to the genus *Cottus*, to which genus, however, it was properly referred by Fabricius.

Table of Measurements.

Species, *Cottus scorpioides* Fabr.

Current number of specimen	21,745 a.	21,745 b, ♂.	21,745 c, ♀.			
Locality	Lat. 66° 24' N. Long. 68° 49' W.					
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length	101					
Length to origin of middle caudal rays	83		115		115	
Body:						
Greatest height		22				
Height at ventrals		22				
Least height of tail		6		6		
Length of caudal peduncle				13		13
Head:						
Greatest length		33		33		32
Distance from snout to nape		23				24
Greatest width		23				
Width of interorbital area		5				5
Length of snout		7		8		8
Length of maxillary		13		14		13
Length of mandible		16		16		15½
Diameter of orbit		8		7		7½
Dorsal (spinous):						
Distance from snout		32		33		23
Length of base		21				
Length of first spine		8				
Length of second spine		9				
Length of third spine		10				
Length of fourth spine		10				
Length of fifth spine		10				
Length of sixth spine		10				
Length of seventh spine		9				
Length of eighth spine		7				
Length of ninth spine		5				
Length of longest ray		16				

Table of Measurements—Continued.

Species, *Cottus scorpioides* Fabr.

Current number of specimen	21,745 a.	21,745 b, ♂.	21,745 g, ♀.			
Locality	Lat. 60° 24' N. Long. 68° 49' W.					
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Anal:						
Distance from snout		60		60		61
Length of base		24				
Length of first ray		8				
Length of longest ray		13				
Length of last ray		8				
Caudal:						
Length of middle rays		21				
Pectoral:						
Distance from snout		31		30		
Length		29		30		
Ventral:						
Distance from snout		29		29		26
Length		21		23		17
Branchiostegals	VI					
Dorsal	IX, 16		X, 16		IX, 16	
Anal	13		12		12	
Pectoral	15		16		16	
Ventral	I, 3		I, 3		I, 3	

Current number of specimen	21,745 d, ♀.		22,327, ♀.		Aver- ages.
Locality	Lat. 60° 24' N. Lon. 68° 49' W.		Cumberland Gulf.		
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	100ths of length.
Extreme length				223	
Length to origin of middle caudal rays	102		100		
Body:					
Greatest height				23	23
Greatest width				22	
Height at ventrals				23	23
Least height of tail		6		5½	6
Length of caudal peduncle		14			13
Head:					
Greatest length		33		32	33
Distance from snout to nape		23		23½	23
Greatest width				22	23
Width of interorbital area		5		5½	5
Length of snout		7		7½	7½
Length of maxillary		14		14	13½
Length of mandible		15		15	15½
Distance from snout to orbit				8	
Diameter of orbit		7		7	7
Dorsal (spinous):					
Distance from snout		31		30	32
Length of base				27	9
Length of first spine				10	9
Length of second spine				11	10½
Length of third spine				11½	11
Length of fourth spine				11½	11
Length of fifth spine				11½	11
Length of sixth spine				10½	10
Length of seventh spine				9	9
Length of eighth spine				7	7
Length of ninth spine				5	5
Length of tenth spine				3	3
Length of longest ray				16	16
Length of last ray				6½	
Anal:					
Distance from snout		61		61	61
Length of base				23	23½
Length of first ray				7½	7½

Table of Measurements—Continued.

Species, *Cottus scorpiodes* Fabr.

Current number of specimen	21,745 d, ♀.		22,327, ♀.		Averages.
Locality	{ Lat. 66° 24' N. Lon. 68° 49' W.		Cumberland Gulf.		
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	100ths of length.
Anal:					
Length of longest ray				12½	13
Length of last ray				7	7½
Caudal:					
Length of middle rays				17	19
Pectoral:					
Distance from snout		30		30	30
Length		27		25	28
Ventral:					
Distance from snout		29		29	28
Length		20		18	20
Branchiostegals					
Dorsal	IX, 15		VI		
Anal	11		X, 16		
Pectoral	16		16		
Ventral	I, 3		I, 3		

Species, *Cottus scorpius* sub-species *grönlandicus*.

Current number of specimen	22,272 a.		22,272 b.		22,272 c.	
Locality	Bucksport, Me.		Bucksport, Me.		Bucksport, Me.	
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length without caudal	71		75		72	
Length to end of middle caudal rays	87		91		88	
Head:						
Greatest length		40		39		39
Length of upper jaw		18		17½		18
Length of mandible		21		19		19½
Current number of specimen	22,272 d.		22,272 e.		22,272 f.	
Locality	Bucksport, Me.		Bucksport, Me.		Bucksport, Me.	
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length without caudal	63		64		66	
Length to end of middle caudal rays	76		79		80	
Head:						
Greatest length		40		39		39
Length of upper jaw		17		17		17
Length of mandible		20		20		19
Current number of specimen	22,272 g.		22,272 h.		22,272 i.	
Locality	Bucksport, Me.		Bucksport, Me.		Bucksport, Me.	
	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.	Milli- metres.	100ths of length.
Extreme length without caudal	58		51		57	
Length to end of middle caudal rays	71		63		70	
Head:						
Greatest length		40		40		39
Length of upper jaw		17		18		17½
Length of mandible		19		21		19

21. *Cottus quadricornis* Linn.

Cottus quadricornis RICH., Last Arc. Voy., 1855, pp. 348-9: GÜNTHER, P. Z. S., 1877, p. 293.

Richardson records the species from the Coppermine River region and Coronation Gulf (68° 30' N., 110° W.).—*Günther*.

22. *Cottus polaris* Sabine.

Cottus polaris RICH., Last Arc. Voy., 1855, p. 351.

Richardson refers to this species as occurring at North Georgia, lat. 75° N., and at the Peninsula of Boothia. The radial formula appears to me more like that of a *Centridermichthys* than anything else, but the genus to which it properly belongs is uncertain.

23. *Gymnacanthus pistilliger* (Pall.) Gill, MS.

Cottus ventralis CUV. & VAL., Hist. Nat. Poiss., iv, p. 194: COLLETT, Christiania Vid. Selsk. Forh. 1878, No. 14, (p. 15).

21732. (1373.) Godthaab, Disko Id., Greenland, A. L. Kumlien. D. XII, I, 16. A. 18. V. 3. Ventrals nearly reach vent.

21733. (1374.) Godthaab, A. L. Kumlien. D. XII, 15. A. 19. V. 3. Ventrals reach fifth ray of anal.

21734. Godthaab. A. L. Kumlien. D. XI, 16. A. 18. V. 3. Ventrals extend little more than half way to vent.

21735. Godthaab. A. L. Kumlien. D. XI, 17. A. 18. V. 3. Ventrals reach third ray of anal.

21736. Godthaab. A. L. Kumlien. D. XII, 17. A. 19. V. 3. Ventrals nearly reach vent.

21737. Godthaab. A. L. Kumlien. D. XII, I, 15. A. 18. V. 3. Ventrals reach fourth ray of anal.

21741. (151.) Niantilie Harbor, Cumberland Gulf, A. L. Kumlien.

21743. (180.) Niantilie Harbor, A. L. Kumlien.

22332. Niantilie Harbor, Aug. 1876, Lieut. W. A. Mintzer.

17431. Christiania, Norway, M. G. Hetting, inspector of fisheries. D. XII, 14. A. 16. V. 3. Ventrals reach fourth ray of anal.

Dr. Lütken rejects the name *Gymnocanthus*, Swainson, because the genus was badly defined. There can be no difference of opinion as to the fact that the genus was poorly characterized; but there is an attempt at definition and a reference to a figure of the type-species, so that one need not hesitate as to what is intended. If we begin to reject names of genera because they are not accompanied by complete descriptions, we may find it difficult to draw the line between what we shall accept and what we shall reject. In retaining Swainson's name it may not

be amiss to reproduce his description.* Concerning the specific name *pistilliger*, Dr. Lütken says:† “Influenced by Steindachner’s notice (Wien. Sitzungsab. 1876) on *C. pistilliger*, Pallas, I have sought information concerning this species in the Berlin Museum; the type is only a bad half skin preserved in spirits; Prof. Peters has been so obliging as to send it to me for investigation, and I have thereby been able to convince myself that the ‘pistils’ which Pallas describes as soft threads with spongy heads are in reality only the half cruciform, spiny scales which distinguish a certain part of the side of the body in *C. tricuspis*. Since the name ‘*pistilliger*’ is thus founded on a misapprehension, its reputed priority (1811) cannot require that it be given the preference over the next in the series, and we should therefore fix upon the name *Phobeter ventralis*, Cuv. & Val.” If we were to throw out all names which are based upon a misapprehension it would involve us in a great deal of unnecessary confusion, and it would be difficult to decide how far the elimination should proceed. The fact that Dr. Lütken could recognize the peculiarity in which the specific name originated is a sort of apology for its adoption by Pallas.

24. *Icelus hamatus* Kröyer.

Icelus hamatus GÜNTL., P. Z. S., 1877, pp. 293, 476.

This species was collected in Discovery Bay, Franklin Pierce Bay, and at Cape Napoleon, in the month of August, by Captain Feilden, and in Franklin Pierce Bay, August 11, 1875, by Mr. C. Hart.

25. *Triglops pingelii* Reinh.

Triglops pingelii GÜNTL., P. Z. S., 1877, p. 476.

Taken in Franklin Pierce Bay, August 11, 1875, by Mr. C. Hart, naturalist on board H. M. S. “Discovery.”

The United States Fish Commission has many specimens in its collections of 1877 and 1878.

* Nat. Hist. Fishes, Amphibians, & Reptiles, II, London, 1839, pp. 181 & 271.

p. 181. GYMNOCANTHUS. Nape of the head contracted; eyes with bony orbits.

p. 271. GYMNOCANTHUS Sw. Resembling in general aspect the last, (*Cottus clariger*, C. & V.), but there are no upper orbits; spines of the head few and naked; ventral fins very long, and of 3 rays; dorsals distinct; the rays of the first naked on their terminal half (?); caudal fin truncate.

G. ventralis, C. & V. iv, pl. 79, fig. 1.

† Aftryk af Videnskabelige Meddelelser fra den naturhistoriske Forening Kjøbenhavn, 1876, p. 10.

Family, GASTEROSTEIDÆ.

26. *Gasterosteus insculptus* Rich.

Gasterosteus insculptus RICH., Last Arc. Voy., 1855, p. 356, pl. xxv.

The types were from Northumberland Sound, lat. $76^{\circ} 53' N$.

27. *Gasterosteus pungitius* Linn., sub-species *brachypoda* Bean.

In small streams on the sides of Oosoadlin Mountain, and in a little pond on the top, 1,500 feet above tide-level, Mr. Kumlien collected numerous examples of a many-spined stickleback, which resembles *Gasterosteus pungitius* Linn., in most particulars, but may be readily distinguished from it by its *very short ventral spines*. The tables of measurements and radial formulæ appended will show other differences, which are, however, not so important.

Description.—The greatest height of body is contained $5\frac{3}{4}$ times in its length to origin of middle caudal rays (in gravid females, $4\frac{1}{2}$ times); the greatest width, 10 times (in gravid females, 8 times). The height at ventrals is contained $5\frac{2}{3}$ times in length of body (in gravid females, 5 times or slightly less). The least height of tail equals half the length of the first dorsal spine. The length of caudal peduncle is $\frac{1}{4}$ of length of body.

The length of head equals 4 times the length of upper jaw, and is from $\frac{1}{4}$ to $\frac{7}{10}$ of length of body. The greatest width of head nearly equals length of middle caudal rays. The distance between the eyes equals the length of snout, which equals the length of antecedent spine of soft dorsal. The length of the operculum equals the length of ventral spine, which is slightly less than a third of length of head. The length of mandible equals the long diameter of the orbit.

The distance of the spinous dorsal from the snout is from $\frac{1}{4}$ to $\frac{2}{10}$ of length of body, and is almost uniformly less than its length of base. The first and second spines of the dorsal are equal in length, and are about $\frac{2}{3}$ as long as the ventral spine. The last spine of the dorsal is slightly less than the first. The antecedent spine of the second dorsal is somewhat longer than the first of the spinous dorsal, and half as long as the first ray following it. The first ray of the soft dorsal is contained $8\frac{1}{2}$ times in length of body, and is three times as long as the last ray.

The distance of the anal from the tip of snout equals $\frac{2}{3}$ of length of body; its length of base is twice the length of its first and longest ray, and slightly less than $\frac{1}{4}$ of length of body. The anal spine is half as long as the first anal ray (in young individuals, $\frac{2}{3}$).

The length of the middle caudal rays is contained $8\frac{1}{2}$ times in length of body; the length of external rays, $7\frac{1}{2}$ times.

The distance of the pectoral from the tip of snout is contained $3\frac{1}{2}$ times

in the total, and about equals twice its own length. When expanded, the pectoral extends usually to the 7th dorsal spine (6th to 8th).

The distance of the ventral from the tip of snout slightly exceeds $\frac{7}{10}$ of length of body. The length of the ventral spine is always a little less than $\frac{1}{3}$ of the length of the head.

Radial formula.—D. IX–XI, I, 10–11; A. I, 9–11; C. +, 12, +; P. 10; V. I, 1.

Color.—General color dull silvery, minutely punctulated with black; upper half of body with large irregular areas of black; chin, throat, and abdomen black in males, silvery in the females studied. Nilsson records a similar condition in *G. pungitius*.*

The relations of *Gasterosteus pungitius* var. *brachypoda* to the *pungitius* (= *Pygosteus occidentalis* (C. & V.) Brevoort) of New England are shown in the table of comparative measurements which follows. I do not use the name *Pygosteus occidentalis*, for the reason that our many-spined stickleback bearing that name shows no characters by which it may be separated from the *Gasterosteus pungitius* of Linné as a species, and the genus *Pygosteus* has nothing to exclude it from *Gasterosteus*. The genus *Pygosteus*, although credited to Brevoort, was not defined by him; it appears in Gill's Catalogue† as a name only. The first to indicate characters by which it was thought the genus could be distinguished was Jordan; they are stated to be the following: "Dorsal spines 7 or more; sides mailed or not."‡ So far as the squamation is concerned, the collections of the United States National Museum show all sorts of individual variation, and justify the ground taken by Günther in his arrangement of the varieties of *G. aculeatus*; certainly, the squamation is not even of specific importance. The number of dorsal spines in the specimens of *G. pungitius* studied ranges from 7 to 11. In *Gasterosteus inconstans*,§ Kirtland, the range is from 3 to 6. I have seen a fresh-

* "*Variat abdomine nigro.*"—Prod. Ichth. Scand., 1832, p. 86.

† Catalogue of the Fishes of the Eastern Coast of North America from Greenland to Georgia, by Theodore Gill, Jan. 1861, p. 39.

‡ Manual of the Vertebrates of the Northern United States, 1876, p. 248.

§ *Eucalia inconstans*, Jordan, Manual of Vertebrates, 1876; Proc. Acad. Nat. Sci. Phila., 1877, p. 65. The generic characters ascribed to *Eucalia* are: (1) "Dorsal spines in a right line," which is also true in *Gasterosteus aculeatus*, L.; even in the many-spined stickleback, *G. pungitius*, I have frequently seen the last four or five spines in a right line, while the anterior ones preserved their zigzag arrangement; (2) "Ventral plates coalesced into a narrow plate on the median line between the ventral fins," just as in *G. aculeatus* and *G. pungitius*; (3) "A distinct sub-quadrate post-pectoral plate," which is present in most sticklebacks; the "associated characters" indicated contain nothing generically distinctive.

water stickleback from Maine,* which resembles *G. pungitius* in many respects, but has only 2 dorsal spines. The number of dorsal spines would seem, therefore, to be certainly of not more than specific value.

Gasterosteus nebulosus seems to me to be separated from *G. pungitius* by no constant character, but only by its habitat. *Gasterosteus mainensis* is identical with *G. pungitius*.

Apeltes (DeKay) Jordan is well separated from *Gasterosteus* by the structure of its pubic bones.

The United States National Museum has received from the Musée d'Histoire Naturelle, of Paris, one of the types of *Gasterosteus blanchardi* Sauvage, described from specimens sent from Boston, United States. This species is our common many-spined stickleback, *G. pungitius*, as will appear from the table of measurements, and the name must be regarded as a synonym of the latter. It is worthy of remark in passing that the shape of the post-pectoral plate in species of *Gasterosteus*, which has been employed as an important diagnostic character, is so variable, even on the two sides of the same fish, that it is not to be depended upon.

The sticklebacks of eastern North America, so far as observed by me, may all be referred to the genera *Apeltes* and *Gasterosteus*.

The basis of the foregoing description of the stickleback collected by Mr. Kumlien is the table of measurements which follows. Only 8 examples were measured, but these show the extremes of variation in the numerous specimens secured. In none of the individuals does the length of the ventral spine exceed one-third of the length of the head.

Mr. Kumlien has sent me the following notes on the species: "The *Gasterosteus* was taken from a pond more than a thousand feet above the sea on the mountain side. Said ponds were not over 18 inches deep, and of course freeze solid in winter. In fact, there was but very little water at the time I procured the fish. It is impossible that they could have come up from below, as the pond empties by a series of perpendicular falls, some of them 30 feet or more. In my note-book I find that they were light greenish above, barred with dusky brown and black; beneath white, irregularly blotched with black. Caudal pinkish. Male (?) with a crimson spot at base of pectoral fin."

* *Gasterosteus Atkinsii* Bean, Proc. U. S. Nat. Mus. ii, p. —.

Table of Comparative Measurements.

	<i>Gasterosteus pungitius</i> * Linn. (averages of 7 examples).	<i>G. pungitius</i> var. <i>brachypoda</i> Bean (averages of 8 examples).
	1000ths of length.	1000ths of length.
Body:		
Greatest height .....	.170	.187
Greatest width .....	.100	.107
Height at ventrals .....	.170	.177
Least height of tail .....	.036	.032
Length of caudal peduncle .....	.150	.140
Head:		
Greatest length .....	.265	.265
Greatest width .....	.110	.113
Width of interorbital area .....	.062	.060
Length of snout .....	.062	.060
Length of operculum .....	.084	.080
Length of upper jaw .....	.070	.066
Length of mandible .....	.080	.076
Long diameter of eye .....	.082	.073
Dorsal (spinous):		
Distance from snout .....	.286	.276
Length of base .....	.276	.310
Length of first spine .....	.066	.057
Length of second spine .....	.066	.058
Length of last spine .....	.050	.050
Dorsal (soft):		
Length of base .....	.245	.250
Length of antecedent spine .....	.080	.060
Length of first ray .....	.140	.120
Length of longest ray .....	.140	.120
Length of last ray .....		.040
Anal:		
Distance from snout .....	.570	.600
Length of base .....	.220	.235
Length of first spine .....	.086	.064
Length of first ray .....	.130	.120
Length of longest ray .....	.130	.120
Caudal:		
Length of middle rays .....	.110	.117
Length of external rays .....	.137	.134
Pectoral:		
Distance from snout .....	.300	.300
Length .....	.160	.160
Ventral:		
Distance from snout .....	.370	.357
Length .....	.121	.083

* = *Pygosteus occidentalis* (C. & V.) Brevoort, from which the averages were taken.

Table of Measurements.

Genus, *Gasterosteus*.

	' <i>Pungitius</i> L., 22,015 a.	<i>Pungitius</i> L., 22,015 b.	<i>Blanchardi</i> Sauvage (type) (39) 21,139.
	Christiania, Norway, R. Col- lett.		Boston, U.S.
	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.
Extreme length to origin of middle caudal rays ..	33	29	46
Length to end of external caudal rays	38	34	52
Body:			
Greatest height .....	.18	.18	.16
Greatest width .....	.10	.10	.09
Height at ventrals .....	.18	.18	.16
Least height of tail .....	.04	.04	.04
Length of caudal peduncle .....	.13	.13	.135

Table of Measurements—Continued.

Genus, *Gasterosteus*.

Current number of specimen.....	{ <i>Pungitius</i>		<i>Blanchardi</i> Sauvage (type) (39) 21,139.
	L., 22,015 a.	L., 22,015 b.	
Locality.....	{ Christiania, Norway, R. Collett.		Boston, U. S.
	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.
Head:			
Greatest length .....	.28	.30	.28
Greatest width .....	.12	.13	.12
Width of interorbital area .....	.06	.06	.06
Length of snout .....	.06	.06	.06
Length of operculum .....	.10	.09	.08
Length of maxillary .....	.07	.07	.07
Length of mandible .....	.08	.08	.08
Diameter of orbit .....	.08	.08	.08
Dorsal (spinous):			
Distance from snout.....	.29	.30	.27
Length of base .....	.28	.30	.28
Length of first spine .....	.065	.07	.06
Length of second spine.....	.07	.07	.065
Length of last spine.....	.055	.055	.055
Dorsal (soft):			
Length of base .....	.26	.24	.26
Length of antecedent spine.....	.08	.08	.07
Length of first ray .....	.14	.15	.13
Length of longest ray .....	.14	.15	.13
Length of last ray .....	.04	.....	.04
Anal:			
Distance from snout.....	.59	.60	.56
Length of base .....	.24	.23	.23
Length of first spine .....	.09	.09	.08
Length of first ray .....	.14	.15	.13
Length of longest ray .....	.14	.15	.13
Length of last ray .....	.04	.....	.045
Caudal:			
Length of middle rays.....	.13	.13	.12
Length of external rays .....	.14	.15	.14
Pectoral:			
Distance from snout.....	.30	.32	.30
Length .....	.16	.17	.16
Ventral:			
Distance from snout.....	.37	.39	.36
Length .....	.13	.13	.12
Dorsal	X, I, 12	IX, I, 10	IX, I, 11
Anal	I, 10	I, 9	I, 10
Caudal	IV, 12, IV	+, 12, +	V, 12, IV
Pectoral	9	10	10
Ventral	I, 1	I, 1	I, 1

Family, MICROSTOMIDÆ.

28. *Mallotus villosus* (Müll.) Cuv.*Mallotus villosus* RICH., F. B. A., iii, 1836, p. 187.

Signalized from Bathurst's Inlet. Mr. Kumlien mentions "small herring-like fish that enter the sound in great numbers in early spring, but soon leave. They are called 'ice-fish' by the whalers." I suppose they belong to the species named above.

Family, SALMONIDÆ.

29. *Salmo salar* (Linn.) Günther.*Salmo salar* KUMLIEN, in lit.

Mr. Kumlien writes me that this salmon was obtained in quantities in the Cumberland waters, and that he recognized at least two species of

Salmo, but could not secure specimens that were not split or otherwise mutilated.

Salvelinus Naresi occurs there, as will be seen in the present paper.

30. *Salmo Hearnii* Rich.

Salmo Hearnii RICH., F. B. A., iii, 1836, p. 167.

The species was described from the Coppermine River, lat. $67^{\circ} 42\frac{1}{2}'$ N.

31. *Salvelinus alipes* (Rich.) Gill & Jordan.

Salmo alipes RICH., F. B. A., iii, 1836, p. 169: GÜNTHER, P. Z. S., 1877, p. 476.

Boothia Felix (Rich.); Discovery Bay (Günth.).

32. *Salvelinus nitidus* (Rich.) Gill & Jordan.

Salmo nitidus RICH., F. B. A., iii, 1836, p. 171.

The species was described from Boothia.

33. *Salvelinus Hoodii* (Rich.) Gill & Jordan.

Salmo Hoodii RICH., F. B. A., iii, 1836, p. 173.

Richardson described it from Boothia Felix.

34. *Salvelinus arcturus* (Günth.) Gill & Jordan.

Salmo arcturus GÜNTHER, P. Z. S., 1877, p. 294, pl. xxxii.

Dr. Günther established the species upon specimens obtained in lat. $82^{\circ} 28'$ N. and $82^{\circ} 34'$ N.

35. *Salvelinus Naresi* (Günther) Bean.

Salmo Naresi GÜNTHER, Proc. Zoöl. Soc. Lond., iii, 1877, p. 476, pl. L.

22000 ♀. Cumberland Gulf, Aug. 1876. Lieut. W. A. Mintzer.

22000 a. ♀. Cumberland Gulf, Aug. 1876. Lieut. W. A. Mintzer.

22000 b. ♂. Cumberland Gulf, Aug. 1876. Lieut. W. A. Mintzer.

Of this small charr, Lieutenant Mintzer secured the above-named specimens, and labelled them "Salmon Trout." The larger of the two females contains well-developed ova, some of which are free in the cavity of the abdomen. The species agrees very closely with Dr. Günther's description of *S. Naresi*. The description and table of measurements which follow will afford a means of estimating the correctness of an identification which records the species about 20 degrees south of the locality from which it was originally described.

Description.—The greatest height of the body is contained 5 times in the total length without caudal, and equals twice the length of the upper jaw. The height at the ventrals equals the distance from the tip of the snout to the nape. The least height of the caudal peduncle equals the length of the middle caudal rays.

The greatest length of the head is contained $4\frac{1}{3}$ times in total length without caudal, and about equals twice the length of the base of the first

dorsal fin. The greatest width of the head is a little less than half its length. The distance between the eyes equals their long diameter and half the length of the mandible. The length of the snout equals half the length of the middle caudal rays. The length of the operculum equals the distance between the eyes. The length of the upper jaw is contained from 10 to 11 times in total length without caudal, and the length of the mandible $7\frac{3}{4}$ times. The distance from the snout to the orbit is $\frac{1}{4}$ or nearly $\frac{1}{4}$ of the distance from the same point to the base of the pectoral. The long diameter of the eye equals $\frac{1}{3}$ of the greatest height of the body. The teeth are arranged just as in the specimens examined and described by Dr. Günther.

The distance of the first dorsal from the tip of the snout equals $\frac{2}{5}$ of the distance of the anal from the same point, and is contained $2\frac{2}{5}$ times in total length without caudal. The length of the base of the first dorsal is contained $8\frac{1}{2}$ to 9 times in total length without caudal, and of its longest ray, 7 times.

The adipose dorsal is placed at a distance from the tip of the snout, equal to $\frac{1}{6}$ of the total length, exclusive of the caudal. Its height about equals the distance from the snout to the orbit.

The distance of the anal from the snout equals $\frac{3}{4}$ of the total length as before measured. The length of the anal base equals half the length of the head in the larger female, and $\frac{1}{10}$ of total length in the smaller. The longest ray of the anal equals twice the distance between the eyes, and the last ray equals half the length of the base of the first dorsal.

The length of the middle caudal rays is contained $2\frac{1}{3}$ times in the length of the external rays and $12\frac{1}{2}$ times in total length.

The distance from the tip of the snout to the base of the pectoral equals twice the greatest width of the head. The length of the pectoral equals the distance from the snout to the nape. The fin when extended falls short of the vertical through the origin of the first dorsal by about one-third of its own length.

The distance of the ventral from the tip of the snout equals 3 times the length of the pectoral. The length of the ventral equals $\frac{1}{3}$ of total length. The ventral terminates at a distance from the vent equal to the least height of the caudal peduncle.

Radial formula.—B. 10? to 11?; D. 13; A. 11; P. 15 to 16; V. I, 9.

Cæca pylorica.—In the larger female, 28.

The coloration cannot be made out accurately. There are a few small spots on the side of the body, which now appear white. Parr marks are

present in all the examples, and yet there is excellent reason for believing the largest specimen at least mature.

In the measurements the unit of comparison is the length to the origin of the middle caudal rays. The figure of *S. Naresi* is employed, and the agreement between that and the Cumberland Gulf specimens is striking.

Table of Measurements.

Current number of specimen.....	22,000, ♀.		22,000 a, ♀.		22,000 b, ♂.		} Fig. of <i>S. Naresi</i> in P. Z. S., iii, 1877, pl. L.	
	Cumberland Gulf.		Cumberland Gulf.		Cumberland Gulf.			
Locality	Cumberland Gulf.		Cumberland Gulf.		Cumberland Gulf.			
	Milli-metres.	100ths of length.	Milli-metres.	100ths of length.	Milli-metres.	100ths of length.	Milli-metres.	100ths of length.
Extreme length.....	139	.....	121	.....	88	.....	197	.....
Length to origin of middle caudal rays	120	.....	103	.....	74	.....	172	.....
Body:								
Greatest height.....		20		19		19		19½
Greatest width.....		12		10		10		10
Height at ventrals.....		17		15		16		18
Least height of tail.....		8		8		8		8½
Head:								
Greatest length.....		23		23		26		22
Distance from snout to nape.....		17		17		19		.....
Greatest width.....		11		10½		11		.....
Width of interorbital area.....		6½		6½		.....		.....
Length of snout.....		4		5		5		5
Length of operculum.....		6½		7		7		6
Length of upper jaw.....		10		9		10½		10
Length of mandible.....		13		13		14		.....
Distance from snout to orbit.....		5		5½		.....		.....
Long diameter of eye.....		6½		6		8		5½
Dorsal (first):								
Distance from snout.....		45		46		47		46
Length of base.....		12		11		12		12
Length of longest ray.....		14		14		16		12
Dorsal (adipose):								
Distance from snout.....		79		80		80		80
Length of base.....		3		.....		.....		4½
Height.....		5		.....		.....		.....
Anal:								
Distance from snout.....		75		75		78		75
Length of base.....		12		10		11		10
Length of longest ray.....		13		13		13		12
Length of last ray.....		5½		6		6		5
Caudal:								
Length of middle rays.....		8		8		.....		8½
Length of external rays.....		17		17		19		18
Pectoral:								
Distance from snout.....		22		22		23		22
Length.....		18		17		20		18
Ventral:								
Distance from snout.....		53		54		55		54
Length.....		12½		13		14		12½
Vent from tip of ventrals.....		8		7½		.....		.....
Branchiostegals.....	11½	.....	10½	.....	.....	.....	11	.....
Dorsal.....	13	.....	13	.....	13	.....	13	.....
Anal.....	11	.....	11	.....	11	.....	11	.....
Pectoral.....	16	.....	15	.....	14	.....	.....	.....
Ventral.....	I, 9	.....	I, 9	.....	I, 9	.....	I, 9	.....
Number of caecal appendages.....	28	.....	.....	.....	27	.....	42	.....

Family, CLUPEIDÆ.

36. *Clupea harengus* Linn.

Clupea harengus RICH., F. B. A., iii, 1836, p. 231.

Richardson mentions the occurrence of the herring at Bathurst's Inlet, 67° N., 109° W.

Family, SACCOPHARYNGIDÆ.

37. *Saccopharynx flagellum* Mitch.

Ophiognathus ampullaceus HARWOOD, Phil. Trans., 1827, p. 49, pl. 7 (*vide* Rich.).

Saccopharynx ampullaceus RICH., F. B. A., iii, 1836, p. 271.

“The individual described by Dr. Harwood, measuring four feet and a half in length, was captured in the entrance of Davis Strait, by Captain Sawyer, of the ship *Harmony*.”—RICH., *l. c.*

U. S. NATIONAL MUSEUM, *April 3, 1879.*

SUPPLEMENTARY NOTE.—The description of a species of *Cottus* from the United States by Sauvage* has just come to my notice. The subject of the description and figure is undoubtedly the *Cottus æneus* of Mitchill.

MAY 23, 1879.

* *Cottus (Acanthocottus) anceps* SAUVAGE, Nouv. Archiv. du Muséum d'Histoire Naturelle, Paris, Deuxième Série, Tome Premier, 1878, p. 145, pl. i, fig. xiii.